Harnessing gamification by using progress tracking as a motivational tool in Kunne Exphil: A user-centered iterative design process

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Abstract

This thesis explores the students' issues with demotivation and analyzes how to design a motivational learning experience using gamification, specifically through progress tracking, based on Yu-Kai Chou's Octalysis Framework for Gamification. While previous research has primarily concentrated on the implementation of gamification through leaderboards and points in education, this thesis seeks to explore the ways we can improve the user experience by harnessing the core drivers of gamification in user-centered design, using progress tracking as a key motivational tool.

In collaboration with Universitetsforlaget, we aimed to enhance user experience on their digital learning platform, Kunne, by making it more comprehensible and motivating for students to use. Our user research identified demotivation as a significant challenge, with students losing motivation as the semester progressed due to a lacking sense of clear progression and achievement.

The prototype "Veien til å Kunne Exphil" integrates gamification elements to guide students through the curriculum, aiming to create a sense of mastery and accomplishment.

This thesis shows how the prototype Kunne Exphil leverages the core drivers of gamification to a high degree, but subtly and effectively, mindful of potential pitfalls and superficial applications. The findings indicate that by focusing on core motivational drivers and integrating them into progress tracking elements, Kunne Exphil can offer the users a more meaningful and motivating learning experience.

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1. Introduction

Prior to initiating this project, my interest for gamification was sparked by a personal experience during winter when my fellow student and I struggled to get up in the cold mornings. Frustrated by our lack of discipline, we decided to implement "Accountable Mondays." The rule was simple: if anyone failed to meet at the library before eight o'clock, they owed the other a chocolate bar. After a few weeks, we decided to up our game, turning Accountable Monday into Accountable Every Day. To keep track, we wrote our names on a whiteboard, adding a mark for each day we arrived before eight.

The whiteboard quickly gained traction, attracting other students who needed extra motivation. Within a week, our peers were sprinting from their homes to avoid missing their mark on the board. Some stood at the door to ensure competitors arrived on time, while others sacrificed sleep to secure their point on the leaderboard. What started as a simple accountability exercise evolved into a fierce, motivating competition. Without knowing it, we had applied gamification principles to our accountability exercise. This experience highlighted the strong impact of tracking progress on user motivation.

In 2022, we partnered with Universitetsforlaget in Oslo to further develop their new digital learning platform, Kunne. The challenge and aim for the collaboration was to make the Exphil curriculum comprehensible and engaging, thereby creating a motivating learning experience for students.

Our user research revealed that demotivation is a primary issue for students. Their initial motivation decreased as the semester progressed, making the learning experience a struggle. The lack of a clear sense of progression and achievement makes the curriculum seem insurmountable, leading to demotivation and frustration.

We address this challenge with our prototype, "Veien til å Kunne Exphil," which guides students' progress toward their goals, providing a sense of mastery and achievement along the way. I will in this thesis address how we have designed for a motivating learning experience. The research question for this thesis is therefore:

To what extent can gamification through progress tracking be used as a motivational tool in Kunne Exphil?

This thesis will explore the user needs to increase motivation and analyze how we can design for motivation using the core drivers of the Octalysis Framework for Gamification by Yu-Kai Chou (2015). It will present the project's background, relevant theories and definitions, and the methods used in the user-centered design process of our prototype, Kunne Exphil. Finally, it will outline possibilities for further development, before summarizing and concluding the thesis.

1.1 The structure of the thesis

Chapter 2 will present the background for the practical component of this project. In this chapter, a presentation of our collaborator for this project, Universitetsforlaget i Oslo and the digital learning platform Kunne, followed by a brief introduction to the university course Exphil Philisophicum and the challenge it poses, and lastly the user group in which we have designed our prototype for.

Chapter 3 lays out the theory and definitions used in this thesis. This includes the overarching concepts of interaction design, user experience design, and user-centered design. I will then present definitions on progress tracking, and the psychological mechanisms behind human motivation before providing definitions on gamification, critical perspectives on gamification, and the application of gamification in learning contexts. I will then present the Octalysis Framework for Gamification by Yu-Kai Chou (2015) and its eight core drivers of motivation.

Chapter 4 presents the methodological approach for this project, which is a user-centered iterative design process. The chapter will reflect the two main iterations and the methods used in each. The first iteration includes the student involvement with the MIX100 students, the focus groups, and evaluations. The second iteration includes semi-structured interviews, prototyping, and user testing. I will then present the method of thematic analysis of data used in this thesis, and lastly briefly present our reasoning behind the research composition.

Chapter 5 provides an analysis of this thesis research question, where the core progress trackers of Kunne Exphil are presented, in addition to the five modes for learning. This includes user needs and our solution to address them, with an analysis

that explores to which degree the gamification of progress tracking across the platform creates a motivating learning experience.

Chapter 6 presents the limitations, and potential future work before summarizing and concluding this thesis.

2. Background

In this chapter I will lay out the background for the practical component of this project, which is the premise of this master thesis. First, our collaborators for this project, Universitetsforlaget i Oslo, will be introduced as well as their digital learning platform *Kunne.* Secondly, the chapter provides a brief introduction to the course Examen Philosophicum, which will be referred to as *Exphil* in this thesis. Followingly, I will present the challenge that Universitetsforlaget i Oslo posed, before introducing the target user group we have designed our prototype for.

2.1 Universitetsforlaget i Oslo and Kunne

In the autumn of 2022, we were presented with the opportunity to collaborate with them to further develop their new digital learning platform Kunne. Universitetsforlaget i Oslo is a Norwegian publisher of educational materials and academic literature. Universitetsforlaget aim to make a lasting impact in the knowledge society and are currently exploring new publishing channels and digital initiatives such as Juridika, and now their new investment in Kunne (Universitetsforlaget i Oslo, n. d).

Universitetsforlaget launched Kunne in 2022, offering its product to students enrolled in the Exphil course at the University of Oslo and the University of Agder. Kunne is designed to provide students an engaging learning experience that presents curriculum through short texts, videos and quizzes. Furthermore, Kunne is marketed as a digital learning platform that makes studying Exphil “more effective and engaging”, by simplifying the curriculum (Kunne, n.d.). Students can gain access for the current semester by paying a one-time fee of 649 kr. Kunne is currently a supplement to the Exphil syllabus, meaning that the platform has yet to replace the curriculum books in its entirety.

Today, Kunne has expanded its availability to learning institutions such as the Norwegian University of Science and Technology, NNH Norwegian School of Economics, and are currently in the process of launching Kunne to the University of Bergen.

2.2 Examen philosophicum

Exphil is an introductory course in philosophy intended to develop students' critical and reflective thinking and writing skills in an academic manner. Exphil sets itself apart from other courses that are specialized in their specific fields by being a mandatory course across all bachelor's degrees at the University of Bergen (UiB, n.d.).

Exphil is a 10 credit course and is therefore typically one of the two or three courses a student has to complete during their first semester. Consequently, Exhil is one the first courses students are exposed to in their academic career.

Upon enrollment in the course, students can choose between two course models. The first, is the seminar model that includes mandatory seminars on a weekly basis. The seminars include various assignments such as quizzes and presentations, concluding with a final home examination. The second model is the exam model, which does not include any mandatory activities, except for the final school examination. The lectures are available for both models, and the models are based upon the same syllabus.

In general, Exphil's syllabus varies across institutions of higher education and among different faculties within those institutions. The syllabus covers a range of philosophical concepts and topics, including utilitarianism, metaphysics, ethics and politics. It also features central philosophers from ancient greek, such as Aristotle, to 19th century thinkers like Karl Marx. As a result, the material is extensive and demands thorough reading and effort from the first-time students.

2.3 The challenge with Exphil

Kunne aims to help first-time students overcome the challenge of learning the extensive material of Exphil. It recognizes the struggle students are facing: "The curriculum can be challenging. Kunne is designed for those who want an easier and more engaging way to understand the material" (Kunne, n.d.).

When we were approached by Universitetsforlaget i Oslo, they presented us with the challenge they have been trying to address with Kunne: “to make the Exphil curriculum comprehensible and engaging, aiming to create a motivating learning experience for students”. Within this challenge, there was an underlying challenge that needed to be addressed.

Since 2015**,** the Norwegian publishing industry has seen a steady decline in paper book sales (Myhre, 2021, p. 2). In response, the Universitetsforlaget i Oslo has focused on digital solutions such as Kunne to maintain their competitiveness. However, for Kunne to stand out in the vast technological advancements in learning products, it needs to be innovative and offer users with something *more* than a digitized curriculum with added functionalities. By fully utilizing the benefits of the digital format, Kunne can move beyond curriculum simplifications to become a user-centered digital learning tool that offers students a motivating learning experience. This approach has the potential to both surpass existing learning products in the market and help students achieve their goals effectively.

Universitetsforlaget aims to address the aforementioned challenge through Kunne, while also helping students learn curriculum effectively. We took on the same challenge by developing and designing our own user-centered solution, in the context of the University of Bergen’s Exphil course and curriculum.

2.4 The students

The target group in this project are students enrolled in the Exphil course at the University of Bergen. The participants in this research project therefore included both first-time students and students with previous academic experience from other institutions that were enrolled in the Exphil course at the University of Bergen. This steers the demographic toward a younger user group in the ages 19 to 26 years old.

The overarching method used in the project is a user-centered iterative design process, and will be elaborated on in Chapter 4. Methods. Therefore, the users are central to both the research and the analysis. As the research project and development progressed, our knowledge of the user group and their needs increased, revealing the themes of progress tracking and motivation. The text heavy material and lacking sense

of progress caused users to feel defeated, unmotivated and apathetic towards the seemingly insurmountable curriculum.

3. Theory

The theory presented in this chapter will serve as the foundation for the subsequent analysis in Chapter 5. First, an introduction to interaction design as a discipline, and the concepts and theories related. Furthermore, present the psychological mechanisms behind motivation, and present the concept of progress tracking, the psychological mechanisms behind human motivation, before introducing gamification and lay out the gamification principles of the Octalysis Framework for Gamification (Chou, 2015) that will be used to assess the research question.

3.1 Designing for users

In this section, I will present the relevant theories that interaction design and the design for user needs encompasses. First, an introduction to interaction design, followed by the concepts and processes it encompasses.

3.1.1 What is interaction design?

According to Cooper (2014) term *interaction design* can be traced back to the 1980s and was first introduced by industrial designers Bill Moggridge and Bill Verplank. However, it was not widely adopted until about a decade later when the concept began to take effect. Traditional design disciplines have historically focused on form and aesthetics, while interaction design distinguishes itself by focusing on the design of behavior (Cooper, 2014, pp. x-xxi). In this thesis I will use the definition of interaction design provided by Jennifer Preece, Yvonne Rogers and Helen Sharp (2019) as: "designing interactive products to support the way people communicate and interact in their everyday and working lives" (p. 9).

As the name suggests, it involves creating user experiences that enhance interactions. Therefore, interaction design requires an understanding of both the capabilities and desires of people and the available technologies (Preece et al., 2019, p. xvii). This makes it an interdisciplinary field. It is fundamental to the research and design of computer-based systems for people, which is why it can be considered a broad term. Various terms have been used to describe the different aspects of what is being designed, including user interface design (UI), web design, product design, user experience design, and user-centered design. Interaction design can be seen as the overarching term that encompasses these interconnected fields, along with their methods, theories and approaches (Preece et al., 2019, pp. 9-10).

3.1.2 User-centered design

Chadia Abras, Diane Maloney-Krichmar and Jenny Preece (2004) defines *user-centered design* as a broad term to describe the design processes in which end-users influence how a design takes shape (p. 1). The term originates from Donald Norman's research laboratory in the 1980s and gained widespread usage and recognition towards the end of the decade, following its inclusion of his co-authored publications (Abras et al., 2004, p. 1).

Norman further elaborates on the concept in his book *The Psychology of Everyday Things* (1988). In this book, Norman offers four fundamental principles for effective design: "1) Make it easy to determine what actions are possible at any moment. 2) Make things visible, including the conceptual model of the system, the alternative actions, and the results of actions. 3) Make it easy to evaluate the current state of the system. 4) Follow natural mappings between intentions and the required actions; between actions and the resulting effect; and between the information that is visible and the interpretation of the system state" (Norman, 1988, p. 188). Abras et al. (2004) notes that these recommendations place the user at the center of the design.

3.1.3 The process of user-centered design

The process of user-centered design is conducted by ensuring the end-users or user groups significantly influence the development of a design. It encompasses both a

philosophy and a variety of methods, representing a spectrum of ways in which the users are involved (Norman, 2013, p. 9). The designer's role is to facilitate tasks for the user, aiming for an intuitive ease when learning how to use the product as intended (Abras et al., 2004, p. 2).

Furthermore, the user-centered design process is based on three fundamental principles widely recognized at the core of the user-centered approach: 1) involve users early in the process, 2) continuously evaluate the design, and lastly 3) iterative design process (Preece et al., 2019, p. 48). These fundamentals emphasize that the primary focus of the user-centered design process is to achieve an understanding of users, their needs, and their contexts by involving them at every stage of the design process, and to incorporate this understanding into the design of a new product or service.

3.1.4 Iterative design process

To understand user needs and goals, designs must be refined based on user feedback, which involves repeated research and testing. Don Norman (2013) defines the iterative design process as a method of human-centered design, where the process is circular, with continual refinement, continual change, and encouragement of backtracking, to rethink early decisions (p. 324). Preece et al. (2019) clarifies the iterative process through four main activities: discovering requirements, designing alternatives, prototyping, and evaluation (p. 50).

The first activity is *discovering requirements*. This step involves gathering empirical data to understand user needs and behavior, which helps define the problem and requirements for a solution. Requirements are statements about the intended product that specify what it is expected to do, or how it will perform (Preece et al., 2019, p. 387). This involves gathering data, through research methods such as interviews, focus groups, observations and questionnaires.

The second activity is *designing alternatives*. In this phase, the design team generates possible solutions and numerous ideas based on the requirements. The activity can be divided into two sub activities: conceptual design and concrete design. The first involves producing the conceptual model for the design and its intended purpose, while the latter involves the detail of the product such as visual elements and

features (Preece et al., 2019, p. 50). This creative process aims to explore a wide range of potential designs.

The third activity is *prototyping*, and includes the development of a design which can range from simple sketches on paper, to a fully interactive design in a software. The prototype is then tested by intended users to evaluate it in the final activity of *evaluation* to determine which aspects of the design work and which need further refinement (Preece et al., 2019, p. 50).

The four main activities are then repeated to ensure that the design addresses the problem being solved, and whether the solution is appropriate (Norman, 2013, p. 230). With each cycle, tests and observations become progressively more precise, moving the prototype closer to the final product. After sufficient iteration, the team decides on a solution or combines different prototype solutions. The iteration process continues as needed to meet user needs and requirements before finalizing the product (Norman, 2013, p. 230).

3.1.5 User experience

User experience (UX) is an overarching term that includes several disciplines. It refers to how a person behaves and interacts with products in the real world. Jesse Garrett (2010) emphasizes that we all have experiences as a user in our everyday lives: “Every product has a user-experience, newspapers, ketchup bottles, reclining armchairs, cardigan sweaters” (p. 10). More specifically, it is about how people feel when they are using, looking, touching, opening, or closing something.

Experience is a fundamental principle of interaction, and is inherently subjective, as it is uniquely lived through someone. Consequently, it is not possible to design the user experience itself, but we can design *for* a user experience. The objective of designers is to create products or features that evoke the right experience that are aligned with what we are trying to achieve (Preece et al., 2019, p. 13). To do so, we need to understand the user's needs.

3.1.6 Usability

Usability is a component of user experience and a quality attribute that evaluates how user-friendly interfaces such as applications and websites are. The term also refers to

the methods for improving ease of use during the design process (Nielsen, 2012). When used as a method, we can measure the usability by conducting a heuristic evaluation of the user interface. Usability is defined by five quality components, as outlined by Preece et al. (2019), who further breaks down usability into six goals: effectiveness, efficiency, safety, utility, learnability, and memorability.

1. *Effectiveness* refers to how well a product performs its intended functions. The goal is for the product to be effective in use.

2. *Efficiency* is about the product's ability to sustain high productivity levels and assist users in completing their tasks.

3. *Safety* involves protecting users from dangerous conditions and undesirable situations. For instance, a website handling personal information must adhere to privacy guidelines to safeguard user data.

4. *Utility* is concerned with the extent to which a product provides the necessary functionality for users to accomplish their goals. The product must offer an appropriate set of features that enable users to perform their tasks effectively.

5. *Learnability* focuses on how easily users can learn to operate a system. Users prefer systems that are intuitive and allow them to quickly become proficient in performing tasks.

6. *Memorability* deals with how easily users can remember how to use a product after learning it. This is particularly important for products used infrequently, where users should require minimal retraining. (pp. 19-21).

To help the user, it is important to understand their specific needs and contexts to enable them to complete their tasks efficiently. Usability is a critical attribute of any user interface, as it directly impacts user satisfaction and overall experience. By focusing on the key components of effectiveness, efficiency, safety, utility, learnability, and

memorability, designers can create interfaces that not only meet user needs but also enhance the overall interaction with the product.

3.2 Progress tracking

Progress tracking is a tool used both for motivation and improvement of usability. It is common that interfaces employ progress trackers, typically in the form of progress bars, to visualize the status of an ongoing progress (Harrison et. al, 2007). This is not to be confused with progress indicators that show system status such as loading or buffering. In the context of this thesis, *progress trackers* are understood through the lens of Myers' definition, whereby a *percent-done progress indicator* is described as a "*graphical technique which allows the user to monitor the progress through the progressing of a task*" (Myers, 1985, p. 11). Expanding upon Myers' definition, this thesis will adopt a slightly narrower interpretation of *progress trackers*, defining them as the *visualization of processes that not only allow users to monitor, but also assist in guiding their progress through the entirety of a task*. This approach underscores the importance of the visual tools in enhancing user motivation and efficiency in reaching their goals.

Progress trackers can be displayed in a wide variety of designs and formats, depending on the display device and what type of data is being tracked. A common progress tracker used in various interfaces is the progress bar. Harrison et al. (2007) describes the progress bar as a linear visualization of progress, where the progress bar's advancement is directly proportional to how much work has been completed and what remains. In short, the more work a user completes, the more the progress bar fills up.

Despite this common linear design, the actual experience of progress can appear non-linear to users. This means that the way a progress bar fills up and the way users perceive their advancements can be influenced by various factors, leading to a perception that does not necessarily resonate with a straight line from A to B. One significant factor being that humans perceive time in a non-linear way. According to Harrison et al. (2007), this perception affects how users experience progress and the passage of time. For example, during engaging activities time might seem to pass quickly, while in others less engaging ones, it drags time, which in turn affects our sense of how much progress has been made (Harrison et al., 2007, p. 115). Furthermore, this

non-linear perception is important for designers to consider when designing progress trackers. Knowing that users' sense of time is relative to the activity and effort, progress bars must be adjusted accordingly to align with the user's perception, making the experience of progressing feel satisfying and meaningful. Therefore, progress bars often visualize non-linear behaviors, such as acceleration, retraction, and pauses (Harrison et al., 2007, p. 115).

Myers (1895) underscores that an important benefit of progress trackers is their ability to lower users' anxiety, and is especially useful for novices using a system. As novice users are less informed of what will happen, the progress trackers give the user a sense of control because it provides feedback on what is happening (p. 16-17). This is a quality of transparency, and can strengthen the users willingness to do a task, and amplify the likelihood of completion, which is closely related to the drivers of gamification (Harrison et al., 2007).

Progress tracking is commonly used in games, and shows the user the way towards a *Win-State.* The Win-State is typically a scenario where the user has to overcome a challenge or complete a task, which is the "win" (Chou, 2015, p. 90). In non-game contexts, they are easy to implement and can be found in daily activities such as awarding children in school with a star sticker for each book they have read.

3.2.1 Content consumption

The act of progress tracking is determined by systematic registration of user data or user-driven input. In other words, users must complete tasks and consume content for progress to be tracked. A typical implementation of progress trackers requires that the programs update them explicitly (Myers, 1985, p. 12). This process involves continuously capturing, updating and reflecting user progress, thereby enabling individuals to assess their advancements towards predefined goals or milestones - leading to a progress tracker on a user interface. Therefore, the content itself is central to progress tracking.

Debeauvais et al. (2014) highlights this relationship between content consumption and presence in long-running games. In the medieval fantasy game World of Warcraft developed by Blizzard, users receive new content regularly. Providing enough content for users to consume is not only important for the continuous activity of

tracking their progress, but also because they drive the virality and adaptation for the game. Players can become bored once they have explored all the game content, and as a consequence, may stop playing (Debeauvais et al., 2014).

3.3 Motivation

Det Store Norske Leksikon defines motivation as the collective term for the factors that initiate and guide behavior in animals and humans. Motivated behavior has a directional component (what we are motivated to achieve) and an energy component (how strongly we are motivated to achieve it). Furthermore, motivated behavior also has a natural conclusion, it stops when the desired goal is achieved (Svartdal, 2023).

Before presenting the concepts of gamification and how they can create motivating learning experiences, it is important to understand the psychology behind human motivation. *The self-determination theory*, developed by psychologists Edward L. Deci and Richard M. Ryan (2000), is a comprehensive approach to human motivation and personality. This theory employs traditional empirical methods to emphasize the significance of humans' evolved inner resources for personality development and behavioral self-regulation (p. 68).

The self-determination theory distinguishes between two types of motivation: intrinsic and extrinsic. According to Ryan & Deci (2000) that intrinsic motivation is a fundamental tendency where humans seek out challenges and novelty such as sports, to extend and exercise one’s capacities in order to explore and to learn (p. 70). It involves engaging in activities purely for the enjoyment and interest they provide. In contrast, extrinsic motivation is about doing activities to achieve an external reward or goal (Deci & Ryan, 2000, p. 70).

Deci & Ryan (2000) further elaborates that the intrinsic motivation is supported in self-determination by three components. The first component is *competence*, which marks the feeling of having the skills needed to accomplish the task at hand. The second component, *autonomy,* is about how the more control a person feels in a situation, the more likely they are to succeed in it. The third and last, *relatedness,* is the feeling of involvement with others (p. 70, 73).

3.4 Gamification

The act of making something game-like is called *gamification* (Chou, 2015, p. 6). According to Brian Burke (2014), the term was first coined by the British programmer Nick Pelling in 2002, using it as a buzzword for describing a service for a hardware startup: "... applying game-like accelerated user interface design to make electronic transactions both enjoyable and fast" (p. 13). Burke (2014) points out that over two decades later, gamification has evolved from a buzzword to an acknowledged practice that plays a significant role in designing and developing digital products (p. 12).

Earlier works on adapting gameplay practices within the workplace can be traced back to 1985, when Charles Coonradt raised the question: "Why would people pay for the privilege of working harder at their chosen sport or recreational pursuit than they would work at a job where they were being paid?" (p. 13). Following this inquiry, he posed five principles of Motivation of Recreation:

- Clearly defined goals
- Better scorekeeping and scorecards
- More frequent feedback
- A higher degree of personal choice of methods
- Consistent coaching

Charles Coonradt (2007) argues that our motivation in recreational pursuits are driven by a wish to succeed, and that success is typically measured by either comparison to previous achievements, or completion of a task. According to Coonradt (2007), our desire to be recognised and awarded for the effort speaks to the human nature of wanting to be better at work, at home or generally in life.

However, upon further inspection of the mechanisms of motivation, it seems to be not only *one* drive to succeed, but rather various *drivers* of it. In Yu-Kai Chou's (2015) book *Actionable Gamification: Beyond Points, Badges and Leaderboards,* Chou presents eight *Core Drivers* of gamification that can motivate humans towards a variety of decisions and actions (p. 23). The core drivers will be further elaborated upon in subsection 3.2.2 The Octalysis Framework of Gamification.

According to Deterdig et al. (2011a), the term gamification entered widespread adaptation in 2010. The game and digital media industry's dissatisfaction with some interpretations led to designers to formulate different terms for their own practices (p. 1). Consequently, there are a variety of academic attempts at a definition of gamification. However, I wish to highlight two definitions of gamification from Yu-Kai Chou (2015), and Deterding et al. (2011b).

1. *"Gamification is the craft of deriving fun and engaging attributes typically found in games and thoughtfully applying them to real-world or productive activities."* (Chou, 2015, p. 8)

Yu-Kai Chou (2015) elaborates upon his definition by emphasizing that the process is "Human-Focused Design", opposed to "Function-Focused Design". According to Chou (2015) systems are often developed and designed with an orientation towards function, aimed at achieving task completion. He exemplifies this with an analogy about factory workers, where it is presumed that employees will execute their duties out of obligation rather than a genuine desire to engage in the given tasks at work. The recognition and incorporation of human emotional and motivational needs is central in user-centered design, focusing on fostering environments where individuals are inspired to participate by their intrinsic motivation, and not solely due to external requirements (p. 8). Therefore, he argues that gamification is a design process that optimizes for human motivation within a given system, rather than functional efficiency alone (Chou, 2015). This view has been critiqued, as gamification can be used as a tool for exploitation, these critiques will be presented in the following section.

2. *"Gamification is an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement."* (Deterding et al., 2011b).

With this definition, Deterding et al (2011b) aims to bring together practitioners from the industry and researchers from academia to develop a shared understanding of the existing approaches and findings around the gamification of information systems, and identify key synergies and opportunities. Deterding et. al (2011b) considers that

‘gamified’ information systems are in immediate relevance to HCI researchers across multiple fields.

Both definitions involve incorporating game-like elements into non-game contexts. However, since Deterding et al. (2019) also emphasize user experience and engagement in their definition, this will be the definition used in this thesis

3.2.1 Critical perspectives on gamification

One of the critics of gamification is the game designer and scientist Ian Bogost (2014), who considers gamification as *exploitationware* (p. 72). According to Bogost, his issue with gamification is not because it misinterprets games, but rather that its main goal is to benefit those that use it as a tool for personal or corporate gain. He argues that instead of being a genuine method to improve a situation or user experience for those involved, it is about serving those who implement it (Bogost, 2014, p. 65). However, Bogost's (2014) argument is market oriented, which does not take the user's experience into account. Gaute Kokkvoll & Jannicke Johansen underscore that Bogost has yet to provide thorough research to support his assertion (Kokkvoll & Johansen 2024, p. 38).

Kristine Jørgensen & Torill E. Mortensen (2011) explores perspectives of gamification that emerged from its popularity in marketing and education around 2011-2012. They identify two groups among game researchers: for or against gamification. The first group’s perspectives are inspired by Jane McGonigal (2011) and views gamification as a way to make the world more fun and ordinary tasks more interesting, whilst the other group’s perspectives are similar to the aforementioned perspective of Bogosts’ (2014). This group views gamification as a form of dishonest marketing that exploits human behavioral mechanisms, while also degrading the concept of gaming.

Jørgensen & Mortensen (2011) argue that both groups that argue either for or against gamification are reductionist and lack the ability and nuance to explain why certain content and design elements motivate people (p. 241). In their research they offer an alternative perspective that incorporates a user-sensitive perspective based on their own and others’ research, focusing on gamification as an experience-centered, cultural, and aesthetic phenomenon related to playfulness and the joy of playing (Jørgensen & Mortensen, 2011, p. 257).

3.2.2 Gamification in learning

The concept of gamification in education, while seeming new, has deeper roots than it appears. Professor of Instructional Technology at Bloomsburg University, Karl M. Kapp (2012) argues that gamification is far from new, emphasizing that academics, educators, and designers are only increasingly leveraging gamification to transform "boring" content into engaging classroom activities (p. xxii).

A common issue when applying gamification in education, that results in superficial design solutions and poor user experiences, is the tendency to use the same gamification methods to address different problems. The design techniques used in gamification should be determined by the specific type of knowledge being taught, rather than applying a one-size-fits-all approach (Kapp, 2011, p. 166).

Central to the effective application of gamification in learning is the context of where it is applied. Barata et al. (2013) provide case examples supporting the claim that gamification has a positive impact on learning by improving students participation and their grades. There are also examples that prove the opposite, such as *When Gamification Spoils Your Learning* (Mogavi et al., 2022). What differentiates these two claims is the context of where gamification has been applied, as the former incorporates gamification strategies in a master course at the University of Lisbon, while the latter provides examples of overuse of gamification in Duolingo, a commercial language learning app. The key difference between these two outcomes lies in the context: the former study applied gamification strategies within a master's course at the University of Lisbon, where students were formally required to participate, whereas the latter examined the overuse of gamification in Duolingo, where users engage out of personal interest.

Duolingo employs various gamification strategies that entice the user toward spending money on their platform, also called *dark nudges* (Mogavi et al., 2022, p. 182). These dark nudges are unnecessary for the user experience and can undermine the educational value of the app, yet they are implemented due to commercial interests.

This legitimizes Bogost's (2014) argument to some extent, where the commercial interest behind the utilization of gamification affects the user experience.

These studies highlight two important aspects of gamification in the context of learning. First, the effectiveness is dependent on the context and the users' motives. Second, the ethical aspect of gamification must be considered, particularly how the difference between educational and commercial interests can affect the user experience and the misuse of gamification.

3.3.3 Explicit and implicit gamification

Chou (2015) differentiate types of gamification into two ways based on how they are designed and how users respond to them: implicit gamification and explicit gamification.

Explicit gamification involves applying features that are obviously game-like. Whether they are obvious is dependent on the user experience, as the user will be aware that they are playing a game (Chou, 2015).

Implicit gamification, however, involves a more subtle implementation, as the features are not obvious to the user. According to Chou (2015), one of the advantages of implicit gamification is that they are technically easy to implement as implicit gamification can be applied appropriately in most contexts (p. 54). This can range from a progress bar in the checkout section on a shopping website, to counting steps on a smart watch. However, this advantage also presents a disadvantage. The convenience and ease of implementation leads to what Chou (2015) calls 'lazy' design, where the overuse of subtle game-like features are superficial solutions that do not improve the user experience (p. 54).

3.2.4 The Octalysis Framework for Gamification

The Octalysis Framework for Gamification by Yu-Kai Chou (2015) provides an approach to understand the drivers of motivation and how they affect the user experience. The framework describes 8 core drivers, each of which creates different motivations. Together, these core drivers form an octagon, which can be used as principles to

evaluate and understand the emotions a product, service, or experience evokes and its effectiveness (Kokkvoll & Johansen, 2024, p. 69). As shown below in Figure 1, the Octalysis framework core drivers forms an octagon, which will be presented followingly.

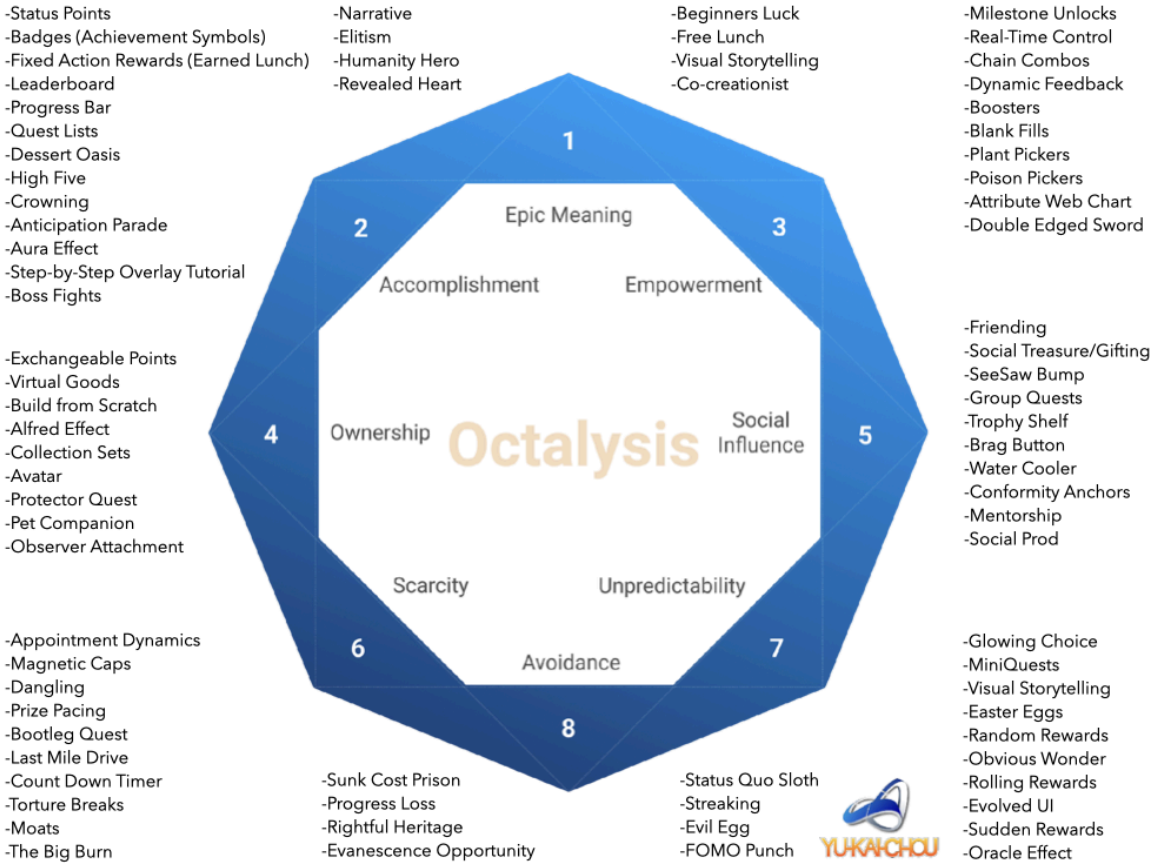


Figure 1: The Octalysis Framework for Gamification (Chou, 2015, p. 23).

Core Driver 1: Epic Meaning & Calling

The first core driver is Epic Meaning & Calling, and is at play when the user believes they are doing or partaking in something even greater in themselves (Chou, 2015, p. 25). According to Chou (2015), the core driver Epic Meaning & Calling is a drive of motivation because it relates to the human desire for purpose. When a task or a mission feels meaningful, it creates a pleasant feeling of calm and control, promoting motivation and deeper engagement (p. 65).

Gaute Kokkvoll and Janicke Johansen (2024) in the book *Spillifisering (gamification) i praksis* notes how Epic meaning & Calling can be found in religion,

lifestyle and the sustainability movement. In a Norwegian context, a relevant example is "*dugnadsånd*" (community spirit). This refers to the activity of contributing voluntarily to the community, where people come together and work for the benefit of the community without expecting any payment or compensation. The collective effort of cleaning up the neighborhood can give the participants a good conscience, and a feeling of solving a problem (Kokkvoll & Johansen, 2024, p. 73). By participating in activities that align with one's values, users are more likely to feel emotionally connected and committed to the cause, resulting in sustained engagement and satisfaction (Chou, 2015).

Although there is no definitive answer on how the core drivers should be applied, one can consider the context in which they are most useful and appropriate. For instance, Epic Meaning & Calling can be applied by providing users a narrative around why they are using a product, thus providing a higher meaning through interacting with a website or a prototype (Chou, 2015, p. 80).

Core Driver 2: Development & Accomplishment

The second Core Driver, Development & Accomplishment, focuses on what motivates us to overcome obstacles, which consequently creates a sense of growth (Chou, 2015). When leveraging this principle, one can create user experiences that allow users to see their progress and celebrate their successes.

Development & Accomplishment has multiple layers. At its most basic level, it involves users successfully navigating and using a product without frustration. When users encounter difficulties and struggle to use a product, they may feel 'stupid' or disengaged, which can lead to demotivation and a poor user experience (Chou, 2015, p. 101). Effective designs often account for this by incorporating descriptive onboarding processes in the design that clearly explain what will happen and why, to prevent user errors. On a more complex level, it involves users overcoming *intentionally designed obstacles*, which leads to a sense of competence and mastery. This feeling of accomplishment is important for maintaining engagement, as it reinforces the user's belief in their abilities and encourages them to continue interacting with the product (Chou, 2015, p. 91).

Development and accomplishment also address a fundamental human need. Jane McGonigal (2011) in *Reality is broken* points out that games can provide rewards and learning experiences that reality often cannot match such as immediate feedback, clear goals, and incremental rewards, which can teach and inspire in ways that everyday life may not (McGonigal, 2011, p. 4).

This gamified approach can be applied to various domains, including education, fitness, and productivity to create motivating user experiences. A common technique for implementing Development & Accomplishment is progress trackers that visualize their development and progression towards their goals.

Core Driver 3: Empowerment of Creativity & Feedback

The third core driver, Empowerment of Creativity & Feedback, is tied to the activities we associate with creativity, like problem-solving and innovation (Chou, 2015, p. 124). The driver is most apparent when we are given opportunities to challenge ourselves either through trial and error, or by receiving feedback on our own creativity.

Empowerment of Creativity & Feedback is closely connected to internal motivation because it encourages users to engage with the tasks at hand, and find satisfaction in their achievements (Kokkvoll & Johansen, 2024, p. 88). It is also one of the most challenging to implement effectively. To successfully leverage Empowerment of Creativity & Feedback, designs must offer continuous opportunities for users to express their creativity and receive constructive feedback. This can be achieved through features that allow users to experiment with different solutions, receive immediate feedback, and see the impact of their creative decisions.

To utilize Empowerment of Creativity & Feedback, it is important that the define goals for the users to achieve, and the tools or strategies they can employ how they wish to achieve the goal (Chou, 2015, p. 134). This approach not only sustains engagement but can also support the feeling of ownership, which is the next core driver that will be presented.

Core Driver 4: Ownership & Possession

The fourth core driver in Octalysis Gamification, Ownership & Possession, is about the motivation that stems from the sense of owning something. This core drive stimulates

the desire to improve, protect, and accumulate possessions, whether they are tangible or intangible (Chou, 2015, p. 160).

Ownership & Possession includes various elements such as virtual goods and currencies, driving behaviors like collecting model trains or saving money. On a more abstract level, this core drive is connected to the investment of time and resources into customizing something to our liking (Chou, 2015). In a digital context, it extends to the avatars or Bitmojis that users create on platforms like Snapchat. These digital representations, customized with face shape, skin color, hair color, and clothing style, reflect personal investment and creativity (WERSM, 2016; Kokkvoll & Johansen, 2024, p. 97).

Systems that learn and adapt to users preferences, thereby creating a personalized experience, also fall under this drive. Engaging users in the development process early on can increase their sense of ownership, making them more vested in the product or service. Chou (2015) refers to this approach as "building from scratch", and involves users in creating and shaping the final product, thereby deepening their connection to it (p. 161).

Core Driver 5: Social Influence & Relatedness

The fifth core driver, Social Influence & Relatedness involves activities that are inspired and initiated by what other people think, do or say (Chou, 2015). In an age where we are surrounded by the influences of social media, one can think of the social network *Instagram* as a digital product that heavily leverages the driver of Social Influence & Relatedness. Celebrities and companies can advertise products for their following, and friends can see the amount of followers they have compared to others. According to Kokkvoll & Johansen (2024), when someone we know or can relate to says or does something, we are typically more receptive to it.

Social Influence & Relatedness is the engine behind competitiveness, envy, and humans desire to connect and compare with one another. This is one of the broader core drivers of the Octalysis, as it involves themes of competitiveness and envy, to teamwork and friendship (Kokkvoll & Johansen, 2024, p. 103).

Chou (2015) notes that this core driver, if utilized properly, serves as one of the strongest drivers and long-lasting motivations for people to become engaged in a

product (p. 196). The disadvantage of the powerful core drive is that it can also have a significant negative impact on user motivation and experience by fostering negative emotions among its users through social pressure, stigma, shame from relations. Therefore, one must evaluate its appropriateness for its context, and be applied with a high sensitivity towards what emotions it will evoke.

Core Driver 6: Scarcity & Impatience

Scarcity & Impatience is the sixth core driver. This drive motivates us primarily because we are unable to have something immediately, or because it is difficult obtaining it. It involves feeling the pressure of time, exclusivity, sales and the overall sense of scarcity (Chou, 2015).

This driver taps into our natural awareness of resources, where we tend to value scarce resources more highly (Chou, 2015). For example, if you have three free movies to watch before a paid subscription is required, you are likely to choose your movies carefully. However, if you already have a subscription with access to all movies, you would likely select movies without prioritizing them. This sense of urgency and exclusivity encourages users to act quickly and make deliberate choices.

Scarcity & Impatience can be implemented by appointment dynamics, which come into play when we experience the pressure of time. The sense of urgency pushes for action: a sale will come to an end by the weekend, and happy hour at the bar will soon be over. By designing tasks that are centered around time, it can trigger users' motivation to complete them before time runs out.

Core Driver 7: Unpredictability & Curiosity

The seventh core driver is Unpredictability & Curiosity, and taps into the human desire to explore the unknown, discover new information. Unpredictability makes us question what comes next, and is an engine that motivates us to seek answers to these questions (Chou, 2015).

This core driver can be implemented by *Glowing Choices,* which are features that intentionally stand out for the user to discover why it is unique (Chou, 2015). This is related to the *isolation effect*, also known as The von Restorff effect, where the item that

stands out in other items is more likely to be remembered and interacted with (Yablonski, 2020, p. 78). In other words, our curiosity is sparked when we see elements that are visually or conceptually isolated from the other items, and we remember them better. By leveraging this effect, designs can draw users attention to specific actions and peak their interest in seeking information, thereby guiding users toward a goal. However, too many elements of visual emphasis will diminish the isolating effect, making it harder for people to find the information they seek.

Core Driver 8: Loss & Avoidance

The eight and last core driver, Loss & Avoidance, is tied to our fear of consequences. It is a powerful motivator because it leverages the uncomfortable feeling associated with potential loss, which often has a more significant impact on our behavior than the prospect of gaining something of equal value (Kokkvoll & Johansen, 2024, p. 122).

The aversion to loss is not only limited to games, as there are many situations in our everyday lives where we act based on the fear of losing something that is the materialization of our investment of effort, time and other resources (Chou, 2015).

Octalysis as principles

According to Chou (2015), this framework offers an approach on gamification that extends beyond simplistic rewards systems such as scores and awards. It strives for creating meaningful and engaging experiences that tap into the intrinsic and extrinsic motivational factors of the users.

In this thesis I will use the core drivers of the Octalysis framework as principles for how gamification can be effectively implemented in both the design process as a design method, and as an analytical method to assess effectiveness of gamification through progress trackers in the design. However, there are some weaknesses in the Octalysis Framework that must be addressed.

3.2.4.1 Challenges and weaknesses

Chou's Octalysis framework, while popular and innovative, has been critiqued for its tendency to oversimplify complex human behaviors and motivations. Researchers argue that by defining motivation into eight core drivers, the framework might not fully

capture the nuanced nature of human engagement (Kokkvoll & Johansen, 2024, p. 69). This simplification can potentially lead to excessive implementation of gamification strategies that overlook important contextual factors and the user needs. Furthermore, Kokkvoll & Johansen (2024) highlights how the Octalysis framework should not be seen as an exact science, or a prescriptive recipe for success in gamification, but as principles in creating motivating user experiences (p. 70).

Research has demonstrated that the Octalysis framework can help to create motivating and engaging experiences, but its impact on the effectiveness of learning is limited. For instance, Economou et al. (2016) found that although Ocalysis-driven designs make activities more enjoyable, they do not necessarily lead to improved learning outcomes. This disjunction highlights an important challenge in gamification, where the design must balance user needs and the appropriate application of the principles. Engaging the user is important, but also requires instructional design and quality content to enhance learning (Economou et al., 2016).

Norman (2013) emphasizes that the best designs are those that users do not even think about, because they are easy to use (p. 3). This aligns with the notion that effective use of gamification creates user experiences intuitive and enjoyable. Using the Octalysis Framework as principles during the user-centered design process can ensure that gamified elements are not only engaging and fun, but also addresses the user needs.

4. Methods

This chapter presents the methods used in our shared project, including the methods used in the thesis analysis. Lastly, I will shed a light on our research design and the reasonings behind the selection of methods. The chapter will be structured according to the two main iterations of the process. The first iteration is focused on the MIX100 course and the methods used, including how we analyzed the research data. Following this, I will lay out the methods of the second iteration, and highlight how the analysis of the first iteration informed the methods used.

The overarching methodological approach in this project is a user-centered iterative design process, which means that the target users and their goals are the

driving force behind the design and development process of the prototype (Preece et al., 2019, p. 47). This will be reflected in our methods for users involvement in the project, qualitative data gathering methods, and the iterative cycles of the project. With each cycle, the testing and evaluating becomes increasingly targeted and more efficient, the specifications more defined, moving the prototype closer to delivering the highest quality possible (Norman, 2013, p. 230).

To collect data in our research methods, we submitted a form to SIKT (Norwegian Agency for Shared Services in Education and Research). All participants that have partaken in this study have signed an informed consent form prior to any activities, providing them details of their personal data protection rights, and what our research methods would include.

4.1 Iteration 1

This section outlines the first iteration of the user-centered iterative design process where we explored concepts through participatory design. This process involved students from the course MIX100: *Introduction in Media and Interaction Design* course as our participants. We conducted two focus groups with a selection of students from the course, followed by a SWOT analysis based on the transcriptions. Lastly, we conducted an expert analysis of the resulting prototypes.

Each method will be introduced with the theoretical concepts and procedures, before presenting how we conducted our research.

4.1.1 Student involvement with MIX100

Participatory design, also referred to as co-design, is an overarching design philosophy (Preece et. al., 2019, p. 47). Tone Bratteteig , professor of Design of Information Systems at the University of Oslo, defines participatory design in *Design for, med og av brukere* (2021) as “having future users participate in the design process, and affect the end result of the design” (p. 16). Elaborating upon the concept, Bratteteig (2021) offers three foundational principles for participatory design:

1. Participants should be involved in determining the outcome; they should *have a say*.
2. Participants must learn from each other, and about each other, to develop collaboration and a shared vision.
3. All participants must be involved in making design decisions and actively participate in the design process (p. 178).

In the fall of 2023, we initiated our research project with a participatory design approach. The MIX100 course involved 32 first-year students at Media and Interaction Design as our participants. A majority of the students were enrolled in the Exphil course parallelly, making them representative of the target user group.

The primary objective of the course is to develop an idea or a concept to a simple interactive prototype (UiB, n.d.). The course was oriented towards designing a digital learning platform for Exphil students with a focus on gamification, including lectures on the Octalysis Framework for Gamification (Chou, 2015). This resulted in seven prototypes that explore different approaches to the challenge we presented to them: *how can Universitetsforlaget i Oslo create a digital learning platform that motivates Exphil students?*

The students were then divided into teams, forming a total of seven groups. The groups conducted user research and explorations of the Octalysis Framework to design a prototype that aimed to address the challenge and user needs.

We served dual roles in the MIX100 course, functioning as both teacher assistants and researchers. As teacher assistants, we guided and facilitated the students' learning process. In our role as researchers, we collected valuable insights and inspiration from the prototypes that utilized gamified features such as progress bars, to-do-lists and guided paths though the Exphil curriculum.

4.1.2 Focus groups

We concluded the student involvement with two focus groups. Focus groups are group interviews led by a facilitator, where three to ten individuals representing a sample of the target user group are brought together to discuss views and experiences about topics (Preece et al., 2019, p. 271). Focus groups are beneficial for investigating shared issues rather than individual experiences, as discussions among participants can highlight issues that might not appear through the other research methods (Preece et al., 2019, p. 272). The loose structure opens up for a flow of natural conversation, however, Bratteteig (2021) points out that the facilitator must be wary of the group dynamic and actively prompt the discussion where it is needed, as the conversation, thus the data material, can be negatively impacted by dominating participants (p. 228-229).

We conducted two focus group interviews with a selection of two representatives from each of the seven groups. The selection of participants was based on their availability, and that they could convey their viewpoints, insights and experiences of both their respective teams and themselves.

The questions and topics of the focus groups were prepared beforehand, and consisted of open-ended questions that aimed to spark conversation. This included an informal introduction where we clarified our dual roles as assistant teachers and researchers, and underscored that the focus groups would not affect their evaluation in the course. Furthermore, the sessions were recorded and transcribed later on.

4.1.3 Analysis of the material

Before initiating the second iteration, we analyzed the data collection from the participatory design process and the focus groups by conducting a SWOT analysis and an expert evaluation. The methods were executed in the online collaborative tool FigJam, which acts as a digital whiteboard. Here, the two methods for our analysis of the material will be presented.

4.1.3.1 SWOT Analysis

SWOT analysis is a process that involves four areas divided into two dimensions and is typically used for strategic planning and competitive strategy. The four areas are *Strengths*, *Weaknesses*, *Opportunities* and *Threats*, making the acronym SWOT (Gürel & Merba Tat, 2017, p. 995). Strengths and weaknesses are internal factors of the organization, while opportunities and threats are external factors of the environment (p. 995). For analyzing technologies, as noted by Albert Rozzo and Gerard Jounghyun Kim (2005), "*it can be usefully applied to guide any organized human endeavor designed to accomplish a mission*" (p. 119).

The objective of the SWOT analysis was to assess Universitetsforlaget's current product Kunne, and its future potential. We applied the data from the focus group to post-it notes to conduct the analysis in Figjam. Then, we categorized the data according to the four areas of SWOT. This approach allowed us to clearly identify and map out the potential strengths, weaknesses, opportunities and threats that we needed to consider in the second iteration.

4.1.3.2 Expert Evaluation

An expert evaluation is a method for assessing the design qualities of a prototype to assess whether they are in accordance with the design principles. It does not typically involve the users, hence the name *expert* as it relies on the researchers or designers expertise in theory and practice in the field, and are the ones carrying out the evaluation of the prototype (Nordbø, 2017, p. 173). According to Preece et al. (2009) it requires that the researchers imagine or model how an interface is likely to be used. This method is commonly used to identify usability problems based on the knowledge, thus the prediction and assumption, of the users' behavior and the context in which the prototype will be used (p. 505).

We gathered screenshots of the final seven MIX100 prototypes in the collaborative platform FigJam. We applied a total of six design principles, three from Don Norman (2013): feedback, visibility and mapping, and three of the usability principles from Preece et al. (2019): effectiveness, efficiency and utility. As seen below in Figure 2, these principles were structured in a table, where post-it notes evaluating each prototype

were categorized according to the aforementioned principles. These were used with the primary goal of detecting usability problems, and identifying the strengths of the design that could be formulated into design implication and incorporated into our own prototype.

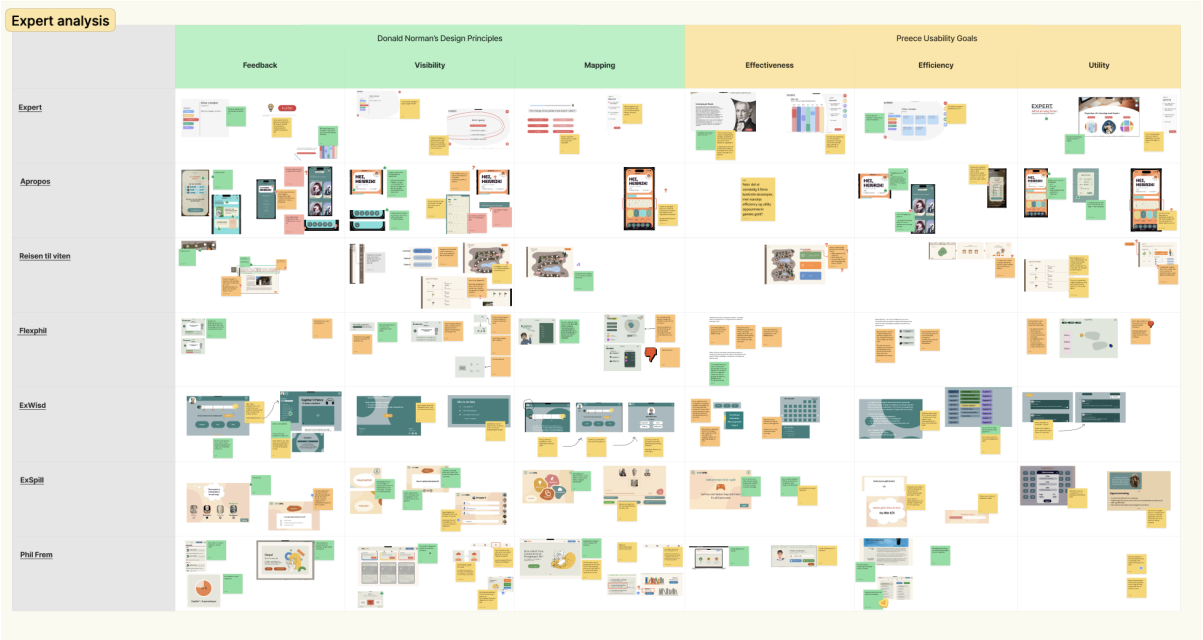


Figure 2: Screenshot of the expert evaluation in FigJam.

4.3 Iteration 2

The second iteration was initiated by semi-structured interviews to identify user needs and requirements. Based on the insights from the former iteration, and the semi-structured interviews, we started the prototyping phase of the project. This process consisted of concept development, prototyping and user testing. The latter methods were iterated in multiple cycles, resulting in the final prototype.

The methods used will be presented, before a description of how the methods were conducted.

4.3.1 Semi-structured interviews

Semi-structured interviews is an interview technique that includes both closed and open-ended questions, where the interviewer follows an interview guide with pre-planned questions. This leaves room for the interviewer to pursue interesting topics that arise from the conversation (Preece et al., 2019, p. 268-269).

We initiated the second iteration by conducting a total of nine semi-structured interviews: six with current Exphil students, and three former Exphil students, from both the Faculty of Social Sciences and Faculty of Humanities at the University of Bergen. The participants were sourced through referrals from friends, co-workers and acquaintances, also known as snowball sampling (Preece et al., 2019, p. 261).

We aimed to collect data that gave us a deeper understanding of the target groups' thoughts, opinions and needs concerning Exphil. We prepared an interview guide with pre-planned topics and open-ended questions, leaving room for open conversation. The semi-structured interviews started with an informal introduction and a briefing on the project. Before closing, a final round of closing questions of what they would personally consider desirable in an ideal solution to address their challenges in the course Exphil, and their expectations of Kunne.

4.3.2 Prototyping

Drawing upon the definition from Preece et al. (2019), a prototype is a "*manifestation of a design that allows stakeholders to interact with it and to explore its suitability.*" (p. 422). According to Lim et al. (2008), prototyping serves two primary functions: as a filter to narrow down design choices, and as a manifestation of design ideas. Lim et al. (2008) introduces the concept of the anatomy of prototyping, suggesting that the act of prototyping can be viewed as a *filter*, also called *filtering dimensions*. This concept enables designers to select the relevant aspects of a design idea, and to exclude the unnecessary aspects of the design (p. 7:3).

Prototypes play an important role in not only evaluation, but also in their generative role, as it enables designers to communicate ideas and users to test them out (Preece et al., 2019, p. 422). According to Lim et al. (2008), a prototype requires a certain degree of detail to be tested effectively, which is related to the concept of *fidelity*

and the *scope*. Fidelity refers to the detail and realism in the prototype, which is categorized into low-fidelity, mid/high fidelity and high fidelity. The *scope* concerns which aspects of the design idea the prototype covers (p. 7:1-7:2). They further state that "*the best prototype is one that, in the simplest and most efficient manner, reveals the possibilities and limitations of a design idea, making them visible and measurable*" (2008, p. 7:3).

We initiated the prototyping phase with a low-fidelity prototype consisting of wireframes of our ideas and concept, followed by a user test, then refinements in the design based on the insights. This process was repeated another two iterative cycles, making a total of three iterative cycles. In alignment with Lim et al. (2008), the progression of the prototype's fidelity evolved from low-fidelity to mid/high-fidelity after each cycle. This provided feedback that informed further refinements, resulting in a high-fidelity prototype that offered a detailed representation of the final design.

4.3.3 User testing

User testing is done to test whether the prototype being made is deemed usable by the intended user to achieve the tasks for which it was designed, and whether the user is satisfied with the experience (Preece et al., 2019, p. 524). The testing begins early in the problem specification phase to ensure that the problem we are solving is well understood. It is later repeated during the iteration process to verify that the new design meets the needs and abilities of those who will use it. User testing involves having a group of people that represent the target user group interact with the prototype while the research team observes their interactions and expressions (Norman, 2013, p. 228-229).

A challenge noted by Preece et al. (2019) is that it is inevitable that some methods influence how people behave as they are being observed. Therefore, when conducting user testing it is important that the interviewer remain discreet to avoid affecting what the participants do during an evaluation (p. 505). Although it is the prototype that is being tested, some participants might feel that *they* are being tested. Addressing these challenges, Bratteteig (2021) suggests that the interviewer should be transparent with the interviewee and underscore that the user test is testing the design,

and not their personal abilities. As the effectiveness of the design is being evaluated, observation alone can miss out important usability issues (p. 203).

The user tests started with an informal introduction about the project and then the participants were asked to 'think aloud' while navigating and interacting with the prototype. The interviewer also gave the user simple tasks, which enabled us to monitor their interactions and assess whether the user managed to achieve tasks in an effective manner. Although the interview guide for the user tests had a similar structure to semi-structured interviews, the topics and questions of the interview guide evolved after each iteration to make sure we were aligned with the scope of the prototype, and that the new features were evaluated.

We conducted three rounds of user testing with a total of four participants. In the first round, one participant tested a low-fidelity prototype. The second round involved another participant testing a mid/high-fidelity prototype. In the final round, three participants, including one from the MIX100 course, tested the refined high-fidelity prototype.

Round 1

The first user test was conducted with a first-year master student, and was focused on gathering initial feedback on the core interactions, with the prototype containing few to none details such as color and realistic text. Only the utmost important functionalities were included, enabling us to evaluate whether the prototype addressed the issues we were trying to solve. This narrowed the scope of the prototype, and what type of content from the Exphil course should be implemented for the next round of user testing.

Round 2

Building upon the first round of user test feedback, we increased the fidelity by adding realistic details from the Exphil curriculum, colors and expanded the user journey. This became the basis for our mid/high-fidelity testing, and steered us towards a nuanced understanding of the design, and enabled us to make informed decisions when removing unnecessary functions and adding new ones.

Round 3

The third and last round of user tests was conducted with one first-year bachelor student from the MIX100 course, and one developer that had recently completed her masters degree. The high-fidelity prototype user tests provided feedback on the functionality and user experience. This enabled us to improve minor usability issues and make final adjustments to the design, ensuring that we addressed the user needs and the issue we were trying to solve.

4.4 Methods for the thesis analysis

This section will also highlight how the emerging themes from the first iteration affected the design decisions that followed, and the thematic analysis that

In this chapter, the methods used to analyze the research question will be presented. The analysis is based upon these approaches, each contributing to a comprehensive understanding of the research topic. First, I will describe how the theme of gamification from the insights, and theoretical frameworks, were integrated into the user-centered iterative design process to ensure that the findings were effectively applied to enhance user experience and meet design objectives. This will be followed by an explanation of the application of the Octalysis Framework of Gamification (Chou, 2015), for evaluating and designing gamified experiences.

4.4.1 Thematic analysis

A thematic analysis is an overarching term that covers a variety of different approaches to examine qualitative data (Preece et al., 2019, p. 322). Braun & Clarke (2006) defines a thematic analysis as a method for "systematically identifying, analyzing, and reporting patterns (themes) within data" (p. 6). Furthermore, they interpret "themes" as "something important about the data in relation to the research question, and represents some level of patterned response or meaning within the dataset" (p. 10).

A thematic analysis was conducted to identify patterns from our pool of data. The thematic analysis was conducted by an inductive approach in line with the six phases of thematic analysis by Braun & Clarke (2006), where the identification of recurring themes in the data affected the development of the design and the study goal. Following

the first iteration, I 1) *familiarized* with the data where transcriptions from the semi-interviews, structured in a digital table-sheet, were explored. Then, 2) I *generated initial codes* to identify features that are interesting, followed by 3) *searching for themes* among the different codes that formed an overarching theme. In phase 4) I *reviewed themes* ensuring that the data within the theme was coherent, and in 5) I *defined and named themes* discovering the core and essence of the themes. The last phase 6), a *report* of the concluding data was produced.

This bottom-up approach of methods allowed us to adjust and direct our design according to the user needs and the defined issues that emerged from it, and allowed for the incorporation of both theoretical insights and user needs to shape the prototype in the second iteration. Thus making the design of Kunne Exphil an analytically informed design.

While the topic of gamification was an integral part of the MIX100 course, the theme of progress tracking emerged from the MIX100 prototypes. Furthermore, in the thematic analysis, the issue of demotivation in the Exphil course became apparent as a recurring theme, underscoring the users lacking sense of progress. Therefore, the thematic analysis draws on insights from both iterations, and the analysis of this thesis. The findings will be presented throughout the analysis of the research question in Chapter 5.

4.5 Research composition

Our research employed a combination of qualitative data collection methods, aimed at identifying user needs and requirements. This approach is called triangulation, which combines complementary methods that account for their limitations, to ensure that the data produces the same result (Preece et al., 2019, p. 264). Although the data collected is qualitative, and therefore will not achieve "true triangulation", one can achieve theoretical triangulation using different theoretical frameworks that have similar philosophical underpinnings (Preece et al., 2019, p. 264).

The project's combination of methods enabled us to compare the data from different techniques. For instance, a potential weakness of the focus groups is the power asymmetry between our participants and our dual roles as researchers and teacher

assistants. The responses collected in the focus groups are potentially shaped by the respondents perceptions of our expectations as teacher assistants rather than researchers. This can lead to the phenomenon where participants provide answers they believe are desired by the researchers, deviating from their own reflections of their true opinions on the matter (Preece et al., 2019, 264). To account for its potential weakness, the semi-structured interviews with participants outside of the MIX100 course can provide data material that point out complimentary themes through a different context and perspective.

5. Analysis

In this analysis, I will first present the progress trackers from MIX100, and how they informed the implementation of progress trackers in our own prototype. I will then present the sections in the order of how substantial the progress trackers are in the prototype Kunne Exphil.

The sequence of which the sections are presented reflect the *layers* of progress tracking within the prototype. The first and most central layer is the core of progress trackers in the prototype, which is not a learning mode, but five extensive progress tracking elements where all user activity across the platform is collected and visualized.

The second layer consists of the five learning modes, which will be arranged in order of their significance in terms of progress tracking. These modes are presented based on the extent to which they utilize progress trackers, starting with the most utilized and ending with the least utilized. As the analysis progresses, the subsequent learning modes will be discussed briefly due to their more limited focus on progress tracking, reflecting their lesser utilization of these elements.

The structure of the sections will address the user needs first, then the prototype's design solution to the issues, followed by the implementation of the Octalysis framework through progress trackers and an evaluation of its effectiveness.

While previous research has primarily concentrated on the implementation of gamification through leaderboards and points in education, this thesis seeks to explore the subtle ways we can improve the user experience by harnessing the core drivers of

gamification in user-centered design by using progress tracking as a key motivational tool.

Before moving on to the analysis, a revisit to the research question:

To what extent can gamification through progress tracking be used as a motivational tool in Kunne Exphil?

5.1 Progress trackers in MIX100

The foundation of Kunne Exphil's progress tracking

In this section, I will present the two of the progress trackers from the MIX100 prototypes, and the qualities that became design implications for the final prototype Kunne Exphil.

Although a common thread through all the prototypes was that they visualized and measured progress, these two form the basis of the insight concerning the functionality and usability of progress trackers. As seen below in Figure 3, the prototypes utilized progress trackers in the form of progress bars and to-do-lists.

Figure 3: Progress bars and to-do-lists visualizing user progress.

The students' approach to solving the challenge of creating a motivating learning experience by utilizing progress trackers caught our interest early in the research

project, and became even more significant upon discovering its recurring presence in user needs.

Through our expert analysis of the prototypes, we discovered that the percentage of progress and general progress bars was difficult to understand as they lacked information about what was being measured, and how it was measured. Additionally, the to-do-tasks were dependent on the user to complete, which can lead to a false sense of progress and achievement if they are not actually completed. Though the challenges in design and technicalities behind progress trackers were important findings in this research, another important insight was that the students implemented these elements based on both their research findings and their own preferences.

5.2 Core progress tracking

Get organized instantly

In the final prototype, Kunne Exphil, the first layer of progress tracking acts as the core of all tracking across the digital learning platform. The core progress trackers consist of five elements that utilize core drivers of motivation in a unique way each, and are found in the landing page *Oversikt* (Overview). Metaphorically, Oversikt acts as a "port" where all progress tracking activity from the five modes of learning across the platform is collected and visualized.

Before assessing how the principles of gamification are used in the design and its effectiveness, I will present the user needs. These needs form the basis for our strategies in applying the Octalysis framework in our final design.

5.2.1 User needs

Findings from interviews revealed early on that the users were unmotivated and overwhelmed. Although there were many factors that contributed to this, there were two recurring issues that caused demotivation: pivotal shifts in motivation, a lack of perceived progression and decision fatigue. These findings are overarching user needs that not only affected the design of core progress tracking but also the learning modes.

Pivotal shifts in motivation

In the beginning of the semester, a majority of participants reported being either overwhelmed and confused, or highly motivated. Interestingly, the outer specters of these initial reactions to the course reversed as the semester continued. The highly motivated participants described that their motivation decreased progressively throughout the semester due to an overwhelming curriculum, while the overwhelmed students became more motivated as they acquired new knowledge and overcame their initial perception of the "insurmountable" curriculum and the topics at hand:

Overwhelmed in the beginning:

"I think, what was kind of nice about Exphil. was that it was obviously very tough at the beginning when you first started learning new things, but after I learned it, then I knew it!"

Highly motivated in the beginning:

"I was engaged at the beginning to learn and had a positive attitude. But then two months passed, and I felt that I didn't understand it, so then my motivation dropped a bit, actually."

Though there were varying degrees of motivation, the majority of participants experienced the latter, where motivation decreased as the course progressed. These pivotal shifts in motivation show how their initial impression of course material can shape the participants' user experience. Therefore, the disjunction between students' expectations and reality shows that they need a structured overview of the course and its tasks.

It is worth noting that the demotivation likely stems from a lack of previous academic experience, making these challenges even more challenging to handle. Here, the two fundamental components of intrinsic motivation, competence and autonomy, are weakened (Deci & Ryan, 2000, p. 70). Their lack of previous studying experience makes it difficult to accomplish the tasks at hand, leading to a lack of control, which also reduces the likelihood of success.

Lacking sense of progression

Another important finding was the difficulty in assessing their personal progress through the semester. The primary feedback participants received were scores from the module quizzes, and whether their weekly assignment was approved. The last, and most important feedback, was their final grade in the course. The scarce feedback, and the considerable leap from quiz scores to a conclusive course grade left the students feeling anxious and unsure of their knowledge:

"I managed fine at the beginning, but then it became more and more difficult. But I would have liked to receive feedback on what I did well and not so well, but we didn't get that".

As some participants managed well in the beginning of the course, some felt as though they "*got lost along the way*". Upon further investigation, the participants had little feedback to assess their prestations in the course. The doubts concerning their competence in the course was repeated among participants:

"It's a bit difficult to figure out how well you're doing when you don't get that feedback, where you stand in the course, other than a 'good job, done'. So, I'm not quite sure how you're supposed to aim for a grade, then."

The lack of feedback on performance and tasks to help them identify their areas of weakness made it challenging to set goals for their final examination. The participants suggested that they preferred the experience of achievement and progress over pursuing in-depth knowledge. Additionally, their self-esteem appears to play a role in their preferences to some extent, as they seek feedback to assess their comprehension and achievements.

Furthermore, the fact that a majority of the participants reported no prior experience with university-level courses underscores the need for enhanced guidance and feedback mechanisms:

"In the beginning, I found it very difficult, but I think it wasn't just because of Exphil; it was also because it was the first time I was studying (...)"

This indicated that users would benefit from guidance as some are inexperienced in academic courses and the demands of higher education.

Decision fatigue

Participants revealed that they struggled with their approach to the Exphil curriculum, a challenge that, upon further analysis, shows that decision fatigue is symptomatic of the aforementioned challenges of lacking progression and overall demotivation. One participant noted,

> *"Initially, I wanted to give it my all and have a good study routine. It always fails."*

This statement reflects the frustration felt by participants who struggle to maintain learning efforts. The burden of making decisions on what to study next, which study methods to learn material and how to manage their time effectively leads to procrastination.

5.2.2 Solution

In this part of the prototype, the core progress tracking addresses the users lack of motivation and feedback by giving the user a sense of control, and reduces decision fatigue by providing a comprehensive overview visualizing what has been done, what remains to be done, and suggest what they can do next. The five progress trackers are 1) *Ukens gjøremål* (Weekly tasks), 2) a feedback statement, 3) *Fortsett der du slapp* (Resume activity), 4) a calendar, and 5) *Påminnelser* (Reminders).

Ukens gjøremål

The users' problem with feeling overwhelmed suggested our design should assist the users by guiding them through the entirety of the course. Therefore the activities resemble a to-do-list, making it easier for the user to choose their next learning activity. Ukens gjøremål gently builds a path to the Win-State for the user to see, and motivates them to get closer to the goal.

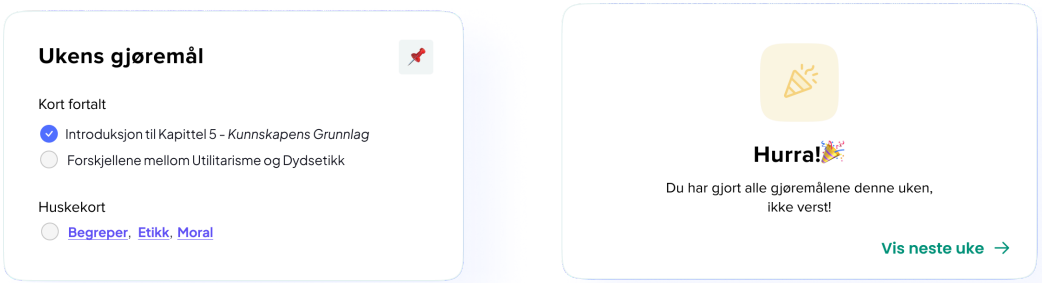


Figure 4: Ukens gjøremål in the active state versus the Win-State.

Here, the second core driver Development & Accomplishment was implemented in the design to lessen the feeling of being lost. As seen in the right part of Figure 4, the weekly tasks break down tasks into a to-do-list to alleviate the user's burden of figuring out what to do next and help with decision fatigue.

The tasks of a to-do-list are intentionally designed obstacles for the user to overcome, which in turn will create a sense of mastery when they are achieved. When the weekly tasks are completed, a Win-State is activated to display the user's accomplishment (see right part of Figure 4).

Furthermore, the principle of Unpredictability & Curiosity is implemented through *Glowing Choices*, which are features that stand out for the user to discover. This concept is also known as the isolation effect, where distinctive elements are more likely to attract interaction. By leveraging this effect, users' attention is drawn to these features, thereby guiding them towards their goals.

The weekly tasks are also time sensitive and the tasks will update with new ones at the beginning of a new week. This relates to the sixth driver Scarcity & Impatience, and creates a sense of urgency where one wishes to reach the Win-State before the weekly tasks disappear.

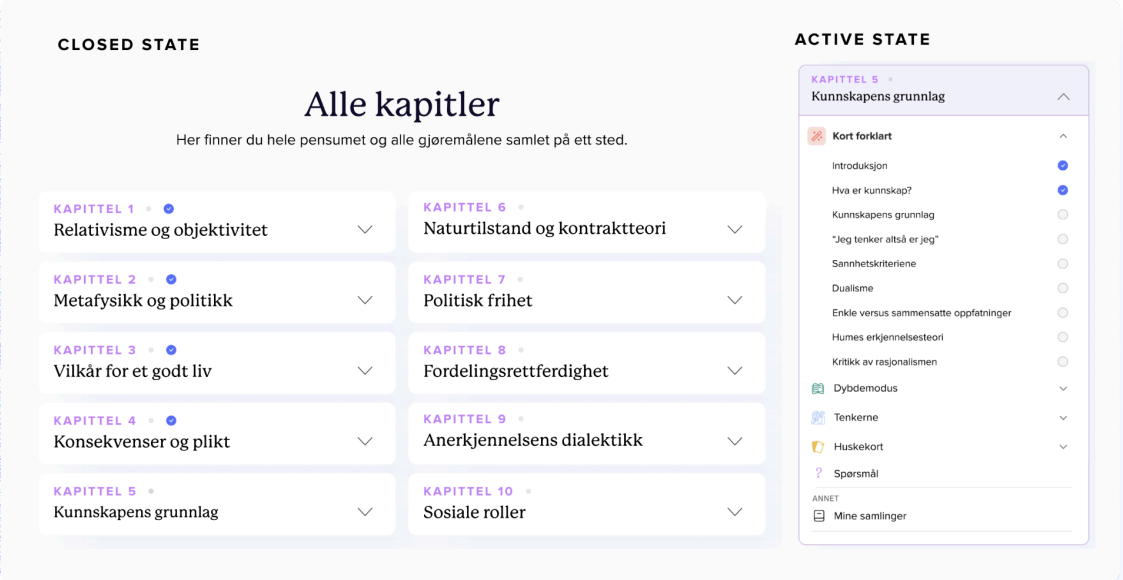


Figure 5: Alle kaptiler (All chapters) in closed state, and active state

To lessen the sting of incomplete tasks, the user has access to all tasks across the platform on the *Alle kaptiler* page (see Figure 5). As seen to the left on Figure 5, the active state of a chapter enables the user to continue their unfinished tasks, and repeat them if they need to. On a macro-level, the chapters where all tasks are completed are marked by a blue checkmark. The user's aversion to loss is effective for promoting motivation, but if used too aggressively the user experience of loss can demotivate the user.

Feedback statement

Although the insights from interviews yielded useful design implications, the design of progress trackers proved to be especially complex and challenging to get right. We designed iterations of pie charts, progress bars, user activity streaks, where none seemed to be useful for the user. Upon further investigation of the driver of Development & Accomplishment, we saw that the progress trackers needed to be *meaningful* in order to be *useful*. However, seeing the achievements through progress trackers does not necessarily lead to the feeling of accomplishment. As Kokkvoll & Johansen (2024) points out: “the sense of mastery is always tied to the feeling of completing or overcoming something”.

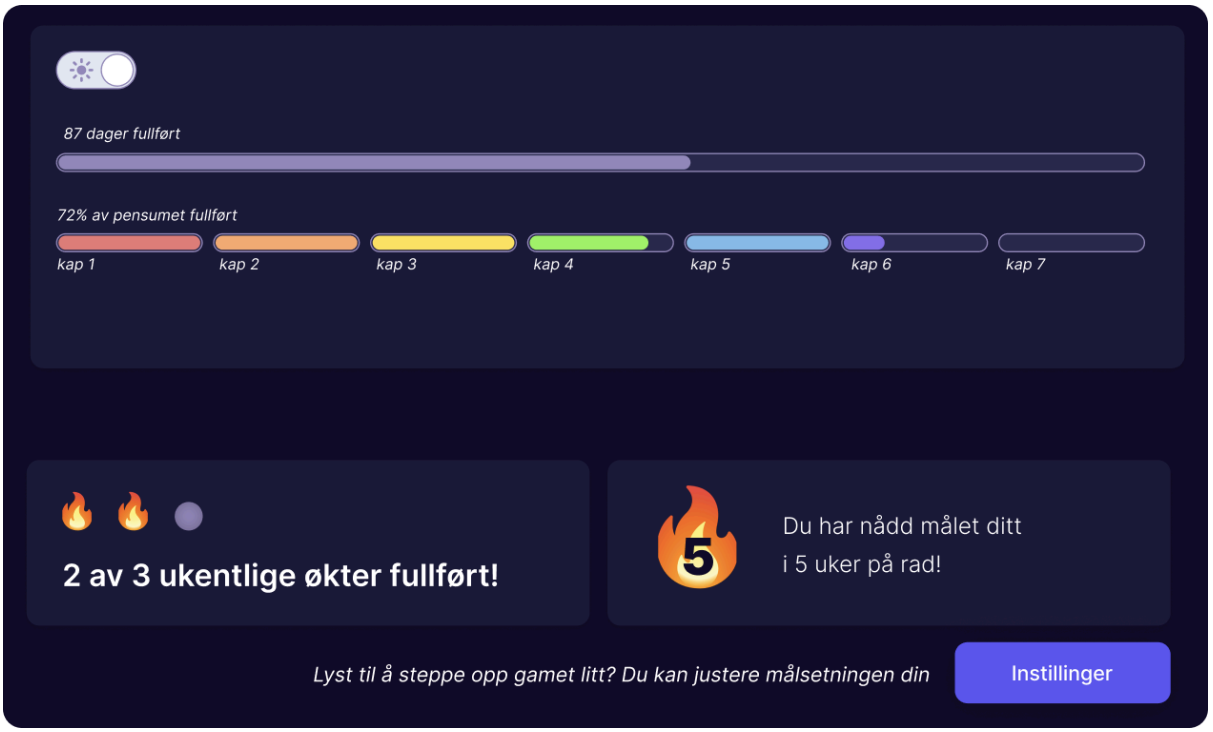


Figure 6: Progress trackers of the mid/high fidelity prototype.

As shown above in Figure 6, the progress trackers from the mid/high fidelity prototype included linear progress trackers. Here, the conventional visualizations of progress trackers were designed on the assumption that it would be meaningful to the user. Its general tracking qualities proved to be difficult for the user to grasp, as it does not sufficiently specify *what* it measures and *why*. In terms of solving the users problem, our design conceptually performed the same function as a physical book: the user read through material on the platform and the progress tracker provided an indicator of the user's general progress.

Upon further investigation, the mid/high-fidelity prototype utilized the drivers of Development & Accomplishment and Empowerment of Creativity & Feedback in a superficial manner. Additionally, the linear progress bars did not take into account that the perception of progress is often non-linear (Harrison et al., 2007). Here, we iterated through the progress trackers based on user test insights, and removed unnecessary elements, also known as the filtering activity of prototyping (Lim et al. 2008). As a result, the progress tracker deemed most appropriate is a feedback statement that explicitly tells the user what it measures, thereby enforcing a deeper meaning to why they are displayed the positive feedback statement.

The final solution, as shown below in Figure 7, is a constructive feedback statement that displays progress in explicit numbers. These reflect four tracking activities: number of pages read, activity time and which tasks and chapters have been completed.

Figure 7: The feedback statement progress tracker.

The feedback statement shown in Figure 7 tracking activities reflect the user's effort, where the title “Fantastisk! Du er på riktig spor” is the statement and the basis for the statement is visualized below. Although the statement is static in the prototype, its intended function is that it will adjust according to whether the user is in route or not.

A challenge with this feedback statement is what it will relay when *Sara* is falling behind the curriculum schedule. The feedback statement was deemed useful and motivating in the user testing, but was questioned during a user test, when a user wondered if they would receive exclusively positive feedback despite low progress. Giving positive feedback when due is important, but overuse will cause inflation and reduce its meaning and impact. Therefore, the feedback statement provides motivation, but in the future one must consider what the statement will tell the user upon poor results.

Fortsett der du slapp

The final solution for the element *Fortsett der du slapp* element includes three traditional progress bars that progress towards a check-mark. Here, the user is presented with three of their last activities that were left unfinished.

Figure 8: The final solution for "Fortsett der du slapp".

As shown in Figure 8, this element is a resume functionality that acts as a bookmark. Upon completion the checkmark will turn to a completed state, or Win-State, and the activity will be registered in the Ukens gjøremål element and in Kapitler. This element was applied in the mid/high-fidelity prototyping to address user's lack of motivation by showing the user what remains and give them easy access to the content where they left off.

As shown below in Figure 9, the mid/high-fidelity prototype included details about the learning activities and linear progress bars with time predictions of how long the remainder will take to complete. The design utilizes Development & Accomplishment and Scarcity & Impatience, however, the user test revealed a lack of transparency, as the participant expressed hesitation and uncertainty about the destinations they would reach within the prototype upon interaction. Additionally, we observed that the amount of activities visualized was excessive, and made it difficult to

pick an activity. This became the reasoning behind removing some features, and increasing the transparency.

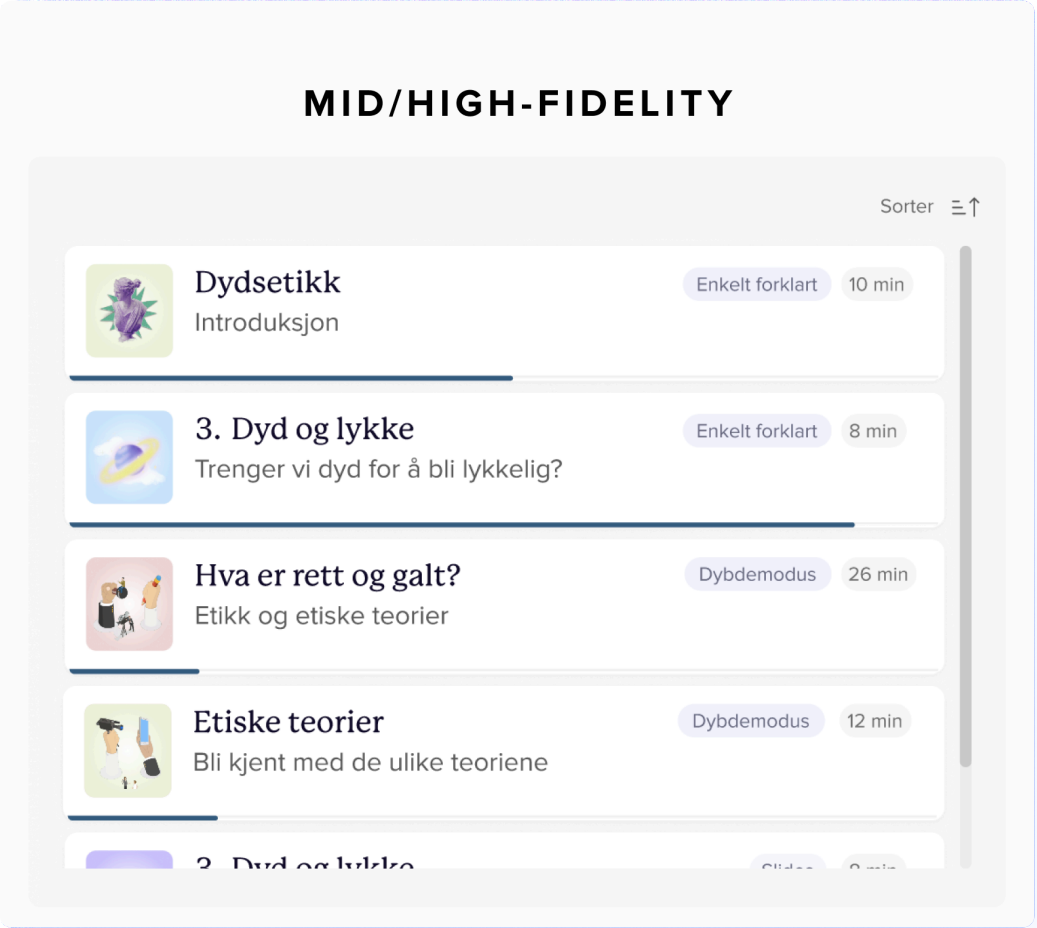


Figure 9: Mid/high-fidelity solution for "Fortsett der du slapp".

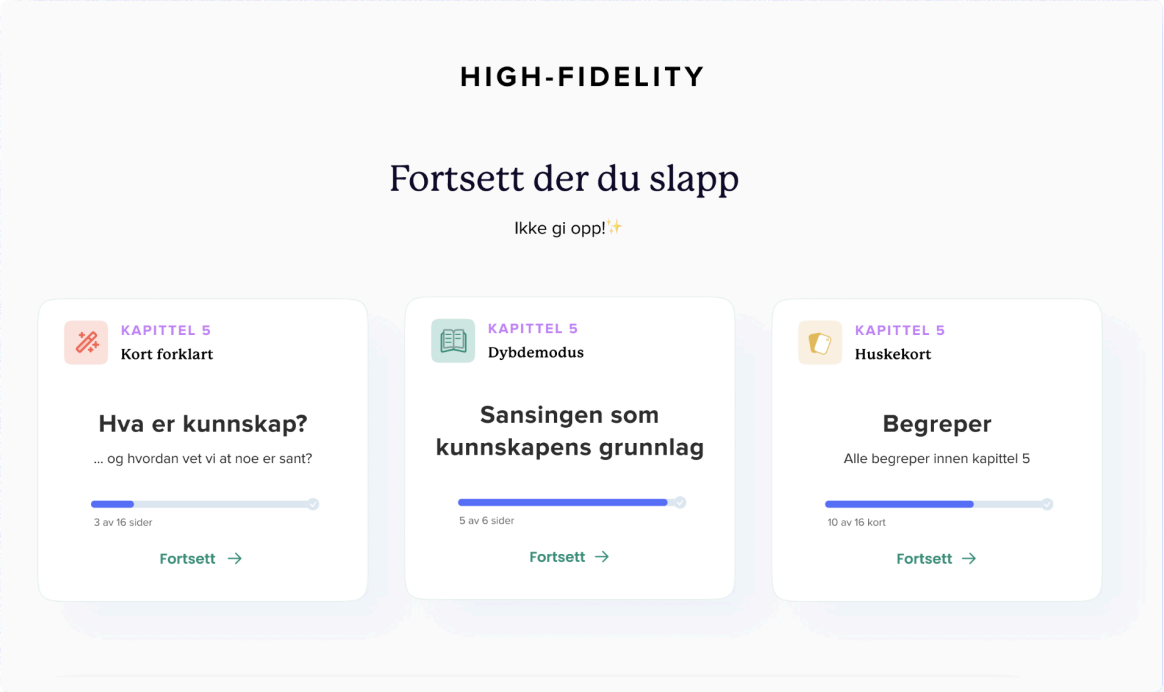


Figure 10: High-fidelity and final solution for "Fortsett der du slapp".

In the final solution of the resume element (shown in Figure 10), the design incorporates the principles of Development & Accomplishment and Scarcity & Impatience to a higher degree as it addresses the issues that arose in the user test. First, visualizing a selection of three activities reduces decision fatigue and gives the user a sense of control. Secondly, the goal of the activity is specified by unfinished checkmarks at the end of each progress bar. Thirdly, the progress bars are transparent, clearly stating the mode in which the activity will take place. Lastly, the former time predictors are replaced by specific text descriptions of the tasks, such as the number of remaining pages or flashcards.

The principle of Scarcity & Impatience drives motivation because the user is unable to achieve the task immediately, and there is an obstacle to obtaining it. The unfinished progress bars will be slightly taunting for the user if left unfinished. However, the intended user experience is not to induce negative emotions, but to offer realistic depiction of what remains of tasks, which can be slightly uncomfortable. Upon completion the user will sense relief and achievement, as they overcame the challenge of

completing a task, which in turn enforces the principle of Development & Accomplishment and enhances the sense of progression.

One of the benefits of progress trackers is that they help users monitor their progress through the entirety of a task and assist by visualizing what remains. This not only provides a clear sense of direction but also provokes curiosity about upcoming content. By visualizing what remains, progress trackers tap into the principle of Unpredictability & Curiosity, motivating users to seek answers about what comes next.

Furthermore, as the platform helps users see where they left off, the progress bars leverage the principle of Empowerment of Creativity & Feedback. They offer continuous opportunities for users to interact with the curriculum and receive immediate feedback when the task has been successfully completed. This interplay ensures that users are both motivated by curiosity and empowered through constant interaction and feedback, assisting them achieve a sense of progress and achievement.

Calendar

The calendar, as shown below in Figure 11, has the traditional layout of one and is personalized according to user input of their exam dates and weekly seminars from the onboarding steps. Seminars, important dates and the final exam are marked by dots that are color coded in accordance with the activity it represents.

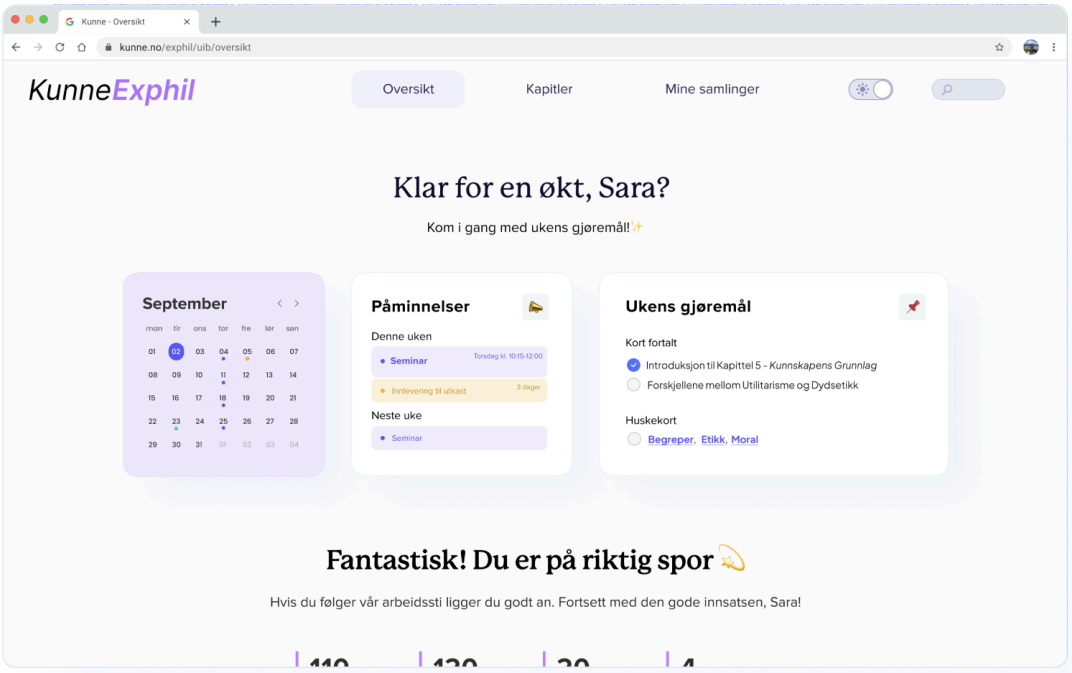


Figure 11: The calendar on the Oversikt page.

The calendar is situated on the landing page Oversikt. The calendar utilizes four Octalysis principles. The first and most prominent principle utilized in this element is Epic Meaning & Calling by providing users a purpose-driven approach to their course journey, highlighting the key dates and milestones. The second, Scarcity & Impatience, is apparent in the visualization of upcoming deadlines which can create a sense of urgency, motivating users to stay on track. The third is Ownership & Possession, as this element is based on user input from the onboarding phase of the prototype. This will enhance their sense of control over their own schedule and motivate them to take action.

The calendar visualizes progress by displaying dates from user input and provides a clear sense of progression. Thus, while not an obvious gamified element, the calendar employs the same mechanisms of Development & Accomplishment, Epic Meaning & Calling, Scarcity & Impatience and Ownership & Possession that shape the user experience and drive user motivation.

Påminnelser

The last core element, *Påminnelser* (see figure 11), is an elaboration of the calendar's activities and specifies the time and details of the upcoming activities. While Påminnelser correlates to the same core drivers as the calendar, it enhances the user experience by providing more information and notifications. Due to its similarities, I will highlight how Påminnelser serves a different function within the user experience than the calendar.

Påminnelser visualizes the progress and short term goals on a micro-level compared to Calendar, which provides a macro view of progress and long-term goals. Therefore, Påminnelser can provide a motivation for the daily or weekly engagement, as it breaks down the activities into manageable information. This decreases the prominence of Epic Meaning & Calling seen in calendar, and strengthens the Driver of Development & Accomplishment.

Summary

In this section I have shown how the core elements of Kunne Exphil's Ukens gjøremål, Feedback statement, Fortsett der du slapp, Calendar, and Påminnelser work together to provide users with a comprehensive, motivating, and structured approach to their learning journey. These features reduce decision fatigue, enhance motivation through clear feedback and progress visualization, and ensure users have a realistic understanding of their remaining tasks. By leveraging principles such as Development & Accomplishment, Unpredictability & Curiosity, and Scarcity & Impatience, the system creates an engaging and supportive learning environment tailored to user needs and progress.

The core progress trackers implement a total of seven principles from the Octalysis framework. The only principle that is not utilized is Social Influence & Relatedness. This decision was based on insights from interviews and two key theoretical considerations. Our research revealed that while participants were open to social elements like forums and chats, they did not particularly see the need for them, as the majority had friends, seminars, and study groups they attended regularly to discuss the curriculum. Additionally, Social Influence & Relatedness is one of the strongest drivers in the Octalysis framework and has significant potential to negatively impact the user experience through social pressures and distractions.

Another aspect to consider is the context in which it is applied. If the Kunne Exphil prototype focused on scores and points, incorporating leaderboards and social aspects would be beneficial. These could be effectively combined with the heavily utilized principle of Development & Accomplishment seen in the core progress trackers. However, Kunne Exphil is oriented towards the user's learning journey, ensuring they stay on track, giving them a sense of progression towards their weekly goals, thus making the overall experience motivating. Therefore, in this context, the risks of adding social elements outweigh the potential benefits.

5.3 Five modes for learning

Three ways to learn, two ways to test

The second layer of progress tracking is found in the five learning modes of Kunne Exphil. The learning modes are divided into two groups: one focused on reading and learning, and the other on testing comprehension and memory. Each mode includes varying degrees of tracking elements to monitor user activity and progression, which are then registered and visualized in the core tracking elements. This section will present the progress trackers for each mode, why they are important for the core progress trackers. Furthermore, I will highlight how the principles of the Octalysis framework are implemented and evaluate their effectiveness.

5.3.1 Kort fortalt

Easy hurdles to overcome

Kort forklart introduces key topics and definitions in a simple manner, and acts as the starting point for each chapter. This learning mode presents the core concepts of a topic, and familiarizes the user with the fundamentals before they read in-depth material in the reading mode *Dybdemodus*.

User needs

The participants addressed several challenges with the curriculum that lowered their motivation, including its sheer volume, material complexity and a lack of perceived progression. One participant that struggled with these challenges offered a potential solution to this problem:

"Maybe a webpage where the curriculum is very short and concise, and that it is clear that you can see that you are working your way through it, the progress, so that it doesn't feel so endless."

When asked about expectations of a digital learning platform, another participant underscored the importance and potential of motivational support that a digital learning platform can provide:

"I had expected it to provide more motivation to understand or to want to understand it [Exphil curriculum] properly, you know. To make it a bit more exciting than just reading. And maybe a bit easier, perhaps. A more convenient way to acquire information, to learn."

Upon further analysis, the participants were aware and interested in how the digital format can make the learning experience more motivating and enjoyable compared to books and lectures.

Solution

To address these challenges, Kort forklart breaks down the overarching theories and complex information into 'bite-size' learning. This approach makes it easier for students to digest the content at their own pace, providing a clear marker of progress.

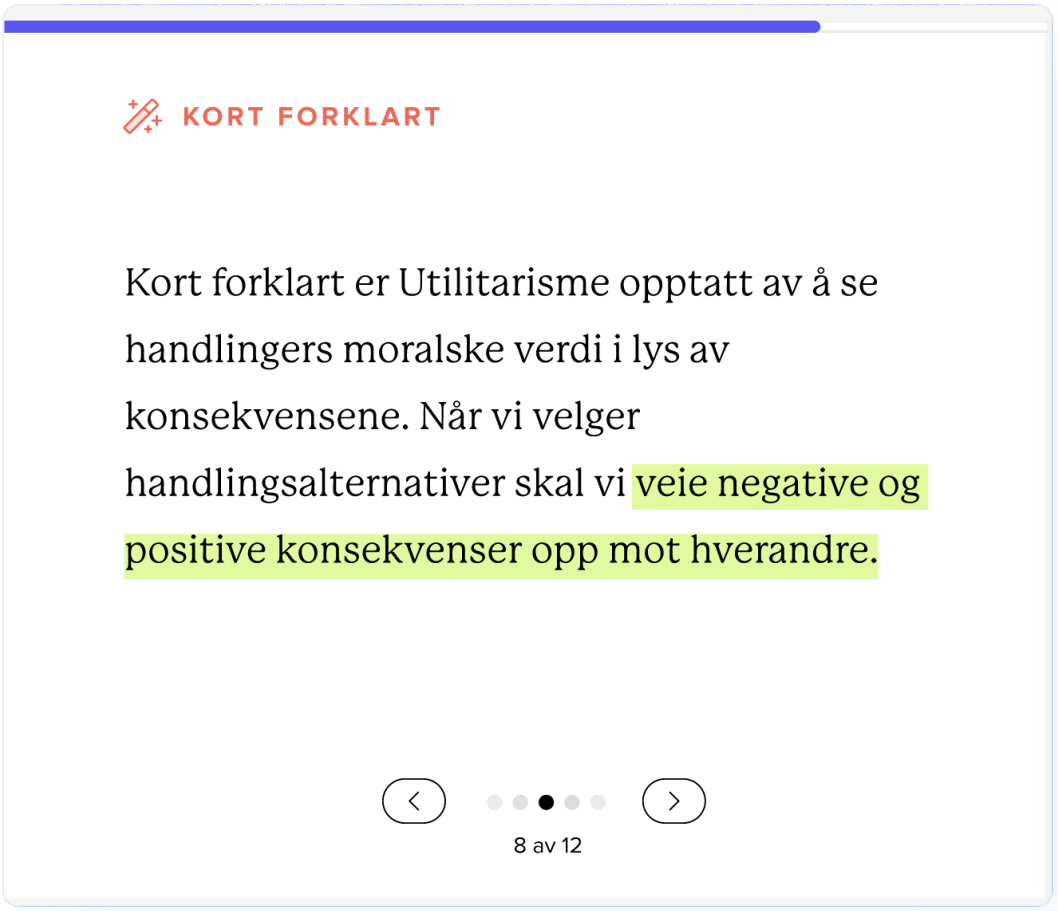


Figure 12: Kort forklart progress tracker.

One of the advantages of breaking down the curriculum into smaller sections is that user activity becomes easier for the system to measure and track. The purple linear progress tracker, seen in the top of Figure 12, is that it helps the users monitor the progress through the entirety of a task. The progress bar visualizes the path towards completion, which addresses the issue of 'endless curriculum'. Firstly, the simplification of curriculum becomes easy tasks for the users to complete. Once a user is familiarized with the learning mode they will know that it is manageable and that the intentionally designed hurdle is to browse all slides on each topic. Here, the user benefits from the interplay of the overarching core driver Development & Accomplishment, and the principle of Unpredictability & Curiosity.

The content of Kort forklart is presented in limited amounts, and indicates that an elaboration on the topic will follow on the next page. This implementation of the

principle Unpredictability & Curiosity draws users attention towards what comes next upon further browsing, which piques the user's interest in seeking additional information. This approach demonstrates the important relationship between content and progress trackers, where the benefits of one are dependent on the other. As seen below in Figure 13, the principle of Development & Accomplishment is implemented by a progress tracker, rewarding the user upon their task completion with positive feedback and animated checkmark that transforms itself from unfinished to completed.

Figure 13: Completed state of the progress tracker.

The simplicity of Kort forklart does not require significant effort from the users, while still giving them an opportunity to feel productive. The slides are manageable segments of core topics that help users mitigate the feeling of being overwhelmed, and ensure that the learning journey is structured and less daunting. Furthermore, breaking down the curriculum into simple slides enables Kunne Exphil to continuously capture and reflect the users progress in the core progress trackers of Fortsett der du slapp, Ukens gjøremål and lastly in the full collection of tasks Alle kapitler.

The interplay of Unpredictability & Curiosity and Development & Accomplishment guides users in their own learning journey, while using curiosity and

accomplishment as a driver for motivation, thus supporting a motivating user experience.

5.3.2 Spørsmål

Get feedback on your strengths and weaknesses while learning

The learning mode *Spørsmål* gives the user an opportunity to test curriculum comprehension and identify their strongest and weakest topics enabling them to adjust their future studying accordingly. It resembles a quiz, and upon completion gives users a summary of the result.

User needs

Among our participants, quizzes were the most popular interactive strategy for learning the curriculum. Quizzes were particularly valued for their ability to filter out key topics for learning and recall. One participant noted its benefits:

> *"If I need to go through a large topic for something like an exam, I've found that quizzes are a good way to go through things"*

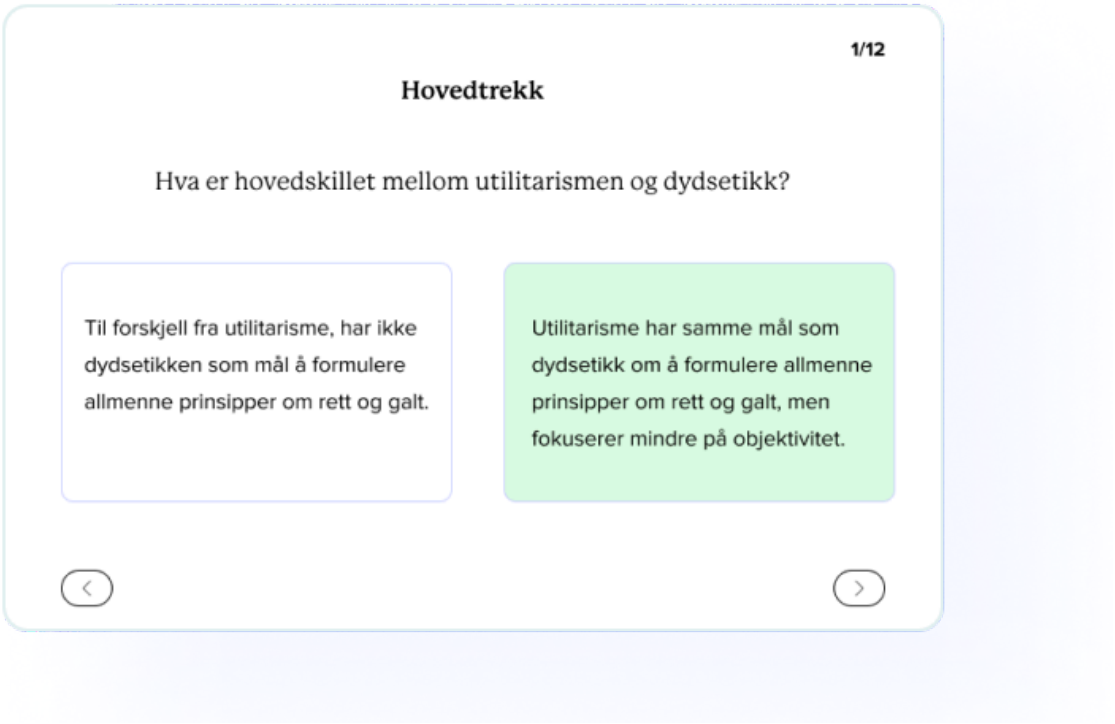
The recurring issue of demotivation is significant, often stemming from disengaging and monotonous learning methods. Traditional learning methods such as expensive books were typically cited as less effective and less engaging. One participant elaborated on their preference for quizzes over books:

> *"(...) The quizzes are also quite good. Just reading a book often feels a bit dry to me."*

Upon further analysis, the participants showed a high awareness around how the digital format of a learning platform could combat the demotivation from 'boring' books by implementing interactive learning elements to maintain motivation.

Solution

Spørsmål acts as a quiz and utilizes the two principles of Empowerment of Creativity & Feedback, and Development & Accomplishment by giving users immediate feedback upon their quiz answer as seen below in Figure 14.



While the former learning element, Kort fortalt, offers the user a low effort learning activity, Spørsmål poses a higher degree of difficulty for the user to overcome. The quiz questions will be difficult to answer if not prepared for, and requires previous effort in the learning modes. The greater difficulty, the stronger sense of achievement users will experience when they overcome it. However, the sense of achievement would be further enhanced by utilizing the principle of Scarcity & Impatience and can be implemented by adding a timer function. Pressure of a time limit can be motivating and make the quiz more engaging. If the time runs out, the quiz will fail, tapping into the principle of Avoidance & Loss. This combination creates a stronger foundation for creating a motivating and rewarding user experience.

The progress tracking activity lies not only in the activity of answering quiz questions and tracking their score, but also in the system, where a completed quiz appears as a completed task in the core driver Ukens gjøremål or in Alle kapitler.

Figure 15: Summary of quiz results in Spørsmål.

As seen below in Figure 15, the progress tracker is a numerical score, providing immediate feedback. Although the principle of Empowerment of Creativity & Feedback is utilized here, it does not acknowledge if the user did well or reward them for it. The design would create a more meaningful sense of achievement by leveraging the principle of Development & Accomplishment through positive feedback such as comparing the user's result to previous scores or awarding them badges. In the design process we were aware of this principal's pitfall: superficial application of badges and points, as the focus groups revealed skepticism amongst the participants towards some

gamification elements such as avatars and badges, and whether these features resonated with their needs:

"*I feel that if there is too much of it [gamification], it can become childish. It kind of loses focus on what you're actually supposed to do, which is to learn something. You're not supposed to sit there with your avatar…*"

The target group are young adults, and specific game elements can be perceived as childish, even patronizing for some. As a consequence, the elements can become an annoyance as they do not see the value or intention of it.

In hindsight, it would be beneficial to further explore as the context for applying badges or points is appropriate in quizzes. Therefore, his element addresses the users call for quizzes, but does not unlock the full potential of the gamification principles.

5.3.3 Huskekort

Keep track of your strongest and weakest topics

Huskekort (Flashcards), provides users with an alternative way to interact with material. The learning mode offers self-evaluation and learning by categorizing flashcards into two categories: "I need to practice more" and "I knew this". This automatically builds a deck of the weakest topics for the user to revise later.

User needs

As previously mentioned, interactive and engaging learning methods were sought after by the participants due the lack of feedback they received over the course of the semester. One participant noted that she preferred interactive learning methods:

"I think quizzes have been the most helpful thing I've encountered so far. Now, I don't have much else to compare with. But yes, that and flashcards"

Flashcards were included in one of the MIX100 prototypes, which made us aware of their potential prior to the interviews. Upon further analysis of the themes from

interviews, the need for simplification of curriculum and feedback underscored the importance of implementing not only one interactive learning mode. Therefore, we designed the Huskekort feature.

Solution

Huskekort stands out from the other modes because it lets users create their own flashcards. This enables users to determine the degree of difficulty if the premade flashcards from Kunne Exphil do not meet their requirements or needs. Here, the progress that is being tracked is dependent on how they evaluate their own comprehension and memory. As noted by Harrison et al. (2007), progress is not always perceived as something linear (p. 115).

This customization taps into the principle of Ownership & Possession by giving users control over their learning material, it creates a sense of ownership and personal investment in the learning process. The principles that this mode utilizes aligns with the principle of Development & Accomplishment. As users categorize their flashcards and see their “I knew this” deck grow, they experience a sense of progress and mastery. This continuous feedback loop enhances motivation and engagement, as users are constantly aware of their advancement, which is drawn from the principle of Empowerment of Creativity & Feedback (seen in Figure 16). This enables users to engage with the material actively and creatively, while reinforcing their understanding and retention.

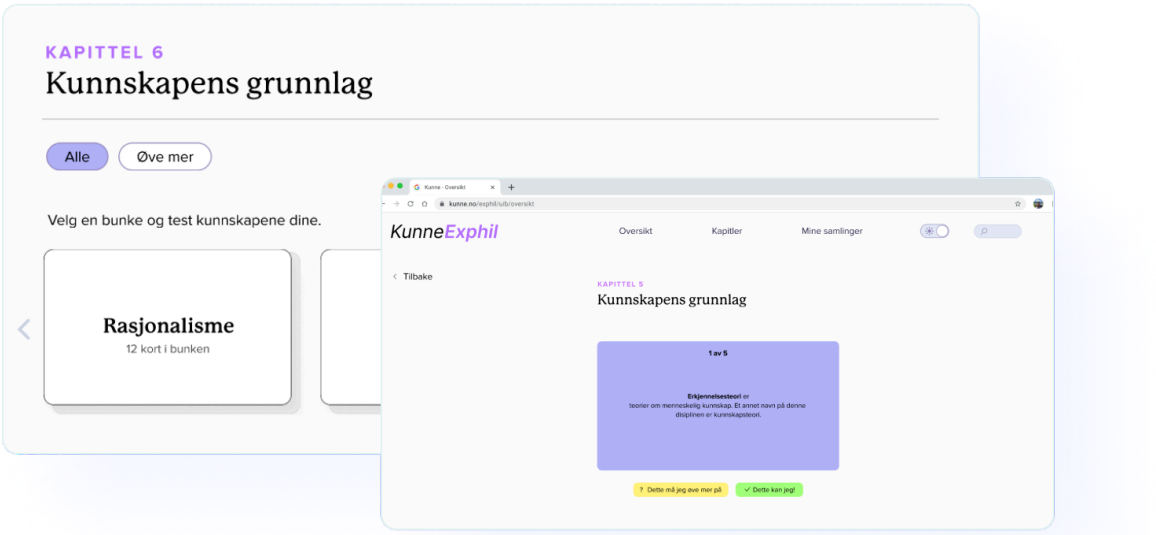


Figure 16: User flow from the flashcard collection to opening a flashcard deck.

Furthermore, the ability to revisit and revise weaker topics ties to the principle of Scarcity & Impatience. Knowing that they have specific areas to focus on creates a sense of urgency and enables users to direct their efforts effectively. Here, the three principles of Ownership & Possession, Development & Accomplishment and Empowerment of Feedback & Creativity support motivation by giving the user immediate feedback upon interaction.

5.3.4 Dybdemodus

Explore the curriculum in its entirety, without getting lost

Dybdemodus lets the user read the curriculum in its entirety and highlight important text. The highlighted text can either be saved as notes, or be used to create flashcards in *Mine samlinger* (My collections).

User needs

Whilst participants expressed their lack of motivation due to curriculum volume and complexity, they also expected a digital learning platform to provide them with access to

the curriculum in its entirety. Some raised concerns about whether they would pass an exam without having access to the syllabus books, as they "*wouldn't pay so much money for only quizzes and some definitions*". In other words, if they felt that they were missing parts of the curriculum, they were not willing to buy access to the platform. Since the interviews were conducted, the price of Kunne has increased from 470 kr to 649 kr, which in turn will further exaggerate this apprehension.

One of the issues with books is their static nature, because unless students have taken notes, it is difficult to remember what has been read and where they found the information. The findings indicate that they need assistance in remembering where they left off, and how far they are along.

Solution

To meet users' expectations of a digital learning platform subscription, we introduced the in-depth reading mode Dybdemodus.

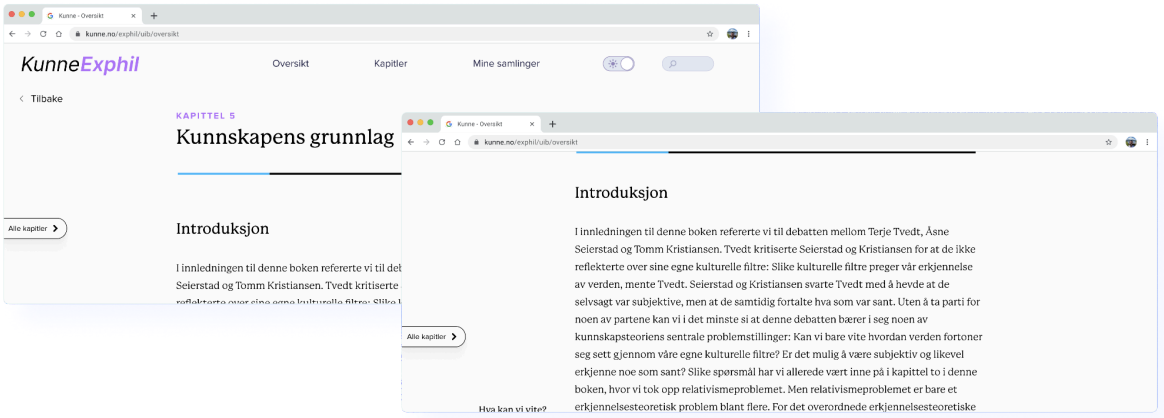


Figure 17: The progress bar in the mode Dybdemodus.

To offer a more motivating user experience beyond the typical ebook format, we implemented a linear progress bar, utilizing the principle of Development & Accomplishment. As shown in Figure 17, the progress bar is a visual representation of the user's current position in the book chapters, and how much remains of it. Upon scrolling further down the page, the progress bar sticks to the top, which enables the user to monitor their progression at all times.

When a chapter is completed, the system registers the task as finished, which is then visualized in Alle Kapitler or Ukentlige gjøremål. This feature not only helps users see their achievements but also give them motivation to complete the reading session, and feel satisfied upon completion. By utilizing these principles, we can ensure that Kunne Exphil provides the user with a motivating experience when reading compared to a book.

5.3.5 Tenkerne

Reducing cognitive overload

Tenkerne (The Thinkers) presents all relevant philosophers of the curriculum, containing the topics, theories and concepts that are related to them. This acts as a catalog of philosophers, where they are categorized after each topic they belong to.

User needs

The challenges of understanding the curriculum was not solely due to its text-heavy material and theoretical complexity. Participants expressed that remembering philosophers and distinguishing them from each other was hard. One participant offered a potential solution:

> *"(...) perhaps a dedicated section for philosophers where you have an overview of each philosopher covered in the curriculum, with keywords, their main ideas, and the ethical theories they support."*

Solution

Tenkerne appears as a catalog of philosophers, where the user can get a complete impression of each philosopher and the related theories and topics (shown in Figure 16).

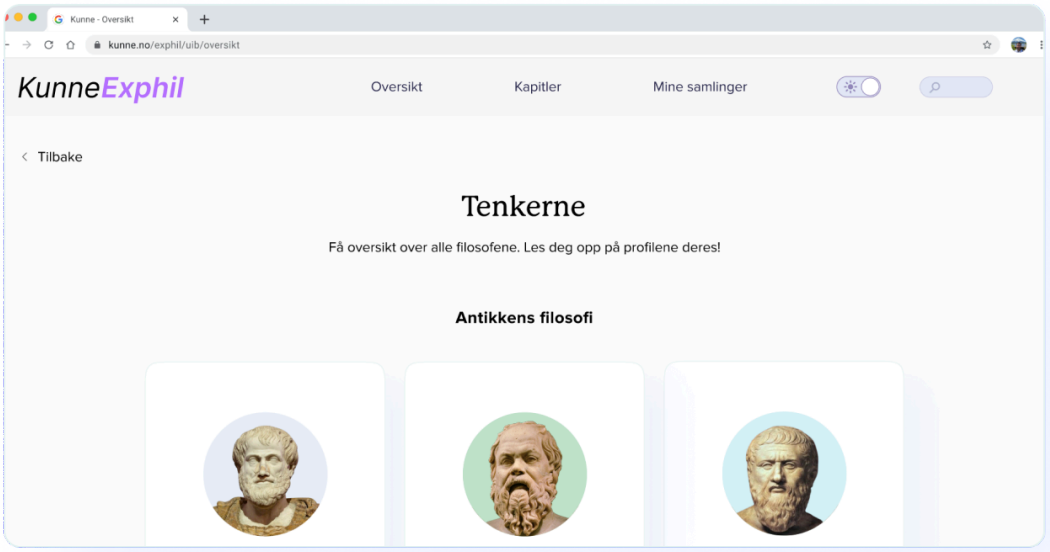


Figure 16: The learning mode "Tenkerne".

In this mode, the only intended progress tracking activity stems from the core tracker of Ukens gjøremål. For instance, if Emmanuel Kant is central to the week's curriculum, then his profile will appear as a weekly task. However, no additional progress trackers are incorporated within this mode.

The primary goal of Tenkerne is to provide a simple yet informative resource where users can revisit their profile if needed. In this context, the addition of excessive progress trackers could cause a negative impact on the user experience, where the tracking activities can cause an uncomfortable feeling of being constantly monitored and watched by the system.

6. Conclusion

This thesis explored the users issue of demotivation and analyzed how to design for motivation using progress tracking as a tool for motivation, by applying the principles of Yu-Kai Chou's Octalysis Framework for Gamification.

In Chapter 2, I presented the project's background for the practical component of the thesis, and presented Universitetsforlaget, our collaborators for the project, and their digital learning platform Kunne including the challenge they presented us with.

This chapter gave a brief overview of the university course Exphil, and the challenges it posed. Lastly, I presented the user group we have designed our prototype Kunne Exphil for.

In Chapter 3, I laid out the relevant theory and definitions that make the foundation for the thesis. This Chapter included definitions and concepts of interaction design, user experience design, and user-centered design including the iterative process that was the main field of the study for this project. Followingly, I presented progress trackers and the content consumption that is required for the activity of progress tracking, the psychology of self-determination theory behind human motivation, before presenting the concept of gamification. Furthermore, I have presented the Octalysis Framework for Gamification by Yu-Kai Chou (2015) and addressed the challenges and weaknesses of the framework.

In Chapter 4, I have presented the methodology for the development of the prototype, the data gathering methods and its iterations, including the thematic analysis that was conducted for this thesis. Lastly, I highlighted the reasonings behind our research composition.

In Chapter 5, I analyzed how the user needs and the core drivers of gamification affected the design, exploring to which degree the progress trackers can be used as a motivational tool. To do this, I presented layers of progress tracking within the prototype, by looking at the core progress tracking and how the tracking activities in the five modes contribute to a motivating learning experience and a sense of achievement. In this analysis I have answered the research question:

To what extent can gamification through progress tracking be used as a motivational tool in Kunne Exphil?

In summary, Kunne Exphil thoughtfully integrates gamification through progress trackers, addressing Universitetsforlaget's challenge to make the Exphil curriculum comprehensible and engaging, guiding students through tasks and curriculum to create a sense of mastery and accomplishment. Key insights from the MIX100 prototypes and semi-structured interviews with students informed the design, emphasizing the principle of Development & Accomplishment to align with user needs. I highlighted that

not all aspects of a learning platform require tracking activities, deliberately excluding Social Influence & Relatedness to avoid negative impacts from social pressures and distractions.

While gamification can have exploitative pitfalls, our approach harnesses its power through progress tracking to enhance user experience, providing Universitetsforlaget with a competitive advantage. Unlike previous research focused on leaderboards and points, this thesis demonstrates how subtle, core gamification drivers can improve user experience in a user-centered iterative design process.

In conclusion, this thesis has shown how the prototype Kunne Exphil leverages the core drivers of gamification to a high degree, but subtly and effectively, mindful of potential pitfalls and superficial applications. By focusing on core motivational drivers and integrating them into progress tracking elements, Kunne Exphil can offer the users a more meaningful and motivating learning experience.

6.1 Future work

The prototype is a result of a user-centered iterative design process. Therefore, the users have been central in the design and development of Kunne Exphil. Although the user tests enabled us to refine the design to meet their needs, our pool of participants is not a general representation of user needs. Therefore, the user needs and requirements could be further explored by additional testing and iterations of the prototype.

As designers and researchers in this project, we have a limited knowledge of the Exphil curriculum and how it should be presented to optimize learning retention. By teaming up with experts within the field, the prototype Kunne Exphil could further expand its contents to improve the relationship between the content, how it is presented and ultimately provide deeper insights on what needs to be tracked.

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