ExSnus: A Persuasive Mobile Health Application for Snus Cessation

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Abstract: The use of snus among Swedish youth is increasing, becoming a growing public health concern due to its associated health risks. To help individuals quit addictive behaviours such as snus consumption, mobile health applications have emerged as accessible and cost-effective tools. This project presents ExSnus, a mobile application prototype designed to support users in quitting snus by employing strategies based on a persuasive systems design framework. The application combines social interaction and self-monitoring to address key factors influencing snus use, such as social influence, cultural normalization, and health concerns. This approach ensures that ExSnus not only supports behavioural change but also provides an accessible tool tailored to the needs of young users.

1 INTRODUCTION

This section provides a comprehensive overview of the context surrounding snus consumption. It presents key statistics, highlights the physiological and cognitive effects of snus addiction, and discusses the challenges of cessation, including withdrawal symptoms and available treatments. Furthermore, it explores the potential role of emerging technologies, such as mobile health (mHealth) applications, in addressing this growing public health concern. These insights support the project's aim to design an effective mHealth application to assist Swedish university students in quitting snus.

1.1 Snus Consumption Statistics

Snus is a type of moist oral tobacco typically used by placing it behind the upper lip so that its active components, primarily nicotine, are absorbed through the oral mucosa (Byhamre et al., 2020). Its sale is only available in Sweden among all the European Union countries and in Norway. Although snus is usually considered a less harmful alternative to cigarettes (Clarke et al., 2019), recent studies are showing that it has associated health risks, including increased mortality rates and a potential association with deaths from cardiovascular disease and cancer (Byhamre et al., 2020; France-Presse, 2023; Norwegian Institute of Public Health, 2019). Recent statistics show that 13.6% of Swedes consume snus every day (Sohlberg & Wennberg, 2020). This trend is particularly alarming among younger demographics, where approximately half of high school students have tried it at least once (The Public Health Agency of Sweden, 2023).

1.2 Physiological and Cognitive Effects on Snus Addiction and Motivations to Quit

Delving into the reasons for consuming it, snus produces several positive effects in the body, mainly related to its nicotine content, a highly addictive substance that encourages its use. Snus promotes relaxation, helps with concentration, and improves mood, resulting in a cheerful feeling that typically lasts around half an hour (POUCHES.EU, 2020). Additionally, snus use is associated with certain beliefs and cognitive distortions that also contribute to addiction. These include the notion that snus relieves stress and the belief that it is necessary for coping with challenging emotions. Cognitive biases, such as underestimating the health risks of snus and

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overestimating its benefits, further reinforce these addictive behaviours (Cognitive Behavioral Therapy Los Angeles, 2020). Other factors influencing snus use include its perception as a less risky alternative to cigarettes or as an aid during smoking cessation (Ramström et al., 2016), as well as its cultural importance in Sweden (Pele et al., 2023).

However, several studies have shown that snus use can lead to overall morbidity and mortality (Byhamre et al., 2020; France-Presse, 2023), which motivates people to stop using it. A study conducted among young people found that nearly half of daily snus users were willing to quit (Danielsson et al., 2023). The study also demonstrated that awareness of the health risks associated with snus and receiving advice to quit had a positive impact on individuals' motivation to stop using it.

Another study conducted among Swedish smokers aged 16-84, who used snus as a method to quit smoking, identified additional reasons for quitting snus (Sohlberg & Wennberg, 2020). These reasons included health problems such as high blood pressure and dental problems, economic concerns because of the high price of snus, negative effects on relationships due to complaints related to the smell, and the perception of the habit as disgusting. Interestingly, some cited the difficulty of shipping and purchasing snus abroad as a reason to quit.

1.3 Cessation Consequences and Established Treatments

Despite the initial motivations, quitting snus is a challenging process due to the associated withdrawal symptoms that emerge when snus is no longer used. These negative symptoms occur because the body has become dependent on nicotine, a highly addictive substance present in snus that influences neurotransmitters in the brain's reward system. Since cigarettes and snus share this nicotine content, the withdrawal symptoms that occur when quitting snus are similar to those encountered when quitting smoking (Ashford, 2016). These withdrawal symptoms typically include intense cravings and mood changes such as anxiety, irritability, and difficulty concentrating and sleeping (Maana; Snusforumet, 2022). It is crucial for people who want to quit snus to be aware of these symptoms and when they are likely to occur. Understanding that these symptoms are only temporary can help them stay motivated throughout the cessation journey (Smokefree Veterans, 2021).

Over the years, different treatments have been developed to aid smoking cessation efforts, which can also be applied to quit snus given the shared nicotine content between the two products. Nicotine Replacement Therapy (NRT) is the most common smoking cessation method, using products that administer controlled doses of nicotine to alleviate cravings and withdrawal symptoms (Smokefree Veterans, 2021). The effectiveness of these treatments is enhanced when complemented with guidance or counselling, usually provided by healthcare professionals (National Cancer Institute, 2022; Smokefree Veterans, 2021). This counselling often involves cognitive approaches to help people change their attitudes towards tobacco and snus use, with Cognitive Behavioural Therapy (CBT) being one of the most established methods for managing nicotine withdrawal (Vinci, 2020). CBT focuses on identifying maladaptive thoughts and behaviours to then alter them (Cognitive Behavioral Therapy Los Angeles, 2020). Furthermore, CBT emphasizes the value of setting achievable goals and creating a realistic quit plan to prevent relapse, along with other strategies such as self-reminders of the reasons for quitting and rewards for resisting cravings (Jenlmat, 2018; Nicotine Pouches with Gum Protection, 2024).

However, accessing professional counselling can be tedious, especially for young people who might lack the motivation or economical means. As technology advances, new and more accessible alternatives for advice and counseling are emerging, including mHealth technologies. mHealth applications provide an opportunity to deliver continuous support, such as the previously mentioned cognitive therapies, making them readily available for people seeking to overcome addictive behaviours.

1.4 Aim of the Project

The increasing popularity of snus among Swedish youth, coupled with the mounting evidence of its associated health risks, is becoming a critical public health issue. To address this issue, mHealth applications have the potential to serve as powerful allies, providing accessible counselling to help individuals overcome addictions. This project focuses on designing a mHealth application tailored to aid university students in Sweden with snus cessation.

The design of the application will follow a service design process and incorporate a persuasive technology framework to ensure that it addresses the users' needs and effectively influences their behaviour changes towards snus use.

The main research questions guiding this project are:

a) What are the key factors that contribute to the use of snus?

b) How can a mobile snus cessation application can be designed to address these factors and incorporate a persuasive technology framework?

To answer these questions, the project will first identify the main drivers of snus use and then determine how a mobile application can effectively counteract them by following some persuasive technology principles.

2 THEORETICAL FRAMEWORKS

This section provides an in-depth presentation of the foundational theories and methodologies guiding the design of the mobile application. It delves into approaches such as Service Design, Persuasive Technology, and User Interface Design, explaining why they were selected. Furthermore, the integration of Artificial Intelligence counselling into the application is examined, highlighting its potential to enhance accessibility and personalization.

2.1 Adapted Design Approaches

This sub-section offers an overview of the theoretical foundation behind the approaches used in designing the mobile application for this study.

Service Design (SD) is rooted in design thinking, which focuses on understanding the users' needs to create products and services that improve user experiences (Stickdorn et al., 2020). SD has been already employed to develop several mHealth applications (Farao et al., 2020; Koumpouros, 2022; Woods et al., 2017). It was selected for this project based on evidence showing that mHeatlh applications designed without sufficient input from users and clinicians often fail to achieve high quality (Farao et al., 2020; Koumpouros, 2022).

Persuasive Technology (PT) uses non-coercive methods to alter user behaviours or attitudes (Wenker, 2022). In the health field, persuasive health technology (PHT) targets health-related behaviours to improve a person's health status (McLean, 2020; Orji et al., 2016). For this project, PHT aimed at tobacco cessation is particularly relevant. This type of PHT uses cognitive strategies to change users' attitudes towards tobacco use (Wenker, 2022), being CBT one of the most well-established methods. The Persuasive Systems Design (PSD) framework acts as a guideline for designing these persuasive technologies through four main areas: Primary Task Support, Computer-Human Dialogue Support, System Credibility Support, and Social Support (McLean, 2020).

Nevertheless, effective mHealth applications require both the right functionalities and an interface that is easy to use. User Interface (UI) design focuses on creating such interfaces (The Interaction Design Foundation, 2024) by defining a clear navigational structure and keeping the number of functionalities offered on each screen simple (Shokurova, 2020).

2.2 Artificial Intelligence Counseling in Health

The use of Artificial Intelligence (AI) based counseling is becoming popular in health-related applications (Espejo et al., 2023). AI-powered chatbots such as QuitBot (Fred Hutch Cancer Center, 2024) provide personalized support for smoking cessation by combining evidence-based content with natural language processing and machine learning. These chatbots offer users real-time guidance throughout the quitting process, making them more accessible and adaptable than traditional counseling methods (Fiske et al., 2019). Although AI holds promise for mental and physical health interventions, ethical considerations and ongoing research are essential to ensure these tools complement professional care effectively (Bendotti et al., 2023; He et al., 2022; Whittaker et al., 2022).

3 METHODS

Table 1 presents the methods employed across four phases of an adapted SD process: research, ideation, prototyping and validation, as depicted in Figure 1. The State-of-the-Art (SOTA), and user interview and its analysis were employed during the research phase. For the ideation phase, persona and use cases were created to represent the application's functionalities. Then, sketching, wireframing and interactive click modelling were used to create the digital prototype of the application. Finally, usability testing coupled with usability interview completed the validation phase. In this way, these methods were used to create this project's application, which was called ExSnus and will be referred to as such from now on.

In the initial research phase, SOTA was conducted to understand the current snus cessation methods. Existing smoking cessation strategies and mHealth applications for snus cessation were reviewed to assess their strengths, weaknesses, and potential gaps

Table 1: Methods Employed in This Study.

Methods	Research topic
State-of-the-Art (SOTA)	Existing mHealth applications for snus cessation
User interview	Relationship of college students with snus
Document and thematic analysis	Identifying key user needs for snus cessation from the SOTA and the interviews
Persona and use cases	Representing a potential end-user and defining the functionalities to address the identified user needs by implementing a persuasive technology framework
Sketching	Translating defined functionalities into visual elements
Wireframing	Converting sketches into digital designs, establishing connections between the application's screens
Interactive click modelling	Giving more realism and aesthetic to the digital screens following UI guidelines, making them functional
Usability testing	Moderated in-person testing where participants completed tasks in the interactive click prototype to evaluate its functionalities
Usability Interview	Use of AI counselling and preferred functionalities from the designed prototype to address snus addiction

that ExSnus could address (Beck et al., 2016). Additionally, current trends in mobile application design were studied to ensure ExSnus meets user expectations.

In parallel, user interviews in the form of semi-structured interview (Lazar et al., 2017) were conducted with five students at Chalmers University of Technology who use snus. The goal was to explore their motivations, experiences, and attitudes towards snus. The interview questions covered topics such as their snus habits and perspectives on quitting, like "Do you feel snus helps you in some way?" and "What do you think you need to help yourself to quit snus?". The answers were analysed using thematic analysis (Braun et al., 2006) to identify key themes that informed the design of ExSnus, ensuring that it addresses the needs users face when quitting snus.

In this way, the knowledge obtained in the research phase allowed the identification of necessary functionalities to be included in ExSnus during the ideation phase. Based on the collected and analysed data, a persona (Method Library - This is Service Design Doing, 2020) was created to represent the needs of potential users of ExSnus. Then, the functionalities of ExSnus were defined to address these needs, based on existing mHealth applications for snus cessation and following the principles of the PSD model. These functionalities are represented through use cases and a use case diagram, which illustrate how users interact with the application, describing their goals, actions, and system responses (Indeed Editorial Team, 2023).

Subsequently, mock-ups were created to visually represent the defined features of ExSnus during the prototyping phase. The prototyping process began with rough sketches, which were later translated into wireframes that focused on structure and layout, omitting visual design details such as content and colour schemes (Osman, 2023). Finally, a more detailed and interactive prototype of the main screens was developed from the wireframe. The project used the Figma[3] software to create both the wireframes and the final interactive prototype.

Lastly, the interactive prototype underwent usability testing to assess how intuitive and user-friendly it was (Maze, 2023). In this project, a moderated in-person approach was used, combining qualitative and quantitative methods. Five participants of the usability testing, who were from the target audience of college students, were given tasks to explore the main functionalities of the ExSnus prototype while verbalizing their thoughts using the Think Aloud protocol. This helped identify any confusing or frustrating elements of the screens (Bil et al., 2022). After completing the tasks, participants had a brief usability interview where they answered questions related to which part of the application they found most helpful for quitting snus, and their thoughts on the social and AI functionalities. They also completed the System Usability Scale (SUS) questionnaire to quantify their perception of the application's usability (Thomas, 2019). Their feedback could be used in future steps to refine the ExSnus prototype, ensuring it is user-friendly and effective before development begins.

4 RESULTS

This section presents the key findings from the design and validation of the ExSnus application. It delves into how theoretical frameworks such as SD and PT were applied during the design process to ensure that the application effectively addresses user needs. Then, it presents the innovative features incorporated into the application through user personas and use cases that are translated into visual design elements.

[3] Figma: The Collaborative Interface Design Tool

Finally, it summarizes user feedback gathered through usability.

4.1 Application of the Theoretical Framework

The design process for ExSnus was based on both the SD methodology and the PT framework. This dual approach ensured that ExSnus correctly addressed users' needs while also increasing user engagement and effectively influencing their behavior. Additionally, the visual design of ExSnus followed UI principles to ensure that the user experience was both intuitive and aesthetically pleasing.

An adapted SD process was followed in the design of ExSnus through the research, ideation, prototyping and validation phases to create and validate the application's functionalities. Tools such as user personas and use cases were employed to understand and meet user needs.

The PT framework was employed to define the functionalities of ExSnus so that it motivated users to quit snus (Vinci, 2020). Particular attention was paid to social support because interpersonal relationships and community influence are crucial for sustaining behavior changes (Oinas-Kukkonen et al., 2009; Soulakova et al., 2018). Various studies have shown that a supportive social environment enhances the success of quitting smoking (Creswell et al., 2015; Sorensen et al., 2002). This social support was integrated through different functionalities in ExSnus, such as allowing users to observe others performing similar behaviors and comparing their progress, which creates a sense of belonging (Fogg, 1998).

Finally, the UI guidelines introduced by Shokurova (2020) were followed to create a simple and intuitive interface. The layout was designed with calming colors and health-specific icons to provide a visually soothing experience.

4.2 Existing mHealth Applications for Snus Cessation: State-of-the-Art (SOTA)

While there are numerous mobile applications to help quit smoking, mobile applications focused on snus cessation are limited and relatively unknown. The found applications that are available either for Android or iPhone systems were Snus Stop, Quit Snus, DipQuit, Snuskollen, Snusfri and Slutta. The most common features across them focus on tracking progress through visual graphs or statistics, mainly on snus spared and money saved. Motivation is usually enhanced by reaching milestones related to days without consuming snus. It is also worth noting that, although some of the available applications provide information on health regained by quitting snus, this information often lacks scientific support, a limitation observed in smoking cessation applications as well. For instance, Haskins et al. (2017) found that only 2 out of 50 mobile applications directed to smoking cessation had scientific backing.

After SOTA, some of these found features were included when designing ExSnus, such as tracking money saved and snus use statistics. Nevertheless, this project goes further by including social features, an AI chatbot, and scientifically backed information on withdrawal symptoms and available therapies. Additionally, ExSnus provides deeper insights into users' triggers for cravings and offers tips to address them.

While research has been conducted on the effectiveness of smoking cessation applications (Haskins et al., 2017; Regmi et al., 2017; Scott-Sheldon et al., 2016; Whittaker et al., 2016), similar studies for snus cessation are lacking. The collective findings regarding smoking cessation mobile applications suggest that they are helpful, both independently and combined with face-to-face support or online programs, particularly in high-income countries that have established tobacco control measures. Reported quit rates for smoking cessation applications range from 12.5% to 51.5% (Barroso-Hurtado et al., 2021), with their success largely attributed to their ability to reach a wide audience at minimal cost, making them more accessible than other cessation interventions.

4.3 Interviews Analysis

The analysis of the interviews with five college student snus users in Sweden revealed several core themes related to their behaviors and perceptions about snus. These themes highlight user's needs that must be addressed when designing ExSnus.

4.3.1 Social and Cultural Influence

Snus use is deeply ingrained in Swedish culture, often introduced in social situations such as parties and considered a normal behaviour. This social acceptance creates a supportive environment to continue its use, making it difficult to find social support when trying to quit, which highlights the importance of including social support on the application.

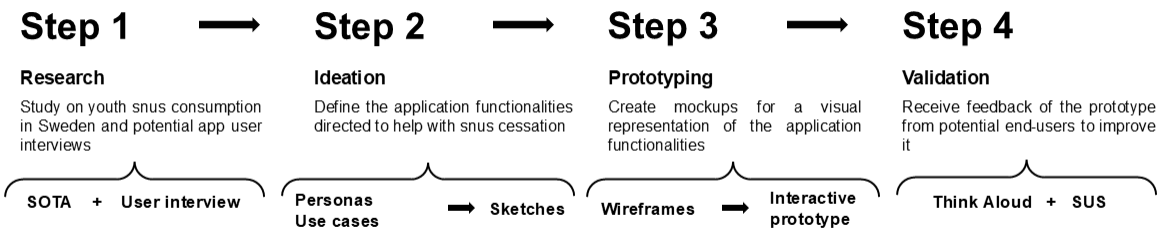

Figure 1: Project steps followed in the application design based on the adapted SD process (Stickdorn et al., 2020).

4.3.2 Addiction and Use of Snus

Many users exhibit physical and psychological dependency, using snus right after waking up and managing stress or focusing on tasks. Addressing these perceived functional benefits is essential to encourage quitting.

4.3.3 Health Concerns and Motivations for Cessation

Although interviewees were somewhat aware that snus could pose health risks, they lacked detailed knowledge about its contents and specific dangers. Health concerns, along with financial costs, were strong motivators for quitting, highlighting the importance of including health education and monetary incentives as key features of ExSnus.

4.3.4 Cessation Support and Technology Scepticism

The interviewees had varied opinions on how a mobile application could help them quit, with some suggesting features like managing triggers or sharing progress with friends.

4.4 Persona

A persona was designed based on insights from the literature study, SOTA and the interviews' analysis, presented in Figure 2 in our previously published paper (Puyuelo-Citoler et al., 2024). This persona represents a Swedish university student and serves as a typical model for potential users of ExSnus. His objectives, preferences, and challenges were considered when designing the use cases that shape the application's features.

4.5 Use Cases and UML Case Diagram

The created use cases cover the encountered user's needs through ExSnus. Then, a UML use case diagram was designed to represent the main functionalities depicted in the use cases and the interactions between the potential end-users and the ExSnus system, as shown in Figure 2. The defined uses cases are the following ones:

1. Create Profile: Enables users to create a personalized profile by completing a questionnaire to assess their addiction level and setting a quit date and motivations (e.g., monetary savings). This tailored profile helps the app provide customized support based on user-specific needs and preferences.
2. Record Snus Use: Allows users to log each instance of snus use, including their emotional state and activity at the time, helping them identify patterns and triggers.
3. Record Craving Overcame: Enables users to log instances when they successfully resist a craving, including details about their emotions, activities, and the methods used to overcome the craving. This supports habit change toward healthier behaviors.
4. Visualize Dashboard: Provides a visual summary of the user's quitting progress, including data on snus usage, emotional triggers, money saved, and health benefits achieved, offering insights to guide and motivate the user.
5. Visualize Timeline: Displays a timeline of the quitting journey, showing snus usage, cravings overcome, and milestones achieved. It also highlights expected health improvements and withdrawal symptoms based on scientific data to educate and prepare the user.
6. Engage with Social Features: Allows users to share their quitting progress and achievements on social media or within a community forum within the app, fostering social support and engagement.
7. Chat with AI Counsellor: Provides instant support through an AI-driven chat feature, offering advice, motivational messages, and

answers on questions related to the quitting journey.

8. Receive Notifications: Sends timely notifications about milestones, progress updates, social engagement, and reminders of quit dates or financial goals, helping users stay motivated.
9. Profile Management: Allows users to manage their profile settings, such as updating their quit date, financial goals, motivational messages, avatar, and notification preferences.

4.6 Application Design

After defining the functionalities of ExSnus through the use cases presented in the previous sub-section, they were translated into visual elements across various screens. Initially, hand-drawn sketches captured the essential features to ensure that all the functionalities were included in the designed screens. These sketches were then converted into a digital wireframe, which connected all screens in low-level detail, including buttons, main text, image placements, and different screen statuses like error messages. The wireframe shows the logic of how the application's screens are connected. During the design of the wireframe, guidelines were employed to correctly place navigation elements on the screens (Lazard et al., 2021) and display specific elements such as error messages (Santiago, 2020) so that the user experience is enhanced. Screens for the timeline, forum, and settings were inspired by existing designs found online using the key search words "Timeline mobile app design", "Forum mobile app design", and "App settings design".

After the wireframe was completed, a more detailed design was created for the main screens, incorporating visual elements such as calming colors, readable fonts, and a clear visual hierarchy for text and images, following healthcare applications' design principles (Mundia, 2023; Shapovalova, 2023; Shokurova, 2020). Most visual elements, such as font type and color, were chosen based on UI tips for accessibility and aesthetic appeal (Heryanta, 2024; Malik, 2023), ensuring that ExSnus provides a user-friendly and engaging experience.

Due to content limitations, only a few examples of the wireframe and final prototype are shown in Figure 3 and Figure 4. However, the full set of wireframes and prototypes can be accessed at Wireframe [4] and Interactive Click Model [5], respectively.

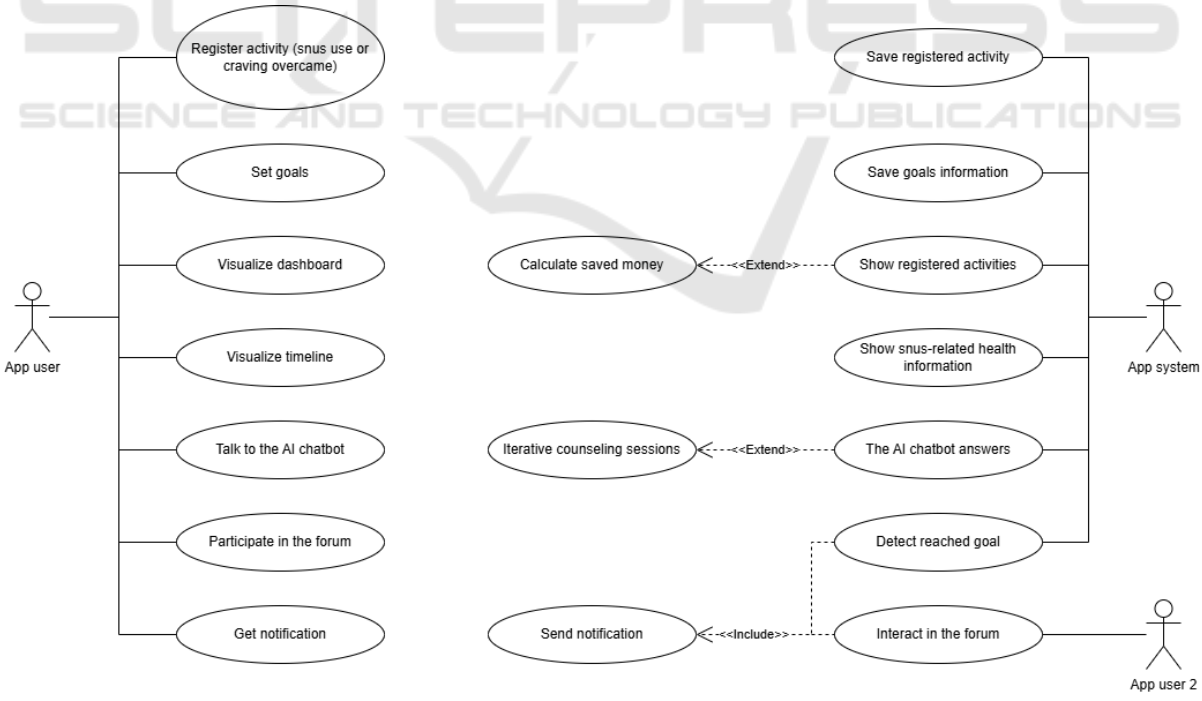

Figure 2: UML case diagram representing a summary of the use cases and the interaction with the system.

[4] Figma Wireframe

[5] Figma Interactive Click Model

4.7 Usability Test Analysis

This sub-section presents an analysis of the usability testing conducted to assess ExSnus' functionality and ease of use. The analysis is based on the feedback collected from participants through the Think Aloud process and interviews, as well as the results from the SUS questionnaire. The insights gained from this testing phase highlight both the strengths and areas for improvement in the design of ExSnus.

4.7.1 Results from the Think Aloud Process and the Usability Interview

Usability testing for ExSnus involved six university students in Sweden, aged 23 to 28. Most participants had prior experience using health applications and AI chatbots, and some had previously tried to change unhealthy habits, either independently or with professional help. Key insights from the Think Aloud process revealed that users appreciated the initial questions about their addiction level when setting their profile, because it made them feel the application was personalized to their individual cases. They also preferred multiple-choice questions rather than having to type responses. Additionally, users considered the dashboard the most useful screen, as it allowed them to track their progress. On this screen, the goal reminders were also welcomed, particularly those related to monetary savings. Another notable finding was the varied preferences regarding the frequency and number of notifications to be received.

Figure 3: Wireframe showing the screens for recording snus usage and cravings overcome, as specified in the second and third use cases.

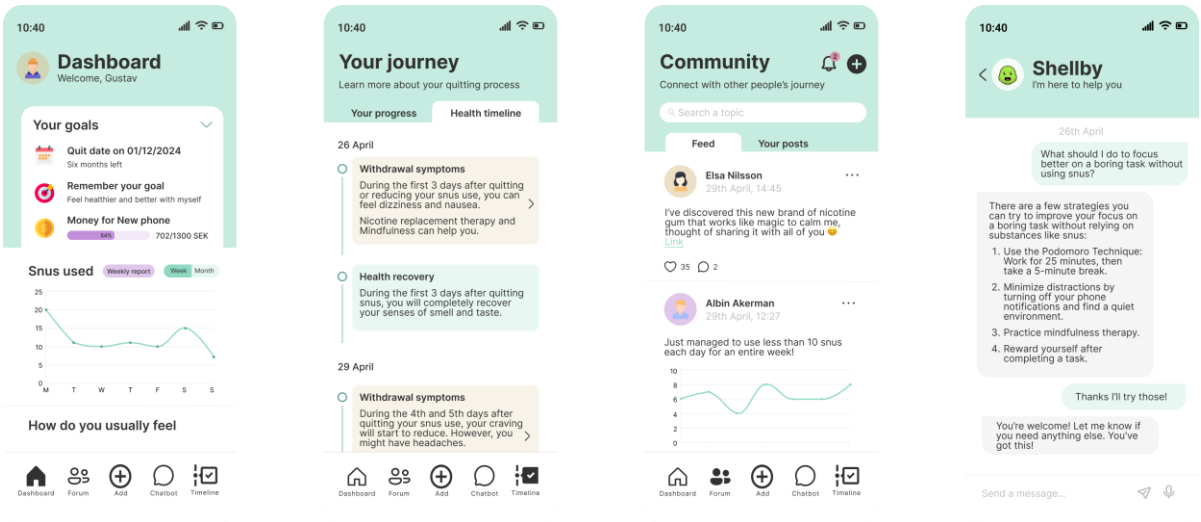

Figure 4: Example of some main screens from the application final design. From left to right: Dashboard, Timeline, Forum, and AI chatbot.

Figure 5: Usability Evaluation of ExSnus using the SUS.

4.7.2 Results from the SUS Questionnaire

The responses to the SUS questionnaire generally indicate that the system has strong usability, as shown in Figure 5. In the left plot, most SUS scores are concentrated in the high 80s, suggesting that users found the system very usable. The scores fall within the 'Best Imaginable' and 'Excellent' categories on the color-coded chart, indicating a positive user interface experience. The steep curve around the 70-80 score range reflects significantly better performance than typical SUS assessments. Most responses were positive, particularly regarding ease of use and the need for minimal prior knowledge or assistance. However, there was more variability in responses to questions related to how frequently users would use the system, how well functionalities are integrated, and whether others would find the system easy to use, pointing to potential areas for improvement.

5 DISCUSSION AND CONCLUSION

The design of ExSnus was guided by the application of the PT principles to address key factors driving snus use, including stress relief, cognitive biases, and social normalization, identified from the user interviews. Knowing that the nicotine content of snus provides relaxation, focus and mood enhancement to its users, ExSnus offers strategies to replace these benefits and manage withdrawal symptoms.

During the research phase, one of the critical factors discovered for the success of quitting snus was social support, as users highlighted the lack of it when attempting to quit. To address this, ExSnus enables users to share achievements and progress within a supportive community forum, fostering a sense of belonging and leveraging social influence to motivate them throughout their cessation journey. These are features included in the PT framework.

Self-monitoring features are another key element from the PT framework, allowing users to track their snus consumption, cravings, and progress over time. This aligns with CBT principles by enabling users to identify triggers, monitor their behavior patterns, and adopt effective strategies. Financial tracking of savings further reinforces motivation.

Educational content plays an essential role in addressing cognitive biases, such as the belief that snus is less harmful than smoking. Scientifically validated information on health risks and the benefit of quitting is delivered through features like the AI chatbot and the timeline. By increasing awareness and correcting misconceptions, ExSnus helps users to make informed decisions about their health.

Usability testing revealed that users appreciated personalized features, such as tailored questions and progress reminders, especially those related to financial savings. The dashboard was well-received for tracking progress, though mixed feedback on notifications and timeline displays, suggesting areas for improvement. Overall, the design of ExSnus successfully addresses user needs, demonstrating the potential of the adapted SD framework and the PT framework in mHealth applications.

Beyond its focus on snus cessation, ExSnus' functionalities, such as the AI chatbot and self-monitoring features, can be adapted to support individuals tackling other addictions, such as caffeine dependence or excessive gaming among teenagers. Furthermore, ExSnus could promote behavioral change beyond its primary target group of students by adapting the design to reach older generations.

In conclusion, ExSnus shows the potential of the PT framework in mHealth applications to assist with behaviour change. While its primary focus is on snus cessation, its adaptable design offers opportunities to address a wide range of addictive behaviours and health challenges. By expanding its current functionalities, its applicability to other addictions could be explored. In this way, our research has the potential to make a meaningful contribution to public health and behavioural change on a larger scale. Future research should prioritize evaluating ExSnus through randomized controlled trials to measure its effectiveness in reducing snus consumption and explore its scalability.

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