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Psymment
Web-based platform
to support psychologists' evaluation methods

MASTER DISSERTATION

Eva Patrícia Azevedo Freitas

INTERNATIONAL MASTER OF INTERACTIVE MEDIA DESIGN



UNIVERSIDADE da MADEIRA

A Nossa Universidade

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**Psyment: web-based platform to support psychologists'
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Mestrado em Design de Media Interativos

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Orientada por:

Luís Duarte Andrade Ferreira

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Abstract

The Covid-19 pandemic was a turning point for healthcare professionals as it forced the development of Information and Communication Technology (ICT)-based healthcare systems to provide better patient interaction and simplify healthcare professionals' working methods. As a result, this project aims to develop a novel web-based platform to assist these professionals in creating clinical assessment tools (i.e., Mini-Mental State Examination) for clinical populations and evaluate its results more efficiently. The project's purpose is threefold: 1) to develop cybersecurity measures to safeguard sensitive information of the clinical population, 2) to develop the system's backend, and 3) to focus on the user experience while developing the front end of the platform. Here, in this part of the thesis, we will focus on and discuss the user experience design while developing the front end of this platform. To develop such a web-based platform for healthcare professionals to create cognitive assessment tools, we had to 1) understand how they use pencil and paper-based cognitive assessment tools with clinical populations and 2) how they are evaluated. We performed 4 interviews with healthcare professionals; one was done while observing the interaction between healthcare professionals and the healthcare center's clinical population. Moreover, we researched similar existing platforms in the scientific literature and online services while evaluating the strengths and weaknesses of each platform. Developing a visually pleasing platform with easy functionalities adapted to the user experience of healthcare professionals is the key to achieving more accurate results for their patient's diagnoses while enhancing performance and productivity.

Keywords—clinical assessment tools, front end, user-centered design, productivity

Resumo

A pandemia de Covid-19 foi um ponto importante para que houvesse uma mudança nos métodos de trabalho dos profissionais de saúde, pois esta incentivou o desenvolvimento de Tecnologias de Informação e Comunicação (TIC) nos sistemas de saúde de modo a proporcionar uma melhor interação com os pacientes e simplificar os métodos de trabalho dos profissionais de saúde. Conseqüentemente, este projeto visa desenvolver uma nova plataforma *web-based* para auxiliar os profissionais de saúde na criação de ferramentas de avaliação clínica (ex., *Mini-Mental State Examination*) para populações clínicas e avaliar os seus resultados de forma mais eficiente. O objetivo do projeto está dividido em 3 partes: 1) desenvolver medidas de *cyber* segurança para salvaguardar informações sensíveis e confidenciais das populações clínicas, 2) desenvolver o *back-end* do sistema, e 3) focar-se na experiência do utilizador enquanto *front-end* da plataforma também é desenvolvido. Aqui, nesta parte da dissertação, nós iremos nos focar em e discutir sobre o design de experiência do utilizador enquanto desenvolvemos o *front-end* desta plataforma. Para desenvolver uma plataforma *web-based* para os profissionais de saúde conseguirem criar ferramentas de avaliação cognitiva, nós tivemos de 1) perceber como eles utilizam o papel e o lápis para executar os testes de avaliação cognitiva nas populações clínicas e 2) como estes são avaliados. Nós realizámos 4 entrevistas com profissionais de saúde; uma foi feita enquanto observávamos a interação entre o profissional de saúde e a população clínica do centro de saúde. Para além disto, pesquisámos por plataformas semelhantes que já existissem em literaturas científicas ou em serviços online enquanto estudávamos os pontos fortes e os pontos fracos de cada plataforma. Desenvolver uma plataforma que seja visualmente atrativa com funcionalidades fáceis adaptada à experiência do utilizador dos profissionais de saúde foi a chave para conseguir uns resultados mais corretos dos diagnósticos dos seus pacientes enquanto melhoramos o seu desempenho e produtividade.

Palavras-Chave—*ferramentas de avaliação clínica, design centrado no utilizador, produtividade*

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I. CONTRIBUTION

My role in this project, as the designer of the team, was to work on Psymment's User Interface (UI), User Experience (UX), and front-end development. We applied to the Journal of Entrepreneurial Researches (JER) (Volume 1, Issue 1) contest with our project's abstract and team description, which resulted in the acceptance for a publication. The title is "Psymment: Advancing Digital Transformation in Psychological Assessments and Diagnosis for Healthcare Facilities and Organizations".

II. INTRODUCTION

Cognitive well-being is crucial for good performance in the practice of activities of daily living. The most prominent worldwide mental disorders in 2020 were depression and anxiety, which significantly increased after the appearance of COVID-19 [1]. The pandemic's impact led to a 27,6% and a 25,6% increase in depression and anxiety, respectively [1]. The pandemic greatly impacted people's lives. For example, social prevention measures enforced to reduce the spread of COVID-19, such as quarantine, wearing masks, and restricting interpersonal interactions, resulted in negative psychological well-being which translated into "*distress, depression, anxiety, traumatic stress, grief, suicidality, substance use and lastly burnout*" (2022) [2]. This outcome increased the search for help from healthcare professionals (HP) such as clinical psychologists. Considering that there is an increase in individuals seeking mental help, it is essential to develop and provide easy-to-use tools to perform their professional activities more efficiently.

Clinical psychologists are trained to help their patients to better understand their mental and emotional state and try to solve these conditions through treatments and rehabilitation [3]. Nowadays, psychologists still use traditional methods when using cognitive assessment tools (CAT) (i.e., pencil and paper). HP use different types of tests (i.e., psychometric tests); that are adapted according to different factors such as age, disease, and environmental contexts. Consequently, psychologists end up with an extensive list of CAT to be calculated and analysed individually to reach a formal

diagnosis. Such tasks are repetitive, time-consuming, and mentally tiresome, considering the number of patients these psychologists assist weekly.

- *Mental and Psychological issues*

The high number of individuals who suffer from problems with cognitive-related conditions is revealed to be worrying. When they find themselves in these vulnerable situations, these people will try to find an HP to give them the support they need and obtain proper treatment for their condition.

According to the law decree nº 113/2021, of 14th December from *Diário da República Eletrónico* (DRE), translated to Electronic Republic Diary, the number of patients with mental and psychiatric health issues in Portugal registers an amount 22,9%, making this country the second in the ranking within European countries [4]. Given that Portugal has a total population of 10,3 million people, the resultant 22,9% represents 2,3 million Portuguese people who have these mental stability difficulties [5]. Within those 2,3 million individuals, around 60% show symptoms of mental issues, however, they do not have access to the treatments needed, which transcribes to around 1,4 million Portuguese people that are not in reach of receiving proper care for their mental health [4]. Although these disorders were widely affected by the consequences of COVID-19, a range of treatments for these issues was also widely available. Yet, even with available treatments, they can not seem to reduce the prevalence of people who suffer from mental disorders, like depression, which is, in fact, a paradox because, with more health care treatments available to people, less depression should be present in the people's daily lives [6].

In Portugal, not including the Azores and Madeira islands, according to studies from *Direção Geral de Saúde* (DGS), translated by the General Directorate of Health, as seen in the *Figure 1*, from 2011 to 2016, the main mental health disorders identified, by pathology, are depressive issues (74,5%), dementia (97,5%) and anxiety (72,6%) issues [7]. All these mental health issues show a very high percentage of records in primary health care in Portugal [7].

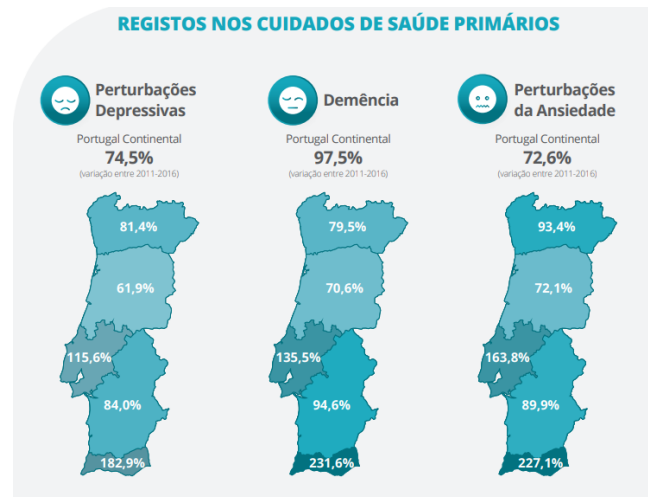


Figure 1. Extracted from [7], page 12

According to the study done by *Direção Regional de Estatística da Madeira* (DREM) in 2019, we can verify that the percentage linked to individuals 15 plus years old affected by depression is 10,4%, being the female gender in the lead [8]. This percentage is the equivalent of 22,9 thousand residents in the *Região Autónoma da Madeira*, totalling 250 769 inhabitants [9].

Because of these high numbers, DGS affirms that changes are needed to improve mental health awareness within the Portuguese community [7]. Firstly, the health care system must have established an efficient and sustainable approach to bring awareness of mental health issues to the population to prevent them and properly treat them [7]. Then, they must try to alert people in every sector about early intervention to prevent the worsening of the disorder and promote a mental health prevention program [7].

They also must give their patients a high-quality health care treatment that is accessible to everyone and promote good practices and routines in mental care [7]. Beyond trying to reduce the impact of the mental disturbances in the Portuguese population, the Portuguese health care system must always make sure that the protection of the human rights of the people who suffer from these mental problems is secured at all times [7]. Thus, developing Psyment can be an opportunity for HP, such as psychologists, to develop CAT and deploy these in clinical populations to obtain a faster diagnosis.

- *Psychologists as Healthcare professionals and their needs*

Psychology is a discipline very present in our daily lives so it is very likely that the perception of Psychology is correct (i.e., school counselors) [10]. It focuses on identifying cognitive inconsistencies, assisting people who are experiencing behavioural

problems yet unaware of the underlying reasons behind their actions, and guiding them towards overcoming these problems [10].

These HP when they must diagnose a patient with a certain mental disorder, use evidence and scientific methods to achieve the results to evaluate patients' illnesses and propose the recovery action plan [2]. Psychologists are HP who have a level of academic education in Psychology while studying theories and methodologies of that area according to certain relevant topics for their research, depending on the patient's age, health condition, genre and many other factors [3]. Later, the HP can apply that knowledge to the evaluations of their patients [3]. These techniques help the ill overcome their psychological perturbances and achieve emotional wellness [3], providing counseling and therapy [10]. The main objective of psychologists and therapists is to be capable of studying and finding anomalies in their patient's mental health, making them understand their condition and be able to help them overcome those issues [3]. To evaluate the mental state of an ill individual, if needed, they will use tests more than once to measure the level of the disease.

In Psychology, all HP rely on scientific methods. However, these professionals show different attributes and interests in the area. Some do research and others do hands-on practical fieldwork. The ones who research to gain more knowledge about the factors that cause a change in the behaviour of animals and humans are called Research psychologists [10]. The other psychologists are called psychologists-practitioners, mostly known to work directly with patients in "*clinical, counselling, industrial-organizational, and school*" [10], in which they use existing research done by the research psychologists and then use that knowledge to enhance the everyday lives of their patients [10].

The HP use empirical methods that consist of a systematic observation through communication studies to collect and organize information, and while analysing it, draw a conclusion using "*quantitative (i.e., survey)*" and/or "*qualitative (i.e., interview)*" methods [11]. Besides using empirical methods, HP also use non-empirical methods to collect the information needed [11]. This technique is used to reflect on the data assembled through systematic reviews and meta-analysis to analyse the developments in a particular subject of research and review through firsthand observations on current events (i.e., critical studies) [11]. As previously stated, HP, such as psychologists, use working methods to assess an individual's mental state. We sought more information from those who work in this field by conducting interviews with them.

- *Healthcare professionals and Cognitive Assessment tools*

Due to the numerous evaluation tools for numerous cognitive domains within psychology and its methods of evaluation, the list of CAT becomes endless. There are 15 areas in psychology: “*vocational orientation, intellectual level, neuropsychology, memory, personality, clinical, personal development, driver rating, diverse aptitudes, intervention programs, vision, listening, language skills, tender procedures, and Snoezelen material*” [12]; in which the list of tests for each area is extensive [13]. To narrow the studies, the professionals were asked to give the list of tests they used the most while evaluating patients in clinical practice.

Psychologists rely on one or more cognitive tests to understand and collect relevant information and to keep track of their patient’s mental state within four categories of psychological testing: “*intelligence, psychiatric diagnosis, personality, and scholastic and vocational aptitude*” [14] using “*verbal, mathematical, visuospatial reasoning, memory, attention, and language and comprehension*” tests [14], these HP will evaluate a person’s cognitive functioning if they desire to learn more about their cognitive capacities [14]. Furthermore, this testing is also useful to monitor and follow any changes in cognitive abilities over time [14].

This project focuses on developing a web-based platform called Psyment that allows HP, such as psychologists, to design their CAT, which can later be used with patients. In addition, the platform will be designed to automatically compute the CAT results, while also providing a graphical user interface (GUI) for easy data analysis. Moreover, this platform will allow the sharing of data between other HP.

III. RELATED WORK

To design and develop the platform, we researched examples of current online medical forms and CAT-related platforms. We found different healthcare-based services and organised them into different categories, such as *Medical apps, Form generator platforms, and Cognitive assessments platforms*.

Medical apps

- *PsicoReg*

It is an app available for IOS, Android, and the web that was developed to assist therapists in managing and interacting with their patients better [15]. As a bidirectional communication app in which patients can communicate with HP and vice-versa, it follows a four-step structure of functionalities: “1) *intervention and evaluation*; 2) *communication*; 3) *clinical information management*; and 4) *clinical management*” [16]. This process, along with the incorporation of new technologies into the clinical field, opens new opportunities for HP and patients to interact more easily, and to prioritize mental health [16].

This app offers many features, including advice on patients’ prescriptions, appointment scheduling, and pop-up reminders [15].

Regarding this app’s visual aspects and functionalities, we noticed that it opted for a more sober and simple design choice by combining two main colours, orange and green [15]. These colours are so distinguished but alike, making them look good together. Orange is a warm colour that gives a lively and energetic feel to a person looking at it, but the green colour has a cool tone that reminds us of refreshing and peaceful environments like nature [17]. Another characteristic we have noticed of this app is that on the introduction of the platform it provides screenshots for the new users to see what this app has to offer them even before their registration on it [15].

- *BetterHelp*

This medical app has more than 3,3 million users that get online help from licensed therapists, in which patients can contact these therapists while assuring that all the data gathered during the online appointments are confidential [18].

According to a study conducted on 318 people with depression who actively use this app, the results showed that after 3 months of registration, the severity of depression symptoms decreased significantly [19]. With these findings, it was concluded that BetterHelp is also effective on people who have never received psychotherapy before, regardless of “*gender, self-reported financial status, or self-reported physical health status*” [19].

BetterHelp provides a friendly design with colours that convey serenity and freshness, like the colour green. The design exhibits an organic design with asymmetrical and rounded shapes [18].

- *TalkSpace*

This is an app for licensed health professionals and mentally ill patients. It was developed in 2012 when access to therapists was harder for some people with mental disorders [20]. Thus, they created this app to try to solve that problem and make it possible for mental care treatment services to be available for everybody [21]. This app provides a long list of therapy sections, including “*depression, anxiety and stress, OCD, eating disorders, LGBTQIA+*” [21] and much more [21]. The effectiveness of this app has been demonstrated by studies conducted that shows 70% of Talkspace users improved their conditions within three months of enrolment [22].

This platform, aesthetically, showcases a more rounded and organic design with three main colours: blue, aqua green and magenta. In the introduction page of the platform, it provides to new users, high fidelity mock-ups [21]. Benefits that could be thought about and implemented in our platform include planning by text, voice, and live videos [21]. Constant access from anywhere, flexibility, and permitting cancellation at any moment are features to have into consideration as well [21].

Form generator platforms

- *Typeform*

This is a very interesting platform as it allows the users to personally interact with it and create form documents with unique designs, providing an exceptional user experience while offering many free templates with customizable design choices as support [23].

The *Introduction* page on this platform offers a concise overview of its content and functionalities, elucidating how it can enhance the experience for its users. [23]. To start creating a form document, the users start by answering some quick questions to understand the user’s intent when using this platform and then it gives suggestions to the user to start creating: “start from scratch, use a template and create it for me” [23], as shown in *Figure 2* [23].

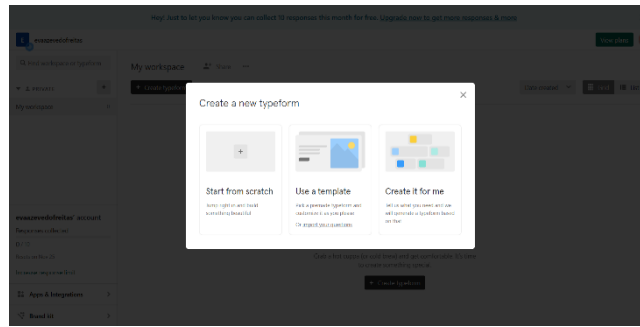


Figure 2. Create a new typeform selection

If the user selects the option “start from scratch”, Typeform will give choices on the type of form the user wants to create, like “*research survey, request form, registration form, quiz, poll, payment form, order form, lead gen form, feedback form, contact form, checklist, application form*”[23] and other [23]. In addition, it gives the users a little tutorial on using the platform’s tools and features through highlight animations on the key points of Typeform, along with a brief explanation for each, as seen in Figure 3 [23].

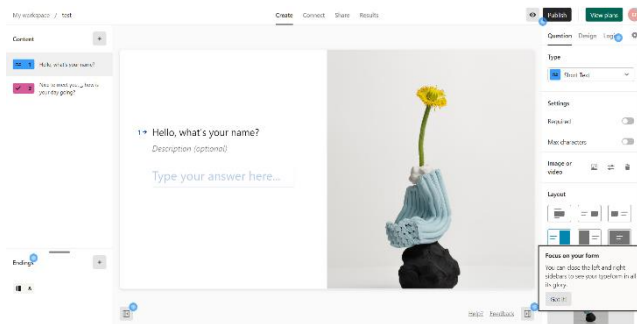


Figure 3. Tutorial of how to use Typeform features with highlight animations and brief descriptions

- *Cognito forms*

This is another platform to create form documents but its design offers a less personal and fun experience than Typeform, providing a more serious and professional interaction [24]. The colours used in this design are mainly light blue and green which provides a more friendly environment to the user [24]. The Cognito forms allow users to choose to participate in a quick tutorial and provide numerous questions to set the form settings [24].

- *Gravity forms*

This is an easy and simple form platform that offers organic and clean design visuals with blue and orange as the main colours and illustration graphics very popular nowadays [25]. On the first page, the introduction page, Gravity Forms allow the new

users to assist a video, lasting 1 minute and 53 seconds, that briefly introduces the app [25].

A feature of usability this platform provides that is very useful is the drag and drop feature [25]. This allows the users to have a faster and easier experience while creating a form-like document. The user can drag and drop any multimedia file on the form [25]. Another good feature that could be implemented in our future platform is the possibility of users changing, for example, the sizes of the texts, images, and videos [25].

A very important behaviour of all these platforms is that the user interface adapts to different screen sizes allowing the users to use it on computers, tablets, or phones.

Psychological Assessments Platforms

- ***PsyToolKit***

It is a free platform developed to develop and create psychological tests [26], [27]. The PsyToolKit is a very similar platform to the one my team wants to develop. It focuses on helping groups of people with smaller budgets like “*students, researchers, and universities in developing countries*”[26], create their own questionnaires and experiments [26], [27]. When using PsyToolKit, the user can program an original experiment, collect and analyse the data collected, and have more than 100 psychological examinations available [26], [27].

Although this platform idealizes a very good and efficient proposal, making many users satisfied with its purpose, it appears to have some usability issues that can be addressed. For example: 1) The login step for initiating online test design involves clicking on a link to access their page; 2) The clarity of this process could be improved for users' confidence. The page lacks responsiveness on smaller screens, impacting the overall user experience; 3) In contrast to the previously mentioned platforms, this one employs bright colors against a dark background. The chosen color scheme may be perceived as provocative and has the potential to affect users' attention; 4) the use of many colours on the same page and their overlay may be overwhelming for the users; 5) the process to login in the platform could be easier and faster rather than having too many steps and redirections into other pages; 6) instead of the user creating its password, it is the platform who creates the password with only 4 digits, which can lead to cybersecurity-related issues; and 7) PsyToolKit requires users to code while creating their CAT, which

can be confusing and does not provide a quick and simple experience for non-coders. The page to begin creating the assessment is shown in *Figure 4* below.

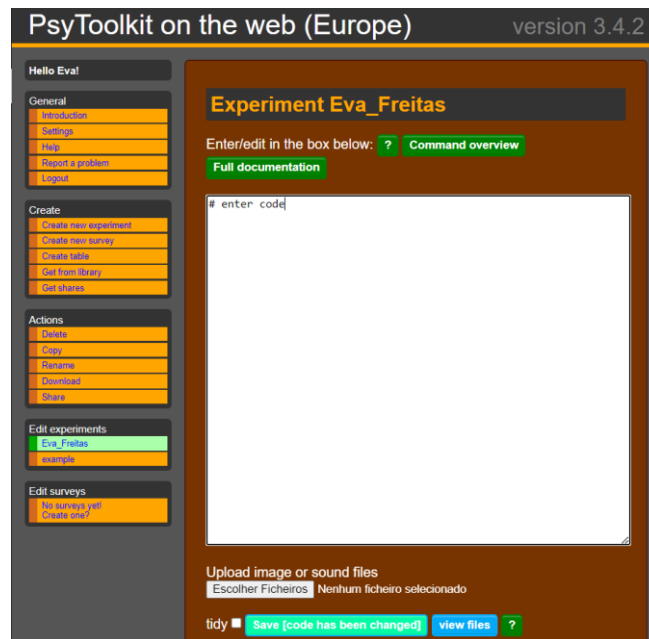


Figure 4. Create new experiment page on PsyToolKit using code language [26]

- *PsyPack*

It is a “*psychometric testing software*”[28] available online, that provides HP with a wide variety of standardised assessments for psychological evaluation, allowing in-clinic and remote management [28]. This instrument may be the best inspiration for our platform as it reflects everything we want to achieve (i.e., automatic scoring with graphing and reporting, all the records of the patients secured, available for different devices with different screen sizes and the target audience is psychologists and therapists, as well as social workers and counsellors) [28].

This platform showed great results in health-related environments, achieving a 42% improvement in clinical outcomes, 40% fewer cancellations, 92% of time saved when performing an assessment with a patient, and a 31% increase in gains [28]. This instrument is user-friendly, with blue as the main colour, contrasting with a white background and some details in pink.

- *Therasoft*

Psychiatrists and therapists, among other medical professionals involved in mental health, are the target audience for this platform [29], [30]. By utilizing clinical assessments, treatment planning, and modules for progress notes with pre-made templates, the aim is to simplify patient interactions and everyday practice operations [29]. All of this is done to offer more effective remote patient care [29], [30].

This site offers users two ways to get started instead of allowing them to have a brief free trial: 1) Therasoft Standard, which costs \$69 per month and gives users access to a “*smart scheduling calendar, automated appointment reminders, assessments and a treatment planner in addition to a large progress note library, credit card processing, automated clearinghouse transactions, a client portal with secure messaging, myTherapist, and the Therasoft mobile app*”[30] ; 2) For \$99 per month, Therasoft Pro offers all the features of the standard option plus additional benefits like “*encrypted email that complies with HIPAA regulations, insurance and third-party billing, an unlimited amount of electronic claims, the capacity to submit several claims, the importation of ERAs from insurance carriers, and an optional telehealth bundle and website*” [30].

Because this platform comes in a variety of screen sizes, users can use it anywhere, at any time, and with greater flexibility. Therasoft's design is straightforward and well-thought-out, guiding us through its information through text, icons, animations, and videos that explain how the product operates, whom it is intended to be more focused on, its features, and client testimonials that increase the trust of potential customers [30]. Lastly, contact information is provided at the bottom of the landing page [30]. This platform's primary colours are blue and yellow, and it provides a user-friendly interface to its users [30].

- *NexusBRaNT – Backoffice para o BRaNT*

This project was a master's thesis by Cunha E. et al with a similar proposal to Psyment. NexusBRaNT is a platform developed during the BRaNT project (PTDC/CCI-COM/31046/2017) that was enhanced to manage back-office data to help HP obtain clinical information about their patients [31].

IV. INTERVIEWS AT CSJD AND UMA

Before designing and developing the platform, we performed interviews and a field study to gather more information about the HP work environment. The HP are from different fields, such as clinical psychology, research psychology, and neuropsychology. The interviews were performed at *Casa de Saúde de São João de Deus* and the *University of Madeira*.

A. *Methods*

We performed three semi-structured interviews and one informal interview to gather additional information about 1) the interaction between HP and the clinical population, 2) what tests are the most used during that process, 3) how they manage and collect the data, 4) the technological practices they employ in their daily work, and 5) potential improvements in their process of evaluation.

B. *Instruments*

Before performing the interviews, HP had to sign an informed consent allowing us to take photographs and voice recordings (see annex A).

To conduct the interviews in an organized manner, we created a script that included a list of questions we wanted to ask the HP (see annex C). However, using the method we chose, we can add more questions and tailor them to the conversation flow.

In the field study, we conducted an informal interview after using observation to record the interactions and techniques of evaluation used by the HP with their patients. This gave us the opportunity to observe how the participants behaved when evaluating a patient in a clinical setting.

C. *Participants*

Each HP working experience is described as follows:

- 1st interviewee – Identifier 1 (ID-1)

ID-1 specializes in clinical psychology and the psychology of justice. ID1 worked for 4 years on the commission to protect children and adolescents. Later, ID1 earned a doctorate in psychology and is currently doing a postdoctoral in cognitive rehabilitation in elderly people with dementia.

- 2nd interviewee – Identifier 2 (ID-2)

ID-2 worked for 3 years in clinical psychology and is now in the research area for 10 years, with 13 years of experience in the field.

- 3rd interviewee – Identifier 3 (ID-3)

ID-3 has 3 years of experience, including a professional internship. ID3 applied CAT on patients daily during the curricular internship, but during the professional internship, ID3 applied CAT weekly. Later, the participant worked on a home care project for the elderly.

In addition to the interviews, we performed research field with 2 psychologists and 2 elderly patients at *Casa de Saúde São João de Deus*. One of the psychologists had just completed her professional internship while the other, with whom we conducted an informal interview, has been practicing clinical psychology since 2013.

D. Results

HP ID-1 mentioned 2 evaluation methods that are commonly used within the clinical community: *Beck's Depression Inventory (BDI)* and *Brief Symptom Inventory (BSI)*. ID-2 mentioned a series of tests done in Psychology that are the most used, and those are the *Mini-Mental State Examination (MMSE)*, *Montreal Cognitive Assessment (MoCA)*, and *Intelligence Scale of Weschler (WAIS)*. Still about the interview, another type of test that has been mentioned to be commonly used is the psychometric test.

The ID-3 introduced many tests used in different areas within psychology. Still, besides the ones already mentioned by the previous interviewees, this professional mentioned a new test also commonly used in clinical psychology called the *Depression, Anxiety and Stress Scale (Escala de Depressão, Ansiedade e Stress (EADS))*.

In the research study conducted in *Casa de Saúde de São João de Deus*, HP performed the *Mini-Mental State Examination (MMSE)*, which is a 30-point questionnaire that measures cognitive impairment.



Figure 5. Psychologists performing the MMSE on a patient. Taken by the Psymment team, 15th December 2022

Because only two of us were permitted inside the room during the test, we took turns participating in each test procedure. While one psychologist administered the *MMSE* to a patient the last member would be outside the room with the other psychologist and the rest of the clinical population in that department. Although the patients were elderly, both participants completed the *MMSE* in less than 10 minutes.

E. Discussion

Through semi-structured interviews, we were able to obtain more precise and comprehensive information about clinical health services. We surveyed the most important information for the development of this project after re-analyzing all the data gathered and came to preliminary conclusions.

Each professional shared with us the most used CAT for evaluating patients in Psychology. For example, the BDI test, more specifically the second revised version of this test, BDI-II, is an evaluation scale commonly used as a measuring tool of depressive severity [32], made of 21 sections, each with 4 sentences organized by best case scenario to worst or vice-versa, with scores from 0 to 3 [33]. Although this measuring tool of depression is commonly used, according to our interviewee, it still shows a limitation in gathering accurate results because “patients may not want to say the truth”, which will affect the results of the BDI-II.

The BSI test was also said to be an important and very frequent test done by Psychologists in clinical health when testing the mental state of a specific person, created by Derogatis [34]. According to HP ID-1, in this test “*with a few questions, we can see a lot*”. To get the necessary knowledge about relevant factors of psychological distress in the patient, the professionals will perform the BSI within 8 to 12 minutes without any previous training [35]. This test can only be done on patients 18 years of age or older, to see if the person being interviewed can understand the questions done by the HP with the test as the evaluation instrument [34]. The goal is to identify psychological symptoms in adolescents and adults through specific questions, consisting of 53 items that consider nine dimensions of symptoms, which are “*Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation, and Psychoticism; and three global indices of distress: Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total. The global indices measure the current or past level of symptomatology, the intensity of symptoms, and the number of reported symptoms, respectively*” [35].

Another test used is the MMSE is the most widespread cognitive test with the most diverse applications to analyse a patient’s mental state, especially in clinical research and practice [36]. Among the many instruments available for detecting dementia, the MMSE test is the most used by HP. The questionnaire is divided into six categories: “*orientation, retention, attention and calculation, evocation, language and constructive ability*” [37]. This questionnaire requires the patient to answer and complete simple exercises such as [37]:

- What day is today?
- Where are we?
- Repeat the 3 words selected.
- Spell a word from front to back.
- Make some simple calculations.
- Remember the 3 words said previously.
- Name the objects.
- Repeat a phrase.
- Do some simple exercises (i.e., fold the paper in half and place it on top of the table).

- Make the patient redraw the drawing in the exam.

However, this test was revealed to be not 100% efficient, receiving complaints about not detecting early-stage symptoms of cognitive impairments (i.e., detecting symptoms of early dementia) [38].

Alternatively, the MoCA is an evaluation method that was designed and developed in 2005 to improve and overcome some detected limitations of other cognitive tools like the Mini-Mental State Examination (MMSE) [38], to identify mild and less obvious cognitive impairments [39]. It covers eight cognitive domains [38] and is validated for use in different studies of various neurological impairments such as mild cognitive impairments (MCI), Alzheimer, and Parkinson [39]. This CAT is a very well-known evaluation method, is considered one of the best CAT, and is frequently used worldwide, making available a wide range of languages, nearly 100 languages [39].

The Wechsler Adult Intelligence Scale (WAIS) test is also considered to be among the most popular tests among psychologists worldwide [14]. Professionals can assess a person's cognitive abilities using ten sub-tests covering various cognitive domains, such as “*verbal abilities, visuospatial reasoning, memory, and processing speed abilities*” [14], using the most recent version of WAIS, the fourth edition (WAIS-IV) of 2008. [14]. This test is on the market in paper-and-pencil or in digital for \$1,079 for the complete test kit which is taken by adolescents and adults ages 16 to 90 years old [40]. This test is also available digitally to provide telepractice in specific cases such as physical distancing, if necessary, due to the worldwide pandemic [41].

Psychometric tests are a type of evaluation related to human psychology that consists of a wide variety of tests that analyse cognitive-related topics [42]. This genre of CAT aims to detect specific and relevant information about a certain person [42]. But for psychologists to provide a correct diagnosis of the patient’s problem, they must first analyse and identify the patient’s irregularities [42]. To do this, the researcher must first be aware of the regularities, patterns, and restrictions of the patient’s emotional and cognitive state [42]. These tests seek to identify the traits of those being diagnosed, and those traits frequently cause the symptoms to persist for months or even years [42].

The EADS test was created to cover all the symptom aspects within 3 categories: anxiety, depression, and, later, stress [43]. Each category includes a series of concepts to

analyse the emotional symptoms for each scale: 7 in depression, 4 in anxiety, and 5 in stress, which can include 42 items or 21 items, in total, for the 3 concepts together [43]. For this reason, according to our ID-3, this evaluation method is available in two versions: 1) EADS-21, which shows 21 items in total, and 2) EADS-42, which shows 42 items in total. These are the short version and the full version, respectively.

Although some validated tests for neuro and clinical psychology are of free circulation among psychologists on the internet, some are still restricted, demanding purchase with high prices or if the professionals send emails to the authors of the tests asking for their permission to use them, sometimes, they only get a response a year after the email was sent.

According to the psychologists interviewed, the tests are administered to patients to keep their cognitive status steady and prevent it from deteriorating. This is crucial since we need to ensure that psychologists can still provide stability to their patients even after any manipulation or the design of assessments in our future platforms.

It is important to emphasize that even though these most used tests are very technical and objective in their results, there are still some factors that can interfere, such as the patient feeling anxious, depressed, or lacking in attention focus during the evaluation process.

According to ID-3, this can result in a test result with a large deficit. Because of the reasons mentioned and many more, it may be necessary to repeat the test to get a more accurate result for the patient in question.

This is because, when all the data is combined, the conclusions drawn from observation and subjective evaluations may indicate a result that is incongruent with what those tests are designed to demonstrate.

Another important thing psychologists mention is that they still use traditional evaluation, correction, and management of tests. For instance, all the HP interviewed claimed that they use paper and pencil to perform the evaluation on patients, which can be outdated but, in some cases, may be useful (i.e., *Mini-Mental State Examination*, folding a paper in half exercise or redrawing the drawing in the test). By 2023, this industry should be more updated and computerized. Nowadays, the health care system

must improve and provide more digital solutions to improve patients' data collection and create a better working space for HP, easing their overwork.

Healthcare apps and websites emerged to provide a better and quicker service between HP and patients. But, as all the health departments seem to evolve, psychologists still practice the same methods of the old ways. Therefore, some limitations are related to the service and working methods of these professionals noted and referred by our interviewees.

To support this, ID-1 claimed that while performing his duties at the clinical psychology department, he witnessed HP using a projector to simplify and accelerate the process of evaluating a patient's results.

"In the past, a few years ago (...) there were some sheets of acetate (...) and what we did to dispatch work was to put the test, yes or no, and look at the squares and we know which is correct and which is incorrect. We placed the acetate on top of the answer, with the correct answers and we were able to see which ones they got right or didn't get right." (ID-1)

In terms of management of storing all the patient's diagnoses, the ID3 claimed that they store all the patient's diagnoses in a google drive folder.

"(...) I also have all this material on paper, and we used, as we didn't have specific software, Google Drive. We had folders for each patient and we put the information in report format, whatever it was, about each user. It ends up being on both sides, it's safer too." (ID-3)

And according to ID-2, the evaluation results are digitally preserved in a computer with name IDs for every patient. Then we asked how they knew which patient it was by the IDs, and the interviewee said that they use a physical paper with a list of names and the respective IDs of each patient.

"I usually store the tests on paper and pencil. I have the ones I used for research all scanned on my computer. It's not ideal, but it doesn't have people's names, it has a code. In research, we do not identify people with personal data. It has the ID, and I have a list of that ID on paper." (ID-2)

According to ID-1, ID-2 and ID-3, the evaluation process is very complicated since it must be done manually, which takes a very long time considering the number of tests they need to evaluate.

“Imagine that you interview 60 people in 1 week and everyone had to take psychometric tests (...) That's all on paper (...), all those 60 tests will have to be scored one by one by hand when the person to be recruited can spend 1 month or 2 being called, because it involves a lot of work. If it were instantaneous, it would take 1 day or 2, or even faster.” (ID-1)

“It is a MANUAL correction. There are correction manuals.” (ID-2)

They say that the calculations needed to determine whether a person suffers from a psychological disorder are very complex and specific for every test. Every formula is calculated by hand and has a determined calculation corresponding to a specific psychological test, depending on an age group, genre, and many other factors. This process overworks HP mentally and harms their quality of care delivery and efficiency towards patients [44]. This problem reflects on the number of people with symptoms of cognitive impairments that receive proper treatment because the longer they take to help a patient the less availability they have for other people with these issues. It is important for psychologists to update themselves to today's digital times and to follow the evolution of technologies whose main objective is to facilitate their work, allowing them to help a higher number of patients in a shorter period [45].

The HP interviewed also confirmed tests that are already done, validated, and on the internet for download are only sometimes available for free, so they use those tests sometimes without paying for them.

“So, the tests, to be very honest with you, here in Madeira, due to lack of funding, we often have the capacity to "legally" buy the tests as it should be done, because some of these tests are protected by copyright and there are others that have already expired. There are some that we can go online to download.” (ID-1)

As they do not have free access to these expensive tests to buy in some private situations, the person who has it usually shares it with other work colleagues.

“(...) There is an exchange of knowledge between psychologists, for example, imagine that there is a very specific test, for example, to assess autism, and that

the colleague received the autistic patient and does not have this test nor can it be found on the internet that is protected. He asks a colleague who works on autism and this colleague sends it by email or facilitates it in some way.” (ID1)

A platform for HP should be available to allow them to manage every patient’s diagnosis and provide them automatic results to enhance their performance as HP.

“(…) reduces the margin of error, because of course when we quote for a long assessment, fatigue can hit us, and it can be enough to make a wrong sum and thus reduce the margin of error.” (ID3)

We may come to a few conclusions from their answers regarding the patient-HP interactions, their access to CAT, their current management and collection of data, any technological practices they may have and potential improvements in their current methods of assessment.

Confidentiality, trust and support are the three main pillars of the interaction between the patients and the HP. Additionally, there is also a lack of financial support to purchase CAT, in private institutions, which may force them to find alternative methods to obtain those assessments. The lack of a specific software that can handle all of their needs in data management and collecting leads to security issues and time-consuming process. We also registered that, because of time constraints, they rely on certain technological practices to dispatch work, including using Google Drive or other methods. In conclusion, it is necessary to implement a digital solution that has the ability to enhance the HP’s methodologies and processes used in evaluation.

V.MAPPING EXPERIENCES

Understanding the users enables the designers to create interfaces that are better and more enjoyable to use [47]. The development of personas and customer journey maps is presented as reliable techniques when creating interactive media projects by the human-centered design theory.

A. Personas

Healthcare professionals from Portugal, more specifically psychologists and therapists, are among our stakeholders. These people will be pictured as fictional characters representing a real group of users with similar characteristics so the team can picture how users will manage the interface in various scenarios [47]. Personas may not be actual people, but they portray them as if they were by having a name, a face, a personality, desires, likes, frustrations, motivations, and other traits that may be used to identify a real person [48].

Three distinct personas, Cláudia Pereira, Pedro Santos and Ana Azevedo, were created for Psymet. These personas were created after actual psychologists and nurses that we interviewed and spoke with while conducting the initial user testing. These personas are depicted in realistic images of real people that can be downloaded for free from the Freepik website. To get to know them, must view the 3 personas in the attachments (see annex F).

B. Customer Journey Maps

Customer journey maps are primarily used to graphically represent a timeline of users' interactions with our product during the buying process [49]. This will show the users' actions, objectives, feelings and touchpoints, issues, and opportunities throughout their interaction with our product and/or without it [49].

I asked one of the psychologists to describe their daily routine and how they typically work with patients so that I could gain a better understanding of the HP daily routine and create a more explicit and realistic as possible example of their routine to then adapt it to when they have Psymet available.

Two customer journey maps for each persona are provided to show their daily activities both with and without Psymet (see annex G). This will enable us to comprehend the impact of our interface on users' lives as well as how much it improves and facilitates their evaluation processes.

C. Requirements

To ensure the quality of our platform and to satisfy our users, a list of requirements had to be created. This process is essential to determine the desired features, functionalities, and characteristics of our platform's design and development process

from an early stage [46]. Below is a list of the functional requirements (product features), the non-functional requirements (system's performance), and the UX requirements (user-friendly features).

Functional requirements

- Have a dynamic and interactive navbar
- Short cut to sign-in;
- Dynamic element to go up on the page automatically
- Sign-up: user name, name, profession, work place, email, password, password confirmation;
- Login: email/user name, password
- Password recovery button;
- Allow the user to receive a verification code via email when forgets password
- Consult patient data;
- Consult results from previous assessments;
- Create new assessments;
- Conduct assessments;
- Share assessments with other HPs;
- Patient's list;
- Have a personal profile account;
- Edit the account's profile data;
- Option to modify an assessment's questions;
- Delete patient's profile;
- Delete assessments;
- View shared assessments by other registered users/HP;
- View assessments shared with other registered users/HP;
- Compare the results of assessments taken by the same patient;
- Share test results between registered users;

Non-functional requirements

- The platform's front-end development must be done with EJS, CSS and JavaScript;
- The design of the platform should adapt to the screen size (desktop and tablet);

- The code of the front-end should allow easy changes, such as updates or improvements;

UX Design requirements

- Conduct user research, such as interviews, to understand our users and their methods of assessment;
- Perform usability tests to identify issues and provide improvement to the usability of the platform, making it more user-friendly;
- Create personas that will represent our users with different backgrounds with HP who assess CAT;
- Good usability and easy to use interface;
- Minimalist design;
- Maintain a consistent design;
- Give visual hierarchy to the content;
- Make the design responsive;
- Provide immediate feedback for user actions (success, error messages)
- Provide tips to assist users when they first register in Psymnet, to help them learn and understand Psymnet’s features and functionalities;

Following that, an overview of some of the features of existing platforms, referred in the section *Related Work*, and Psymnet was created to help understanding the differences between the two, as shown in the *Table 1* below.

Existing platforms’ features	Psymnet’s features
Online appointments;	Inclinic assessments;
Form building platforms;	Create assessment forms;
Patients’ prescriptions;	Patients’ medical records;
Appointment scheduling;	Share assessments;
Automatic scoring;	Fast test validations;
Concise overview;	Automatic scoring;
List of standardized tests;	Fast analysis of results;
Free pre-made templates;	Assessment management;
Customizable;	List of standardized tests;

File uploads.	Customizable; File uploads.
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Table 1. Comparing features of existing platforms with Psyment

VI. USER TESTING OF PSYMENT

Nielsen asserts that to make claims about findings that are supported by facts and statistical significance rather than merely luck and chance, user testing is important and must be done [93]. According to him, having a small number of subjects for user testing is preferable to having none [93]. Even though a small amount is not as important as a large amount, it still helps us understand the general public's perceptions and increases the probability that we will provide a more precise and customized product for our intended market, enhancing the possibility of client satisfaction [93]. Three to five test users is the recommended number because it will make the user testing process easier, and we will be able to submit nearly the same results as those obtained with a larger number of test subjects [93]. It was time to test the platform's usability with potential future Psyment users after the wireframes and the initial draft mockups were finished. As a result, we got in touch with Casa de Saúde São João de Deus in Funchal, Madeira, and requested permission to test our project with five psychologists of their medical staff. They kindly approved our request, and two nurses also participated in the user testing that followed. Having this in mind, my teammates and I decided to start by choosing the usability testing techniques we wanted to use to gather as much information as we could.

A. Methods

Users were asked to interact with the prototype while “thinking aloud” [95]. They are required to articulate all aspects of their thoughts, “*ideas, facts, plans, beliefs, expectations, doubts, anxiety,*” [95] desires, and various other considerations [95]. As Team Psyment, we attentively listen, observe, and document these expressions while participants engage in solving our tasks and exercises [94], [95]. Making sure we received information in concrete detail about each exercise, this allowed us to comprehend the experience users had while interacting with our interface, making it easier to identify the strengths and weaknesses of the platform.

B. Instruments

We have crafted a series of nine tasks, each providing users with specific exercises and context. The guide commences with a concise overview of our project, team, and the objectives of the usability testing, setting the stage for the subsequent tasks.

Each task is divided into the following categories and focuses on various exercises related to the various pages of the Psymment platform: 1) First task: login and sign up on the landing page; 2) second task: create a CAT; 3) third task: edit a CAT; 4) fourth task: share CAT with other HP; 5) fifth task: apply CAT; 6) sixth task: collect patients' lists and medical records; 7) seventh task: edit already-approved CAT; 8) eighth task: applying CAT shared by another HP; and 9) ninth task: edit HP profile and cancelling the account. Even though these tasks are numbered, HP shouldn't perform them in the same order. We conducted our user testing tasks in a randomized order for each HP because we wanted to give our users a chance to experience a range of interactions with our platform without the possibility of getting influenced by the experience of other HP by guessing or assuming what to do even before encountering the tasks. By randomizing the tasks we are avoiding learning bias.

After finishing our guide, we decided to conduct a test amongst ourselves before using the HP to test usability. This made it easier to prepare and gave an idea of how long each test would typically take. We took between 30 and 45 minutes to finish testing amongst ourselves, but we knew that time would vary depending on how long it takes each person to complete the tasks and to express their thoughts and worries given that they are less familiar with the platform than me and my team are.

The purpose of this user testing was to practice, using high-fidelity prototypes created in Adobe XD, on computers and tablets. However, we discovered the tablet was slow when interacting with Adobe XD—for example, clicking a button to navigate to a different page would take some time—and was not updating to the most recent iteration of Psymment's prototypes while we were organizing the final details before user testing. We therefore determined that it would be best to discard the tablet and keep only the computer for testing purposes.

C. Participants

Before starting the intervention, me and my teammates split into two groups to conduct the usability session. We then gave each HP an informed consent to sign before

the user testing to ensure they understood and agreed with the conditions of the usability test (see annex B). In total, 7 HP—5 psychologists and 2 nurses—participated in the usability testing over the course of two days. We decided to test the platform with nurses as well, although the primary goal of this session was to test it with psychologists. However, during the usability testing session, the professionals recommended that nurses could take part of testing as well. In this user testing, the HP had an experience ranging from 1 year to 19 years of professional experience. Everyone was eager to try and have an interface available for them that could lessen their workload, even though their age may have an impact on how comfortable they are using technologies in the initial phases of adjustment, at least. Given the age of some of the participants and the fact that none of the mockups of our platform were in their native language, Portuguese, it was clear that this had an effect on how well or poorly they performed, particularly in terms of how well or poorly they interacted with the digital platform because they were unfamiliar with it and were less willing to try new things than the habitual things they already did.

Following the opportunity for each HP to use and experience the platform's mockups, we requested that each HP share their thoughts and opinions using the following three usability testing methods: *System Usability Scale (SUS)*, *NASA Task Load Index (NASA TLX)*, and *Intrinsic Motivation Inventory (IMI)*. The *SUS* is a technique that employs a 10-question simple questionnaire to scale the overall perspective of subjective evaluations of the users' usability regarding a specific interface [96]. Each question is given a point value between 1 and 5, and occasionally 7, to indicate “*the degree of agreement or disagreement*” [96] relating to what the users thought of the interface they just tested [96]. The six subscales of the *NASA TLX's* rating sheet—“*Mental Demands, Physical Demands, Temporal Demands, Own Performance, Effort, and Frustration*” [97]—give us a simulation of the overall workload scores of users [97]. With the help of this rating system, we can evaluate how well or poorly users performed and how their interactions with our platform were overall, according to their experience [97]. The *IMI*, a measurement tool created to measure users' subjective perceptions of their experience in a particular task, was the third technique used [98].

D. Results

Given the ease of analysing the overall outcomes of each questionnaire, we opted to convert them into a digital format using Google Forms. This enables us to automatically collect and calculate results, facilitating visual analysis through data charts [99]. This

approach keeps the survey results concise and organized on a single page, influencing our decision to utilize Google Forms. [99], [100].

System Usability Scale (SUS):

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Mean Score
ID1	5	1	5	1	5	1	5	1	5	1	100,00	88,6
ID2	5	1	5	2	5	1	5	1	4	1	95,00	
ID3	5	1	5	2	4	2	5	1	4	1	90,00	
ID4	4	1	4	2	4	2	4	2	4	4	72,50	
ID5	5	1	5	1	5	1	5	1	4	1	97,50	
ID6	5	1	5	1	4	2	5	2	5	2	90,00	
ID7	4	1	4	3	4	2	4	1	3	2	75,00	

Table 2. Results of the System Usability Scale (SUS)

Nurses and psychologists with varying levels of experience served as our test subjects for our UX testing. Asking their years of professional experience in the medical field was significant to us because it determined whether they were more comfortable changing their evaluation methods or not. Most of the time, the context is directly related to HP's age, which will reflect how familiar they are with technology.

In terms of the SUS survey, the answers are scored on a scale of 1 to 5, with 1 representing "totally disagree" and 5 representing "totally agree", as mentioned earlier. The mean score was 88,6 which indicates that the user testing was generally successful and surpassed our expectations with an excellent evaluation provided by our user testing subjects. While analysing in more depth the results of this tool we were able to learn that although HP would like to use it frequently because of its simple, user-friendly features, some HP required assistance to use the platform confidently.

NASA Task Load Index (NASA-TLX)

	Mental Demands	Physical Demands	Temporal Demands	Performance	Effort	Frustration
ID1	2	2	4	9	4	1
ID2	2	1	1	2	2	1
ID3	2	1	2	2	2	1
ID4	2	1	1	6	4	1
ID5	2	1	2	3	1	1
ID6	5	4	6	1	5	1
ID7	7	2	5	3	5	1
Score	3.14	1.71	3.00	3.71	3.29	1.00

Table 3. Results of the Nasa-TLX

The NASA-TLX is a tool that has 21 gradations for each category scale. These gradations match the vertical lines in a scale that, depending on the first line on the left, tallest line in the middle, and the line on the right, in that order, can be categorized into the three very low, medium, and very high key-stages of this scale [97]. Users are expected to categorize their experiences into different demand categories, ranging from extremely low to extremely high. However, we converted the NASA TLX document into a Google Forms document because we intended to analyse the results more quickly and easily. The scale for each demand now has an evaluation from 1 to 10 instead of 21 gradations as a result of this modification. Because of that, the average results were determined according to this new scale.

With the help of this tool, my team and I were able to determine just how physically, mentally, quickly, and how stressfully demanding user testing with Psymet was. When asked to rate the mental strain of using our platform, the majority of users gave it a 2 out of 10. The average result of this demand was 3.14, which is positive because it is within the low rate on this scale and falls below the middle of the scale, which is 5. In terms of the physical demands of the tasks, the results ranged from 1, 2 and 4 on a scale of 1 to 10, with 1 being the most voted answer, indicating a very low physical demand. Nonetheless, the average response for this demand was positive, being 1.71 on the scale of 1 to 10. Next, we needed to understand how they perceived the task's rhythm—that is, whether they felt it was moving too slowly or too quickly to finish the

tasks. The fact that answers 1 and 2 got the most votes indicates that it took them a little longer than they had anticipated to finish the user testing. The remaining three votes, which came from three HP, were split equally between 4 and 6, indicating that the tasks required a typical amount of time to finish, according to them. Consequently, HP's average evaluation of the temporal demand was 3.00. The most common responses to the demand about how successfully they finished the task were 2 and 3, and the remaining votes were split evenly between 1, 6 and 9. Despite a few nonconformities, the performance demand average was 3.71, indicating good overall performance accomplishing what they were asked to do. Their most popular responses during the user testing of Psyment for the effort demand are evenly spread across stages 2, 4, and 5 of this scale. The average result for the effort demand is 3.29 which means overall there was not much effort or difficulty completing the tasks. Now, based on their perceptions of their low success rate, the only response we received was a 1, making it an average result of 1, very low frustration rate overall.

Intrinsic Motivation Inventory (IMI)

	ID1	ID2	ID3	ID4	ID5	ID6	ID7	Average
<i>Years of experience</i>	2	2	1.5	12	11	1	22	
Q1	7	7	7	6	7	7	6	
Q2	7	7	7	6	7	7	7	
Q3	7	6	6	7	7	7	7	
Q4	7	6	6	7	7	6	7	
Q5	7	6	7	6	7	6	5	
Q6	7	7	5	6	7	7	5	
Q7	7	6	7	6	7	6	6	
Q8 (R)	2	1	1	1	1	1	1	
Q9	6	7	7	7	7	6	7	
Q10	7	7	6	7	7	7	6	
Q11	7	7	6	7	7	7	6	
Q12 (R)	1	1	1	1	1	1	1	
Q13	5	6	5	6	7	7	5	
Q14 (R)	1	1	1	1	1	1	1	

Q15	7	6	5	6	7	7	6	
Q16	7	7	6	6	7	7	6	
Q17	7	6	7	6	7	7	6	
Q18 (R)	1	2	2	6	7	7	5	
Q19	7	7	7	6	7	7	5	
Q20 (R)	2	1	1	1	1	2	1	
Q21	7	6	1	7	7	7	5	
Q22	7	7	6	6	7	7	7	
Q23	7	6	6	6	7	4	5	
Q24 (R)	1	1	1	1	1	1	1	
Q25	7	6	6	6	7	6	5	
<i>Interest / enjoyment</i>	7,00	6,25	6,38	6,38	7,00	6,38	6,00	6,50
<i>Value / usefulness</i>	6,78	6,56	5,44	6,33	7,00	6,78	5,56	6,35
<i>Perceived choice</i>	6,63	6,88	6,75	6,13	6,25	6,00	6,50	6,45

Table 4. Results of the Intrinsic Motivation Inventory (IMI)

With this tool, we were able to gain a deeper understanding of our users' subjective perceptions of their experiences when testing Psymment's high-fidelity mockups. We asked them to provide us with an ID that they felt best suited them to facilitate our identification of them, and we also asked them to provide the number of years of experience they have. These questions were asked before the anticipated IMI questions.

We decided to use the version of Activity Perception Questionnaire and by using this tool, we can confirm a variety of aspects related to our participants' experiences, such as their level of interest in the activity and enjoyment while engaging in it, the activity's value and utility to them, and whether they felt under pressure or had a choice when engaging in a particular activity [98]. Overall, the questions were rated from 1 to 7, with 1 denoting "not at all true," 4 denoting "somewhat true," and 7 denoting "very true." The results of every calculation for every subscale are shown below.

Interest / Enjoyment

For this subscale, each HP perceives interest and enjoyment differently, therefore, the formula's result varies according to HP perceptions. However, the results varied from 6,00 to 7,00, with a mean of 6,48 overall. Considering that 7 is the highest rating, this evaluation is excellent and demonstrates that HP were intrigued by our product and enjoyed using it, despite the fact that it was merely a high-fidelity prototype and now we improved it considering their insights.

Value / Usefulness

The formula for this subscale was quite simple—all we had to do was add up all of the answers to these questions and divide that total by the number of questions in this subscale, which is nine. The HP had results ranging from 5,44 to 7,00, with 6,35 serving as the final average value of this subscale of the 7 HP. This is a good result because the rating is very close to the maximum of 7, indicating that HP believe this platform is valuable and enhances their workflow.

Perceived Choice

The range of results was 6,00 to 6,88, with an average of 6,45 out of the 7 HP. This outcome is a good way to show that HP are aware that they had some influence over this activity.

The average numbers the users gave throughout this tool for most of the questions were very good on a scale from 1 to 7, being the mean number overall above six values. The HPs felt this experience was very interesting, indicating that this platform had potential. They agreed that this activity is important probably because it will determine whether this platform had potential or not and could possibly be improved for them to use it in the future.

E. Discussion

The results of the measuring tools presented above were generally positive, but there are a few factors to consider for each tool. An interpretation of the results, which provides a reflection about this user testing, can be found below.

Regarding the SUS, it was great news for my team to learn that most HP respondents said they completely agreed and would like to use this platform frequently. It showed us that HP was willing to use the platform once it was finished and put on the

market. Knowing that they intend to use this technology in the future is essentially a sign that they will become clients and that this concept will be helpful for their routine patient assessments, simplifying their work.

Because they disagreed that Psymment was an unnecessarily complex system and agreed it was an easy-to-use tool instead, was satisfying. They also agreed without hesitation that this system was incredibly simple to use and understand, demonstrating its simplicity. Even though the high-fidelity prototypes used for this user testing was undeniably trickier and more complicated than the finished product, it nonetheless generated some interest in HP and offered the possibility of moving forward with a less complicated design. These findings demonstrate that even though they evaluated early versions of Psymment and some of the HP were not particularly good with computers, they still discovered it to be more user-friendly than their dated procedures.

Despite the language barrier, which made it difficult for them to understand what was written and required them to ask the Psymment team to translate it when needed, Psymment was still able to demonstrate the product's value and potential to them while also making notes about possible changes to make it even simpler for them to use going forward.

Most of the respondents believe they do not really need assistance from someone to understand how to use Psymment, according to the overall responses and feedback. But if Psymment is truly commercialized in the future, then one person felt a little more in need of this support at first, and as a result, this HP somewhat agreed to have assistance to better understand how to work with this system. Although most of them indicated that they do not require any assistance or learn a lot of things before moving on to use Psymment, the ideal situation would be to provide them with a workshop to demonstrate them and instruct them on how Psymment functions. This is because it would be best if everyone was on the same page and level of knowledge given that they are unfamiliar with these technologies at work.

The prototypes utilized for this user testing were not the finished product; they were meant to be improved upon as the system was developed if needed. Although HP acknowledged that Psymment's features were well-integrated, their input allowed for the identification of issues that surfaced from the platform's general layout, showing room for improvement in Psymment's user interface and user experience. This was also

emphasized in their answers to the 6th statement in this survey, in which they disagreed Psymment's system had too much inconsistency, which tells us that there are some minor issues within the platform but not many. Our team did its best to filter all recommendations from HP through a selection process, which later in this document, my team and I will determine which adjustments are most important to make and incorporate them into the finished web platform.

Then, users were required to rate the NASA TLX tool in several categories, including mental, physical, temporal, performance, effort and frustration demands.

Regarding their mental demand while using our platform, the most common answer was 2 out of 10. Nevertheless, two HP employees believed that this platform had some kind of mental strain. My team and I have been working to find a solution for this problem so that as many users as possible can be satisfied.

When it comes to the physical demand the tasks of the user testing required, the most popular answer was 1 out of 10 but some HP answered higher notes such as 2 and 4. Since our platform is web-based and does not involve any physical activity of any kind, it was difficult to understand why it was a little physically demanding for some HP. However, we reasoned that they might be referring to the fact that it was a little exhausting at times.

Regarding the temporal demands, the physical demands can be reflected in this section as well because the average evaluation from HP in this category was 3 out of 10, enhancing the idea that, moving forward, we will carry out the user testing more rapidly and cautiously so that the average time is 30 to 45 minutes, as we had predicted before the user testing. In the fourth demand, they contradicted themselves when comparing their responses from the earlier tool to this one.

In respect of the performance of the HP while testing Psymment, it is unclear if they chose a low or very low success rate, with average of 3,71, because of the language barrier, or if they simply did not understand the question very well, which is a possibility. But in the SUS, they claimed they did not need any help because the platform was simple, but in that case the response is not matching these results on NASA TLX, which enforces the idea of implementing some workshops in the future.

The effort demand's results raised doubts regarding the validity of the answers from the previous demand because the participants' responses do not line up; they claim to have had very little success completing the task, but they also did not believe that working with Psymment and completing the tasks was difficult.

The last demand, the frustration rate, was unexpected because based on their perceptions of their low success rate, my team and I anticipated that the responses to the last demand—the frustration demand—would be somewhere between medium and high on this scale. However, every response we received completely disagreed, with a rate of 1 out of 10, stating that it did not cause them to feel stressed, insecure, bored, unhappy, or even angry.

In the last survey, the IMI, we were required to calculate the answers for three distinct categories—"*interest/enjoyment, value/usefulness, and perceived choice*" [98]—using specific formulas. Because the results of some questions in Table 4 are interpreted as being reversed, it was decided to designate them with a "R". In other words, when a reversed question has an 8 as the answer, it truly indicates a 1, which is why we subtract the value provided in the reversed question from 8, the top value. For the Interest/enjoyment category we had to use the following formula: " $(Q3 + Q5 + Q7 + Q11 + (8 - Q12) + Q15 + Q17 + Q23) / 8$ " [98]. For the value/usefulness category the formula we used was quite simple since it did not include reversed questions, only calculating the result within the following formula: " $Q1, Q4, Q6, Q10, Q13, Q16, Q19, Q21, Q25$ " [98]. The formula for the last subscale, the perceived choice scale, had more reversed questions than the previous subscales, so it was like this: " $(Q2 + (8 - Q8) + Q9 + (8 - Q14) + (8 - Q18) + (8 - Q20) + Q22 + (8 - Q24)) / 8$ " [98].

A. Conclusion

All things considered, the results showed impressive numbers, allowing the user testing to be considered successful. Me and my team were able to gather a lot of information from the seven participants in this user testing, including valuable insights. This number of users might seem like too few to provide us with reliable information about Psymment's usability. However, according to Nielsen, a usability study only needs five test users for us to be able to identify usability issues as we would with a larger sample size of usability test users [101]. In addition to the quantity of participants, we also required diversity among the test users, which we achieved. We tested Psymment's

usability with five psychologists—psychologists being our main target within the HP’s group—as well as with nurses, who also perform CAT on patients.

Based on the qualitative data collected from these usability tests, we concluded that Psymment required some modifications in order to meet the requirements and expectations of HP. My teammates and I made a Google Doc in Google Drive that we shared between us to highlight and summarize everything the HP recommended we change or take into consideration for Psymment. This made it easier for us to identify the most pertinent feedback they provided us with.

Regarding the overall layout of the Psymment user interface, HP suggested 1) we enlarge the letters so they do not force their eyes too much to be able to read the screen; 2) we offer Psymment in a variety of languages: the basic ones for now, Portuguese as the primary language for non-English speakers, and English for prospective international users who might be interested in using this platform in the future; 3) a change to the colour palette—especially the orange, which they found to be too vivid. It was not our priority to alter the colour palette entirely, as only three of the seven HP stated this; instead, we looked into other hues that would soften and complement the vivid orange we had in the original mock-ups; 4) we include a mandatory profession field on the registration page; and lastly, 5) include a feature in the patients list that permits HP to remove a patient's profile due to privacy of data concerns.

Regarding the readability of Psymment’s interface components, they recommended that 1) we rename the menu bar category from "menu assessments" to simply "menu" because they found it to be confusing. This might also be the case because most of them found it difficult to translate from English to Portuguese during their Psymment user-experience and 2) using italic font for the names of the assessments on the pages that include them, like the Shared Assessments page and the My Assessments page. Even so, since it was brought up just once by one of the medical professionals conducting the testing, it was not a particularly crucial detail to which we needed to pay particular attention. By observation, we could understand that the sidebar menu, which was the original concept, was visible but was not practical and took up a lot of extra space on the pages. Because of this, the design of the pages started to feel out of balance, so it changed into a centered top bar menu.

Regarding the visual elements and aspects of the original Psymment interface, it was said to be made extensive use of contrast, particularly regarding the colour of the background. My original intention in utilizing dark and bright backgrounds was to create contrast between the pages so they did not all have the same appearance. However, it lacked consistency and was not aesthetically pleasing, it could potentially cause distress and fatigue to the eyes. Because of that, it was preferable to have a straightforward visual with a consistent white background across all the interface's pages.

Psymment's contact information was initially displayed on the landing page's left bottom corner using only icons. However, its presence on the page was not clear or understandable enough. Because of this, the contact information was relocated to the footer at the bottom of the page, which is a standard web design.

The Psymment feature that lets HP share assessments with other HP revealed generally positive responses, but there were a few things worth emphasizing. Having a time limit, they said, would be ideal because they could send a file to another HP and cancel sharing at any time, causing that file to be immediately removed from the recipient's list of shared assessments. Furthermore, we believed it was better and safer for HP to look for the colleagues with whom they wished to share a particular assessment using their professional certificate. But since they did not memorize each other's professional credentials, they could instead search for the other HP by name. As they type the professional's name, the platform will suggest Psymment users who also go by that name and show their respective profile pictures. Along with their names, they suggested that they could use the collaborator or mechanographic number to search HP as well. Users had to choose the HP they wanted to share the assessment with before advancing to a confirmation page. One HP proposed adding an arrow to the button's text or making the button itself into the shape of an arrow so that the HP would know to continue with the activity.

Moving on to creating their own assessments, most of them did not find this feature as helpful as we had anticipated, likely due to their familiarity with using the assessments that are already provided by the institution where they work, which are well-known and recognized assessments in psychology across the globe. Their main concern was that they did not want to develop anything that was not authorized and might not be helpful or accurate for the state of the patients doing it. As a result, it is more likely that they would create an assessment for research purposes, allowing them to perform

validation studies to guarantee that it assesses what it is supposed to assess, making this feature more appropriate for research psychologists. There were few suggestions on the page where these assessments were to be created: 1) The point box of each question box should be moved inside the question box; 2) Include a button to add a domain and another to add questions within the domain. This would replicate the familiar appearance of paper tests they are used to working with; 3) We had to make each exercise's title more obvious because it was not very clear or intuitive; and 4) After choosing the question-style they wanted, they weren't sure how to add more options, so we also had to take that into consideration.

Then, the HP clicks a button to be taken to the patient's results after conducting an assessment on the patient. This page included the patient's demographic data, such as genre, age, education, profession, and civil status, as well as a text box for the HP to record any observations. Along with that, there was a clock to show how long it took the patient to finish the test and a graphic of the results. According to HP insights, the majority of them did not care about the time and stated that being able to see the points specific to each domain rather than just a global result would be important.

A button that allowed HP to change the patient's responses if necessary was added to this results page in Psymment. However, they felt that this option was not the best one given the possibility of future accuracy issues with the patient's diagnosis. They came up with the idea of giving respondents 24 hours after the evaluation to edit their responses, but only allowing minor alterations, such as changing their residence from "Santo António" to "Funchal".

The capability for HP to compare the outcomes of assessments completed by a particular patient was another feature we included in the mockups with the intention of implementing it in the future. They were able to compare the results' differences as a result. To make it easier to analyse the data, the HP suggested on this page that only the scoring of each domain be displayed in a visual graphic, each domain having its own colour. They also emphasized the need for the results of the comparison to come from the same assessment but from different points in time.

Furthermore, they advised us to remove the option to filter the list's order by the newest to the oldest patient in the list when it came to the patients' profile list because the date of a patient's profile creation was deemed to be of little significance to them.

Lastly, to prevent HP from accidentally deleting their accounts, they also advised sending a confirmation note before doing so, if necessary.

B. Limitations

Considering the information we acquired, our interviewees are all Portuguese and work in Portugal, so the data we gathered regarding their working and evaluation processes differs from that used elsewhere. We concentrated primarily on Portuguese psychology approaches to provide our target audience with a more trustworthy and relatable platform.

This user testing session was conducted with 7 HP at *Casa de Saúde São João de Deus* and, even though our participants came from different professional backgrounds, it would still be beneficial for us to conduct this user testing on HP who are not affiliated with the same institution and who did not share the same everyday routines and practices. Furthermore, although we had both computer and tablet prototypes, due to technical problems with opening the prototypes on the tablet we decided to only test the computer prototypes. By discarding testing the tablet prototypes for user testing we knew we would not get all of the feedback we wished to have but this method worked just as well for testing the platform's overall fluency on the computer only.

Majority of the users who tested the early version of Psymment were not particularly good with computers, yet they still managed to find Psymment a platform with potential to substitute their dated procedures. However, as previously stated, Psymment was considered to be a user-friendly platform by the healthcare professionals, but the ideal scenario would be conducting workshops regularly to teach them how to use it.

What was more challenging for them while interacting with our platform and why they unavoidably did not feel as confident while using it and had some questions during the testing is because Psymment's prototypes were written in English and the majority of them did not speak it well.

VII. BRAND IDENTITY

A. *Name and Logo*

Name

With psychologists as our primary audience, this platform focuses on enhancing the psychometric evaluation techniques used by healthcare professionals. Having special attention most of our test subjects and experiment participants are psychologists, this makes them the primary source of inspiration for this platform's UI/UX design. When beginning our project, we needed a brand name that was appropriate for it, but there were a few factors we had to consider.

A brand name should convince our customers to use our product while also carrying desirable qualities that may support product recognition [50]. Examining and weighing the pros and cons of having a meaningful or a non-meaningful brand name is necessary to come up with a memorable and effective brand name [51].

During a discussion about choosing a company name that is appropriate for the platform with my project partners, "Psymment" came to mind. Psymment is the name we chose together because it combines the words 1) psychology and 2) assessment, which is dominant to our vision for the platform. The first half of the brand name is "Psy" which is a diminutive of Psychology and to maintain its continuity the other half of the name, "assessment", is divided in half and reduced to just "ment".

Logotype

With the platform's name already decided, Psymment needed a visual identity, which should begin with the creation of a logotype. The word "logo" is derived from the word "logos," which means "word" in Greek [72]. Designing a logo for a brand is creating a "visual word" [72] or symbol to help people recognize a company [72] [73].

Logo is a generic term used to describe symbols that include illustrations, text, or a combination of the two. However, there are logos and wordmark logos if we want to be more specific. The difference between them is as follows: 1) A logo is an image or shape combined with text, usually the brand's name, such as the Airbnb logo; and 2) A wordmark logo is a brand's text-only logo written in a distinctive typeface that does not include images, shapes, or other illustrations, such as the Coca-Cola logo [74]. Knowing

this, it was decided for this project to create an illustrative logo with shapes and text combined due to visual preference.

We began brainstorming several concepts for the logo until we came up with one that was thought to be a decent place to start. The logo combined two components: 1) “Psy”, and 2) “ment”. The first half resembles the Greek letter Ψ or Psi frequently used to represent psychology and psychic phenomena [75] [76]. This strategy was also applied to the logo of Psypack, one of our sources of inspiration. Due to the original calligraphy of Ψ being preserved, there is a striking similarity to it in their logo, making recognition almost automatic. Considering this, we seized the opportunity and used Ψ as the foundation for the Psyment logo as well.

During the research and experiments for the logo, it was concluded that the letter “m” of “ment” and the letter “ Ψ ” should be included visually in the logo. This would be an example of combining both ideas into a single design.

In the first logo, it was chosen a less creative and abstract representation of the company name or brand, drawing inspiration instead from typeface logos. Basic shapes like circles and rectangles were used to create this logo design rather than picking a font and giving it style [77].

One experiment was chosen to create the first logo design option and it was changed repeatedly until we were satisfied, as seen in *Figure 10*.



Figure 6. Tests for the initial logo design

The initial logo design was as shown below, in *Figure 11*. This logo was incorporated into the initial mockups, which were then tested with HP at Casa de Saúde São João de Deus.



Figure 7. Initial Psyment logo design

However, we made the choice to add the company’s name below the logo, as seen in *Figure 12*, because it felt too plain and unfinished.



Figure 8. Initial logotype design with name Psymment

Thought to be the final logo, it gave off the impression that something was still missing. Logos are essential for building a company's brand because they make a brand more instantly recognizable and can even replace the company name [78]. As an illustration, companies with strong visual identities like 1) Nike, 2) Adidas, 3) Apple, and 4) McDonalds are easily recognizable even when their names are not mentioned.

- 1) The Nike commercial "Nike FC presents the Footballverse" omits to mention the brand name because the Nike logo is already distinctive and obvious on its own [79].
- 2) The name Adidas is not used on the Adidas website; instead, their logo of three diagonal stripes is used [80].
- 3) Apple devices do not need to have their brand name written on them because the Apple logo is one of the most recognizable logos in the world [81] [82].
- 4) With golden arches that, due to their yellow colour, resemble French fries, McDonald's has a distinctive "M" logo [83].

When designing a distinctive logo for a user interface or business, it is important to pay close attention to how the content and style work together to form a cohesive design [78]. These two elements can be combined to produce a visually appealing logo by incorporating our creativity into the text and graphic elements that make up a logo, giving it style and identity [78].

As the group's designer, it was my duty to give our platform a distinctive identity, so other possible logo ideas started to come up while maintaining the original concept.



Figure 9. Second Psymment concept logo design tests

This time, we decided to use a design in contrast, using the letter "m" as typeface and incorporating the letter "Ψ" into it. When we use a font and give it a different visual style, we create a new variation of that font, which is known as the typeface [77]. We had to pick a good font, which was *Broadway regular*, and test it in various scenarios with that in mind.



Figure 10. Third sequence of tests for Psymment concept logo design

The contrast of the letter "Ψ" inside the letter "m" was not obvious and could be misread with a screwdriver. The original Greek letter finalization with serif was incorporated into the design to correct that and make it more obvious in the logo.

It is important to note that only the upper half of the Greek letter is depicted in the logo; however, the goal was to make its presence noticeable without being the only element. The final logo definition is displayed below.



Figure 11. Concept Monochromatic logo design

Now that the logo design was complete, there were some additional factors to consider. According to Vellest, picking the appropriate colour for a logo is a step toward giving it additional meaning [73]. Having already decided on my colour scheme helped me comprehend and make a more informed decision about the desired colour for the logo.

The primary colour of Psymment is orange, which, in Vellest's opinion, conveys innovation by allowing HP to conduct original assessments for research and provide the healthcare system with a new source of concept for psychometric evaluation [73]. Following the gathering of this data, the second concept logo is created.



Figure 12. Concept Logo design with colour

Despite having a strong theory behind its meaning, the visuals and character of this logo did not resemble Psymment's essence and did not assist people in determining what type of platform Psymment is and for what it was created. Furthermore, this platform was designed with healthcare professionals, not just psychologists, in mind. As a result, the " Ψ ", Psi, mark is no longer meaningful and was dropped from the original logo concept.

The logo was redesigned again, this time with the essence of Psymment as inspiration. Everything in Psymment revolves around analysing and evaluating cognitive matters such as behaviour, mental capacity, memory, and other brain-related issues. This makes the brain our primary source of inspiration.

Because of this new understanding and perspective on Psymment's desired logo, a simpler but understandable illustration of the brain, as well as Psymment written in a compatible font, was desired. We started looking for high-tech brain logo examples to help me with this so we could get some inspiration and see what is already on the market. In terms of aesthetics, colour schemes, and general design choices, we found three examples that served as my main sources of inspiration. We observed that in the medical apps that we used as inspiration, such as Psicoreg, BetterHelp, TalkSpace, Typeform, Cognito forms, Gravity forms, Psytoolkit and PsyPack, most of their logos were primarily wordmarks, except for Betterhelp, TalkSpace, Cognito forms, Gravity forms and PsyPack, these transpired more the vision we wanted for the Psymment brand logo, which was having an illustration associated with the name so we could use the logotype with both text and illustration or just the logo. We noticed that most of the medical web-based platforms as well as some of the apps that served as my inspiration had wordmarks for their logos, except BetterHelp, TalkSpace, Cognito forms, Gravity forms, PsyPack, and also the Serviço Nacional de Saúde (SNS)' logo, which more accurately represented the vision we had for the Psymment brand logo, which was to have an illustration associated with the name so we could use the logotype with both text and illustration. As inspiration, the logo concepts for concept brands like Brainer in *Figure 17*, Neureno in *Figure 18*, and Aivo in *Figure 19* were considered the best models found that matched our team's ideal for the finished logo design.



Figure 13. Brainer concept logo design [84]

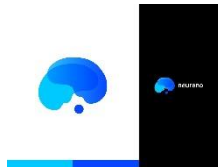


Figure 14. Neureno concept logo design [85]



Figure 15. AIVO concept logo contest for Neuroscience laboratory [86]

We started by drawing a simplified image of the human brain to obtain a more accurate representation of the same. Then, we experimented filling the shape in and just overlining it, and between the two we chose the overline path because it was more visually appealing and elegant.

The first attempt arrived after many sketches, as shown below in *Figure 20* in positive and negative concepts. The idea was to create a simple form that served almost as an abstract outline of the brain, but also in an organic shape with varying line widths throughout its extension. The font used to better pair with this brain shape was Roboto Bold. This new look had good visuals but no resemblance to the brain. However, it aided in determining what I liked and disliked about it to improve it in future concepts.



Figure 16. First studies for Psyment final logotype design

Following that, other ways of drawing a brain with the same visuals as the previous one were created, as shown below in *Figure 21*, providing our team with a broader range of options for selecting our final logo design. A new attempt to recreate the logo was made but with subtle changes to its overall characteristics.

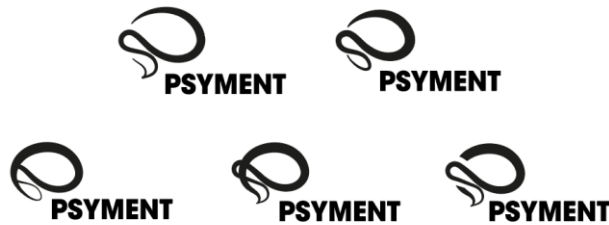


Figure 17. The sequence of studies for Psyment final logotype design

The winner of these five logo concepts was chosen by me and my teammates. This logo can be seen at the top right of the image above. This choice was critical because our goal was to help the public recognize the human brain shape and associate it with a brain-related platform by simply looking at the Psyment logo.

After deciding on the final logo visuals, it was time to give it a branding identity by creating multiple concepts of this logo to be used in various situations and environments.

Final Logo design

The process of creating the final logo was difficult because it affects first impressions of our project's reliability or lack thereof. A logo is an essential component of a product's or project's brand identity because its visual characteristics assist consumers in recognizing a brand by its logo, influencing product preference in today's market [78]. This is why we gave it special attention by devoting more time to it during this project's development.

The primary logo design concepts for Psyment include a logo without the brand name and two logos with the name in both positive and negative concepts. Because technological advancement of cognitive evaluation methods in health institutions is desired, this logo aims to have a more technological design that reflects that objective; as a result, it was noticed that health tech brand logos in some cases use more than one colour and sometimes a gradient, the Serviço Nacional de Saúde (SNS) logo is an example of

that, so we attempted to incorporate this into my final logo design. By adding character and personality to our logo, these details contributed to its branding and uniqueness.

To make the logo more vibrant, we decided to add three colours in a gradient to the shape of the human brain in Psyment's logo, as shown in *Figure 22*. While the main colour of Psyment's interface is orange, the logo must also adhere to the colour scheme based on orange tones. Orange (hex code: #ED8D00), light red (hex code: #E05636), and light orange (hex code: #FFBA7B) were the three colours chosen.



Figure 18. Psyment final logo designs (main logo, positive and negative logotypes)

For Psyment's secondary logo concepts, we opted for a monochromatic colour scheme in black and white, using either white or light backgrounds or, if necessary, black, or dark backgrounds, as seen in *Figure 23*. These examples can be used in situations where the logo needs to be clear and readable, portraying minimalism and a classic look.



Figure 19. Psyment secondary final logo design (positive and negative)

B. Moodboard

A design tool used during the initial stages of creating and developing an interface is a moodboard [52]. Moodboards allow designers to express their creative thoughts and desired visual style by visually representing their concept [53], [54]. Moodboards are widely used in a variety of fields, including nonvisual ones [54]. Moodboards convey feelings and sensations and can be portrayed as such [54]. But in most cases, moodboards are essentially collages made of images, keywords, typography, colour scheme, and other elements to demonstrate a visual idea of an interface in an instructive and persuading manner [54].

Moodboards allow UI/UX designers organize all sources of inspiration and carry out a visual search [55]. This will prompt us to start working on some rough sketches to test various designs with speculative ideas that might result in unintended but brilliant new concepts [55]. The components of a moodboard, which are typically images, can be interpreted in ways other than their exact meanings [55]. To summarize and clarify the main idea, these compositions are typically followed by a verbal explanation of their meaning and objectives [55]. Applying this strategy will promote a satisfying user experience within the target audience [56].



Figure 20. Fashion Textures and Colors Moodboard, design by Mariana Azevedo [57]



Figure 21. Kitchen Interior Moodboard, design by Merve Balik [58]

The moodboards in *Figures 6 and 7* depict artistic, colourful, entertaining, and communicative qualities that are in line with Psymment's desired moodboard and portrait. A simple layout can be improved by adding interesting elements, such as text or illustrations, giving the moodboard a stronger visual identity [57] [58]. These compositions served as the basis for Psymment's moodboard because it was intended for

this project to offer unique proof of the dominant colour palette as well as layouts, graphic representations, logo inspirations, typography, and other pertinent elements to stand out. This approach leaves it up to the designer to be creative with it; it does not follow any specific style or organization [53] [59]. Despite being well-organized, the elements should appear disorganized to enhance the appearance of notes and collages in a notebook. The moodboard's layout should be less structured, like the two earlier examples, to achieve that similarity and resemblance.

It was time to set the web-design inspirations to follow before we could start designing the visual identity of our platform. This was done by conducting experiments on how the interactions between different elements and details within a web-based platform should be handled. This made it clear what design direction we should take to build a solid and upbeat platform for Psymment’s target audience.

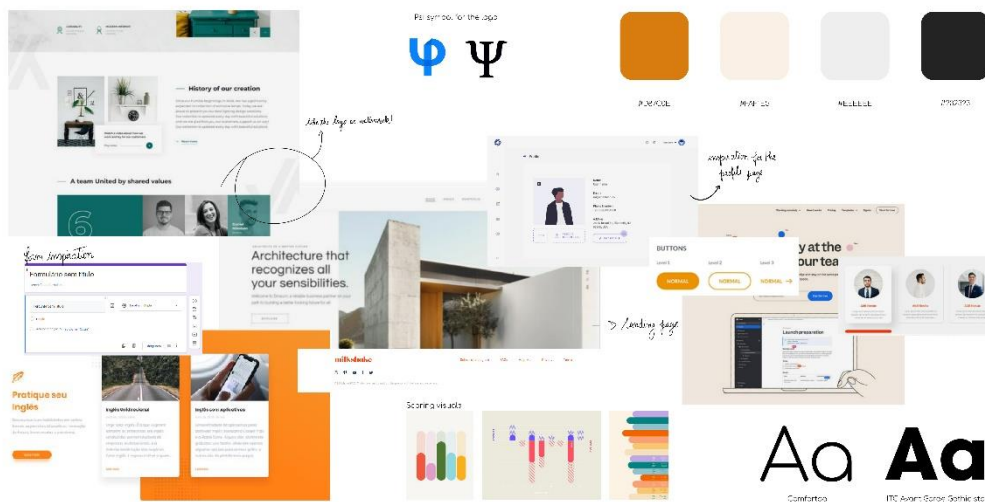


Figure 22. Psymment Moodboard

Colour scheme

Colours can influence certain feelings and emotions when used in particular contexts, which can change how we perceive things by making us feel comfortable or uneasy [60]. The appropriate colour choice for our interface brings our platform one step closer to success by enhancing our audience productivity and communication [60]. We must provide a positive experience for how HP perceive and interact with our interface given that the colour choice has the potential to affect the feelings of our clients positively

or negatively. The contrast, complementarity, and vibrancy of colours stimulate this psychological phenomenon in humans [60]. We must choose colours to attract customers to our interface, keep it looking positive, and persuade them to purchase it [61]. Psymment focuses on the most common perceptions of colour, even though different communities around the world have different cultures and worldviews that cause them to all perceive colour differently [60].

The colours commonly used in healthcare interfaces are blue and green for being considered relaxing colours. However, studies show that blue is often seen as unhappiness to people and melancholy; and the colour green is referred to diseases, guilt, but also give the impression of refreshing and peaceful since it resembles nature [17]. On the other hand, orange is a warm colour that resembles lively and energetic feelings as well as creativity and exuberance [17]. Moreover, in Portugal, the Psychology course is also symbolized by the colour orange during the college graduation ceremony [62].

Bright orange (hex code: #D87C0E) was chosen as the primary hue for Psymment because of the reasons explained earlier but also because of its versatility in standing out against both dark and light backgrounds. Along with this orange, the colour scheme should persist warm and vibrant while remaining neutral to add some variety but prevent vulgarity. To achieve that, the main orange was supplemented by a lighter orange tone (hex code: #FAF1E5), a light grey (hex code: #EEEEEE), and dark grey (hex code: #232323).

Considering the colour wheel, orange is a secondary colour that tends to convey lively and captivating user interaction [61]. In UI/UX design, this colour is typically used to draw attention to key buttons to increase the engagement with an interface [61]. Additionally, because the colour orange has the ability to energize people by portraying captivating and attention-grabbing qualities, it is widely used in advertising [63], [64]. The *Figure 9* below illustrates these characteristics of the orange colour being used in web-design.

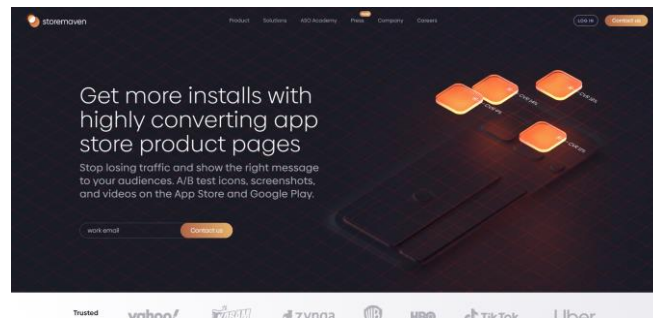


Figure 23. Screenshot of the Landing page of Storemaven [61]

Typography

Typography has the goal of determining how a user interface communicates with and appeals to its audience [65]. The phrase *"write in accordance with form"* [65] is the current definition of typography, which is derived from the combination of two Greek words: 1) "typos" which means "form", and 2) "graphia," which means "writing." [65]. Depending on how we arrange the text on the page, its size, and its weight, the main function of typography is to guide our eyes through the content according to *"the mood of the text"* [66]. Typography works best when the content, form, and graphics are balanced.

Fonts typically have a common font family that includes regular, bold, italic, and bold italic, as well as additional weights like light, extra-light, and condensed [66]. However, not all of them are designed for digital interfaces. The majority of fonts *"are designed to print well on paper"* [66], which makes them difficult to read on screens, and that becomes a problem for designers when choosing fonts for a web-based platform [66].

Knowing that different typefaces show different uses and purposes for expression is important. Because of this, typefaces should be carefully matched to create a more effective expression and create a beautiful visual impact to the design [65], [67].

To portray a balanced design, header, sub header, and body fonts typically need to present differences in appearance [67]. For instance, the header should be in a bold, sans-serif font like Helvetica because it needs to stand out and be easier to read [67]. In contrast, body fonts typically appear lighter than header fonts like Times New Roman. Depending on the interface (paper or web), these body fonts are typically serif or sans-serif, regular or lightweight [67].

For Psymment's platform the typeface combination was the following:

- Header: Roboto Bold
- Body: Comfortaa, Bold and light

Both fonts are sans-serif because serif fonts are more frequently used and better suited for printed designs while sans-serif fonts on screens are typically easier to read [68].

Graphic representations

Nowadays, the Internet has a big impact on people's daily lives and has evolved into the main public communication channel of most businesses and organizations over the last few years [69]. Our users' ability to understand the information we intend to convey to them through the platform's visuals depends on how effectively our interface communicates visually [70]. To guide users' eyes through our interface, our visual communication can be assigned to a variety of shapes and sizes, including “*position, colour, size, shape, alignment, contrast, and more*” [70] from the components [70].

The main objective of a good visual interface communication is to give users the “*effectiveness, efficiency, and satisfaction*” [69] they need to complete the tasks they set out to do [69]. Because the human brain processes and remembers images more quickly than text, visuals are crucial in a web-based platform [70], [71]. As a result, important design components like interactivity, responsiveness, usability, content, and much more are necessary to satisfy our users.

The following list addresses the initial inspirations to use in Psymt:

Logo

- The Greek letter “Ψ” and Psypack's logo, which was also inspired by the Greek letter, were my sources of inspiration for the Psymt logo.

Logo watermark

- One of the first things that was considered for the interface was to add the Psymt logo as a watermark in the background of the interface to give it an interesting touch. This was done to avoid having a plain and uninteresting background.

Colour scheme

- It was decided to use orange as the primary color, with lighter orange, light grey, and dark grey serving as its complementary tones.

Buttons

- The buttons should be more rounded and not sharp. Rounded shapes are regarded as friendlier than sharper ones, so we decided to follow the design of softer edges.

Page to create assessments

- The design of this page on the Psymment platform was heavily influenced by Google Forms.

Visual of images and graphics

- We wanted vector designs for the images and results graphics in the user interface. The graphics would only be filled in with colours other than the primary ones, leaving the images with an outline.

Layout

- The elements' arrangement would be aligned to the page's left. Therefore, the text would typically be on one side and the images on the other.

C. UI Style Guide

It was time to organize all the guidelines for Psymment interface design after gathering all the inspiration from the moodboard and creating the logo.

Although moodboards are sometimes used as style guides, they tend to be more subjective and artistic in nature [87]. Knowing this, to guarantee the project's visual coherence, an objective set of guidelines had to be established.

A document with all the design decisions and recurring elements defined is crucial for our platform to maintain a consistent design throughout different screen sizes [87] [88]. This strategy will be used to present visual coherence and give project context, ensuring it progresses in an organized manner [87]. Establish standards for the typography, colour scheme, buttons, and other elements that go into making an interface is important.

The first UI style guide created was very basic and focused only on emphasizing the main components and features of the Psymment interface. As seen in the *Figure 24*

below, it only displayed the typography, colour scheme, and button hierarchy that would be used.

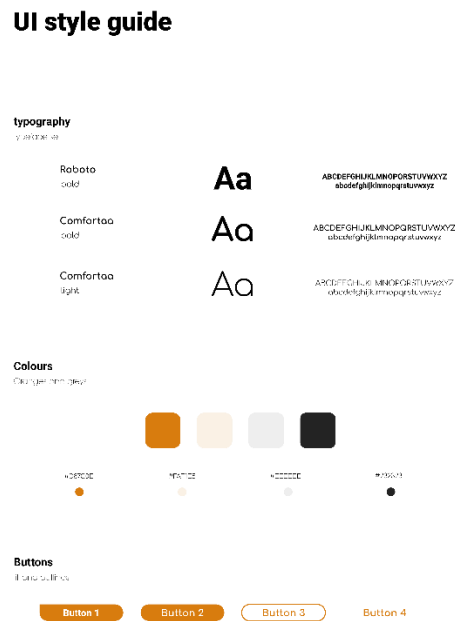


Figure 24. Initial UI style guide

Typography

The font you choose will greatly affect how the platform looks. Additionally, it will affect how users perceive our platform and their ability to use it properly over time. Given that some HP may not have as good of eyesight as other HP, the size and weight is also very important and should be given special attention. Roboto Bold will be used for statement information like titles, Comfortaa Bold for other information that needs to be highlighted, and Comfortaa light for the remaining text.

Colour scheme

Here is where we begin to choose the colours that will work best to represent our platform visually and how well they complement one another. We chose bright orange (hex code #D87C0E) as the main colour for this moodboard. The other main colours are very light orange (hex code #FAF1E5), very light grey (hex code #EEEEEE), and dark grey (hex code #232323).

Buttons

Buttons must have various designs based on their importance and hierarchy, as seen in *Figure 24*. We had to create our buttons in a similar way, with a rounder design for a friendlier appearance and coherence with the visuals of the interface. The topmost button in the hierarchy is for statement decisions and actions; it will be orange in colour with text that is Roboto Bold and have a rectangle shape with the top left corner straight and the rest rounded. The second-most important button will be used for choices that need to stand out but aren't statement choices, like the button to apply a test. It is also orange with rounded corners and its font is in Comfortaa Bold typeface. The third button will be used for actions that are less crucial and frequently used. This button will resemble the one before it, but it will have an orange outline, a white background, and orange text that stands out against the white background. The last button in the hierarchy will have just the text in Comfortaa Bold and no box. This kind of button will be utilized for other actions within the platform.

D. Prototypes

Interface designers have two prototyping options at their disposal: low-fidelity prototypes and high-fidelity prototypes; according to their objectives, fullness of the design, and resources available for the prototyping [89]. By contrasting the functionality and efficiency of the two, it is clear that low-fidelity prototyping has some limitations in comparison to high-fidelity mock-ups [89].

The primary distinction between the two approaches is their fidelity, which varies in terms of “*visual design, content, and interactivity*” [89]. A clearer comparison of the two approaches is provided below to demonstrate their value at various stages of the design process.

Low-fidelity prototyping (Paper wireframes)	High-fidelity prototyping (Digital prototyping)
<ul style="list-style-type: none"> • Quick and simple; • Evaluate how well a product works; • Platform’s content with main components and visual elements; • Limited interactivity; • Inexpensive; • Clarifying; • Permit early testing; • Easy to make changes. 	<ul style="list-style-type: none"> • As close to the final product as possible; • Very similar to final design; • Realistic interactions; • Test interactions and UI elements; • Good for user demonstrations; • Higher expenses in relation to time and money; • Device optimization; • Efficiency.

Table 5. Differences between low and high-fidelity prototyping [89]

A. Wireframes or Low-Fidelity prototypes

A basic step in web design process is creating wireframes which is basically making sketches to visualize how the functionality and flow of the interface would be before the ideas could come to life [90]. This process helped me see how the interface would look and where things would be placed on the screen [90].

To illustrate the page layout and arrange the design elements across different interface pages, this method uses static drawings that can be made with traditional methods, paper, and pencil, or digitally with Adobe Illustrator, Adobe Photoshop, or other similar design tools [90], [91]. Typically, wireframes consider the content, layout, and page flow to reveal a more comprehensive structure [91]. This method is revealed to be more adaptable than others, such as prototypes or high-fidelity mock-ups, because it takes little effort to represent the layout of a page, is simple to modify, and takes little time to produce [91]. In addition, wireframes demonstrate how easily our website can be represented visually on any device.

Our top priority is to improve how healthcare professionals assess their patients in the clinic, and it is registered they use computers during work. With that in mind, the first step was to design some computer screen layouts as shown in *Figure 25*. However, the world of web design is currently being taken over by the digital age, and applications and websites do not restrict their design to one screen size but use responsive design to adapt their layout to various screen sizes [91]. Considering this, we still thought it would be beneficial to allow them to use our platform on smaller screens such as tablet screens. The design should be adjusted to the width of the screen using wireframes for smaller screen sizes. [90].

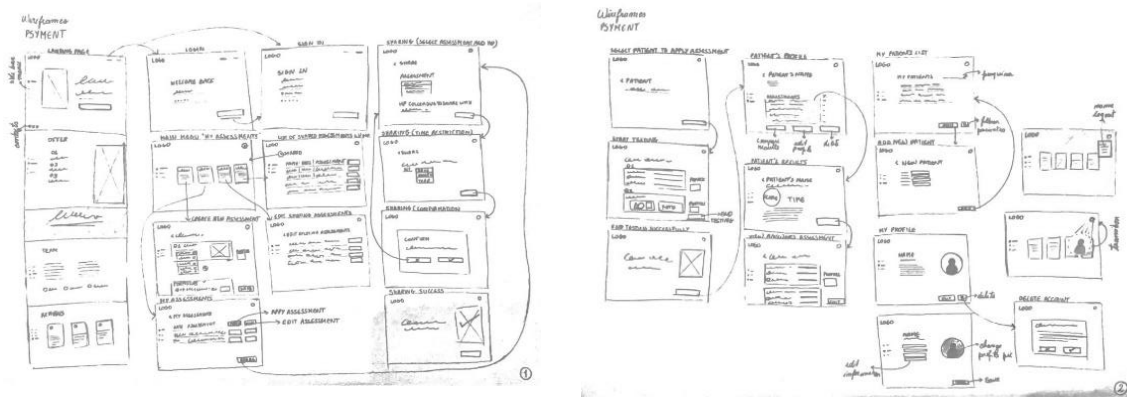


Figure 25. Psymnet computer wireframes

Despite having the same interface, some changes are required in the way that elements are organized. With smaller screen sizes the information needs to be reorganized to fit the screen because the elements will be more tightly packed in the pages. As a result, wireframes for the tablet were also required to highlight the interactions within the pages and the connections among them as shown in *Figure 26*.

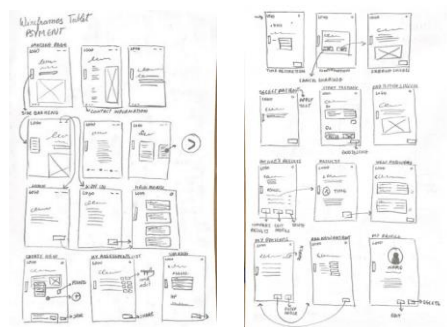


Figure 26. Psymnet tablet wireframes

B. First High-Fidelity prototype

Since some wireframes had already been made, it was time to see a Psyment prototype closer to what was desired to be the final product. Using this user experience (UX) design prototyping technique, my partners and clients will be able to understand and visualize my design vision for Psyment, more clearly [89].

The high-fidelity mockups were created in Adobe XD, an "easy-to-use vector-based experience design platform" [92] that enables designers to craft their design vision and give it a realistic performance experience [92]. Users can click on the buttons in these high-fidelity prototypes and interact with the interface in the same way as they would on a regular website.

It was desired to give Psyment a distinct appearance from what we are used to seeing in other healthcare-related platforms, so we began developing high-fidelity mockups by following the initial UI Style Guide. With this, we already had the foundation to begin designing the initial Psyment's high-fidelity mockups and we choose to stick with a simpler layout.

These pages had a sidebar menu and left-aligned elements as seen in *Figure 27*. Since Portuguese people read from left to right, the sidebar menu was made to be both functional and simple to use. Users would have access to the topics covered in the pages. To give this menu bar more room, the remaining page elements were also moved to the right. It was difficult to fit all the information and visual components we wanted to include while still having every element appear balanced on page.

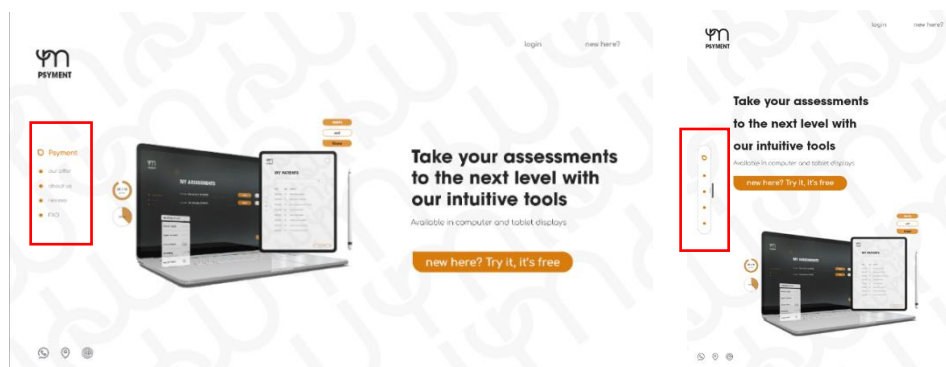


Figure 27. Sidebar menu on Psyment's landing page in computer and tablet

Afterwards, we tried something different to add some interest to the pages, so we added a pattern of Psyment's original logo that was large, rotated 33 degrees, and had very little opacity—it almost looked like a watermark on the pages. The colour of these

watermarks would vary from light to slightly darker depending on the background colour of the page, as seen in *Figures 28 and 29*. At first, it was seen as an intriguing addition to the pages, but eventually, it grew obnoxious to look at and dispersed the focus of having a clean aesthetic, which was my goal since the beginning.



Figure 28. Psymment mockup page with the logo watermark in the background

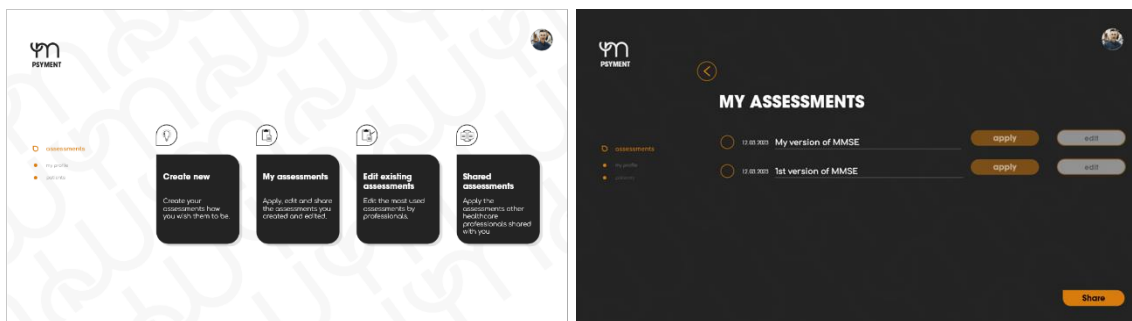


Figure 29. Watermarked pages with a white background on the left and a dark background on the right

Except for four pages, the background of Psymment's pages was mostly white. These pages could only be accessed through each section of the menu page, where the background colour matched the colour of the section's boxes, which was dark grey. Watermarks would be slightly darker with a light grey colour on a white background, and slightly lighter with a lighter grey colour on a dark background.

Regarding the visual elements of Psymment, we wanted to give a hierarchy to these elements on the pages. To achieve this, we used a bolder, larger font for the messages we wanted to stand out, such as titles, and a smaller, more appropriate font to give the titles more information and significance without taking too much attention from the concise messages in the titles. Simply serve as reinforcement for these messages.

Psyment's landing page underwent several revisions before we were satisfied with the final design. In the original mockups, we intended to add an image along with the title to entice users to use our product and stimulate their curiosity by providing them with a visual representation of what our platform has to offer.

Our interface was designed to be responsive to various screen sizes, enabling healthcare professionals to perform evaluations on devices like tablets. Because of that, high-fidelity tablet prototypes were also created for this reason.

The performance and adaptability of the instruments of evaluation, whether they are HP-created or simply using the instruments available in the platform, are improved by having Psyment available in screen sizes other than computers. There would be some restrictions if the interface was only available for computers. For instance, during the drawing exercises, the HP and the patients would need assistance from outside resources like paper and pencil. Additionally, the HP would have to take a picture of the patient's drawing and upload it to the platform for it to be registered in the test. If the institutions do not have access to tablets, this method will still be available on the platform, but it is critical that our interface supports HP in its evaluation procedures and catches up with current trends in responsive interfaces.

Because it was intended to be used for user testing at Casa de Saúde São João de Deus, the first draft tablet mockups were created at the same time as the first draft PC mockups. However, we had to do the user testing without the prototype for the tablet because it did not work well on the tablet we had, so we had to stick to using mockups for just the computer instead.

E. Design Adjustments

After reviewing the feedback, we obtained from the user testing by the medical professionals, we improved our platform accordingly to fit their desires and expectations. This procedure is important because it allows me, as a designer, to improve Psyment's readability, fluency, ease of use, and enjoyment to HP. By doing so and paying attention to their needs, we will be one step closer to improving Psyment's usability regarding their evaluation process, potentially making Psyment a future investment for them to use on a daily basis at work.

The prototypes of Psyment were changed four times in total, and we will highlight some of these changes below, along with how the design evolved over time.

The tablet prototypes also experienced some modifications as a result. To enhance the tablet mockups' usability and ensure that the platform is uniform and consistent across screen sizes, the alterations made to the high-fidelity computer prototypes had to be reflected and adapted to the tablet design as well.

Since a prototype is not always the final product, some changes can still be made to enhance the visual appeal and usability of an interface before starting the implementation [90]. In the case of Psyment, the design changed occasionally throughout the course of its development, but it preserved the pages' initial organization. The changes followed the user testers recommendations and insights as well as design standards in UI design, such as the 10 usability heuristics for User Interface Design by Jakob Nielsen. These principles were as follows: 1) "*Visibility of system status*" [102], emphasizing the importance of using user feedback to keep users informed of developments; 2) "*Match between system and the real world*" [102], which refers to making words, phrases, and concepts familiar, understandable, and intuitive to users; 3) "*User control and freedom*" [102], which provides users with a "emergency exit" to avoid an unwanted action, such as "undo" and "redo" options; 4) "*Consistency and standards*" [102], this principle seeks to reduce the cognitive load of our users by maintaining consistency in the design of our product; 5) "*Error prevention*" [102], provide users with helpful error messages before committing to an action, such as warnings with "confirmation" and "undo" options, to avoid problems; 6) "*Recognition rather than recall*" [102], because every individual has short-term memory, it is crucial to make elements visible to reduce the information that must be remembered and avoid forcing the users to remember it; 7) "*Flexibility and efficiency of use*" [102], this principle warns designers to provide their users with shortcuts to enable them to customize frequent actions (e.g. keyboard shortcuts and touch gestures); 8) "*Aesthetic and minimalist design*" [102], which aims to maintain a basic content and visual design; 9) "*Help users recognize, diagnose, and recover from errors*" [102], as designers, we must make it obvious to our users about what went wrong, and for our users to understand, we must provide them with visible and straight to the point error messages (e.g. error messages in bold and red text); and 10) "*Help and documentation*" [102], this principle aims to provide users with the documentation

required to complete their tasks, such as providing context to our users when and where they need it [102].

Considering this, the pages that saw more significant modifications, however, will be discussed later in this document.

Final UI Style Guide

Because of its incompleteness, the original UI Style Guide was not comprehensible enough to be used in the finished product. It underwent adjustments to align with the updated Psyment design, refined based on user testing feedback and my critical evaluation. The Final UI Style Guide can be seen in *Figure 30* below.

UI style guide

Logo



Secondary logo



Typography

Rebato bold	Aa	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
Comfortaa bold	Aa	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
Comfortaa light	Aa	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz

Colour palette



Buttons



Icons



Graphic representation

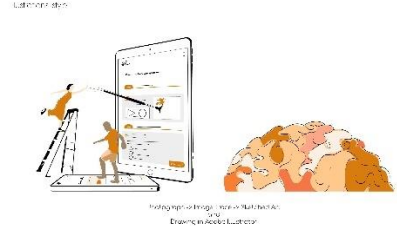


Figure 30. Final UI style guide

- *Logo*

Because the Psyment logo was still being refined before conducting user testing, we did not include it in the UI Style Guide at the time. However, because it will appear frequently on the platform's pages, this element is extremely important. This is because users might be unaware of the website they are currently visiting if the logo is not clearly visible on the pages, as the logo stimulates memory and recognition [78]. For this reason, we had to include the logo as a component of Psyment's visual style.

- *Typography*

Because the chosen typography performed well in the user tests, we chose to stick with it. The size was the only problem, but Psyment's website will address that. Roboto Bold for statement information like titles, Comfortaa Bold for other information that needs to be highlighted, and Comfortaa light for the remaining text.

- *Colour scheme*

We must consider how well the colours we select complement one another as well as which ones visually best represent our platform. The initial primary colour scheme was altered because it gave the platform an extremely boring appearance. Complimentary hues were intended to add vitality and brightness to the design. Because of this, the colours most frequently used are: the bright orange (#D87C0E) and a dark grey (#232323), with the addition of a light orange (#FFC88D). Aside from these colours, we chose three from the same orange palette to create complementary colour schemes: a very light orange (#FAF1E5), a pink-orange (#FDA68A), and a red-orange (#F67647).

- *Buttons*

The buttons continued to be designed in a hierarchy based on their relative importance. We kept the buttons' general design, but we added a few more that HP suggested during user testing, so we had to give them a unique visual identity to set them apart from one another. We have now clarified the purpose of each button: 1) We created button 1 with a rounded top left corner to set it apart from the other buttons because it is for significant decisions and agreements; 2) Button 2 is similar to Button 1 but it is shaped as a rounded-pill and is used for applying assessments; 3) Other crucial options are accessible via button 3; 4) Button 4 represents the menu buttons, which have rounded

corners and a more rectangular shape; 5) Button 5 represents platform additions, such as the addition of new questions, assessments, patients, and so forth. 6) To delete any profile, element, domain, or other item, we created button 6; 7) with Button 7 users can send assessments to other HP registered in Psymnet; 8) Button 8 allows users to choose from drop-down menus; and 9) Button 9 allows users to add a new domain when making a new assessment. There was a need to add two new buttons—one for adding options within questions and the other for deleting questions—while making a new assessment.

- *Icons*

These are the icons that will be used for each category in the main menu. The icon for adding a new assessment will be a plus sign (+), which denotes that HP will expand its list of assessments by one. The icon for the "my assessments list" is next, and it is depicted as a multiple-choice test question. Next, there is an icon for "edit existing assessments" that looks like a pencil with a rubber tip and lets us add, delete, or rewrite content. The final one represents the cycle of sharing in which we send or receive assessments by using an icon for shared assessments.

- *Graphic representation*

Because the style of the illustrations was still being discussed and studied, this field was filled in last. Then the final decision was made: photos would be taken and then traced by using Adobe Illustrator tool of Image Trace.

Main modifications to the design

- *Landing page*

The landing page took longer to complete because, in my opinion, if it is not captivating enough, users will not purchase our product. According to Nielsen's heuristics for interaction design, our platform must have an aesthetic and minimalist design, providing our users with relevant information while avoiding distracting elements and focusing their attention on what they need [102]. A landing page with better aesthetics has a greater chance of being perceived as more credible than one with a complex design and messy aesthetics [103]. Lack of credibility will impact how users perceive our platform and whether they choose to stay on our website or move on to the next one [103]. Users' first impressions of our platform are also formed by this page, so it must create the

right first experience and provide information that will persuade visitors to purchase our product.

The evolution of the high-fidelity mockups of the landing page is displayed below in *Figure 31*.

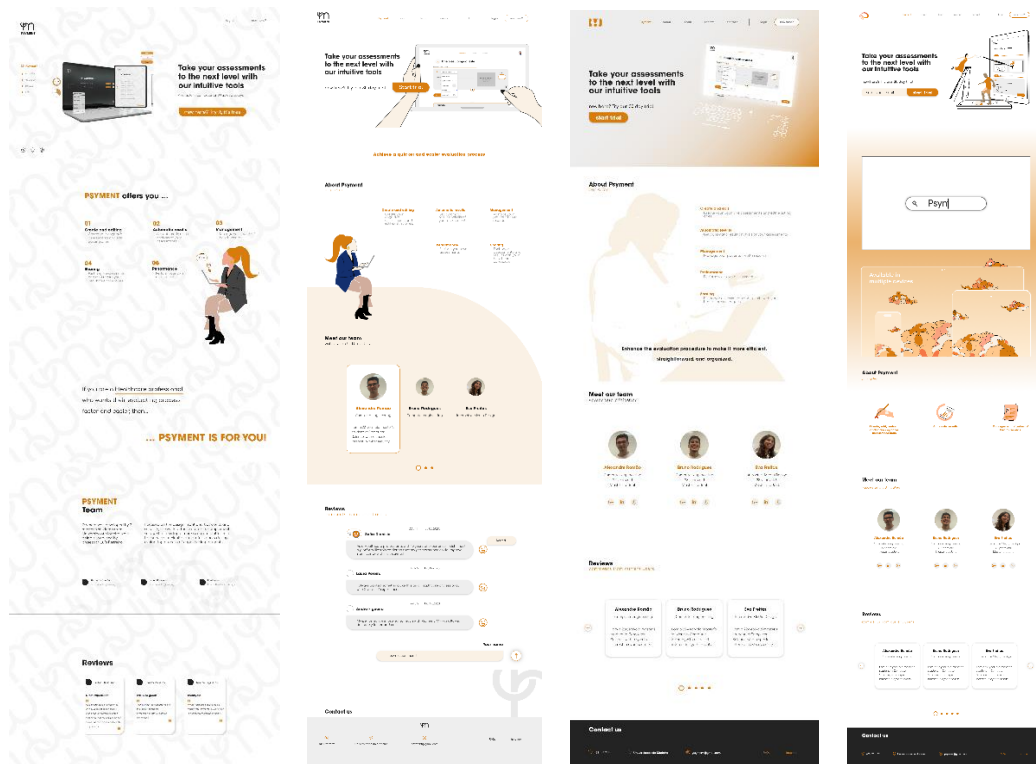


Figure 31. Evolution of the high-fidelity prototypes of Psymt's Landing Page, computer design.

As we can see, the top section of this page was among the first things to change.

This page's overall layout and graphics underwent numerous changes. To produce the final visual graphics, we had to experiment to find the best way to convey my ideas. All the illustration styles were produced using Adobe Illustrator, starting by using computer and tablet mockups downloaded for free from Freepik and later where we took photos to create Image Trace - Sketched Art. The subsequent prototypes employed the same illustration style technique by image tracing our photographs, following the second prototype where we used photographs to draw the elements' outlines. To better understand the steps involved and the final product of the technique used for the visual graphics, we have arranged the photos and illustrations side by side below.



Figure 32. First illustration style, creating vector art from my own photos (left and right)



Figure 33. Second illustration style, Image Traced, Sketched Art photograph in Adobe Illustrator

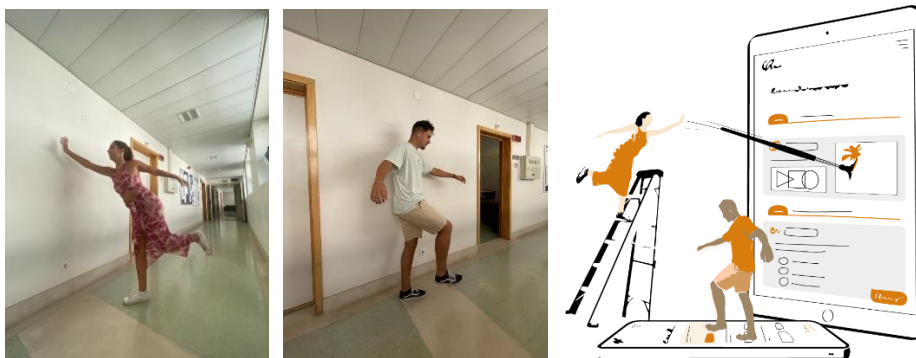


Figure 34. Final illustration style for Psyment

The font named Roboto is used in titles of this page and all the other pages of Psyment. This is because Roboto is a free font that can be downloaded from Google Fonts. The button and message remained the same, but the accompanying image underwent significant changes in terms of its visual language, and the menu bar moved to the top of the page from its previous location on the left. The features that Psyment provides to its users are then covered in the next section below. This section shrunk from five categories

to three categories because, in the previous mockups, we had the “create”, “edit”, “perform”, and “share” content under several categories; in the most recent mockups, however, all of that was combined under a single category “create, edit, perform and share cognitive assessment tools” along with the addition of "automatic results" and "management of health records". In the final prototype, however, this part comes after an automatically playing promotional video (more on that later) and an illustration that was created showing the three devices that users of this platform can access. Then, users were presented with extraneous information in the Psymment Team section instead of concise details about our team. As a result, since this page's second modification, we have included our names, photos, and interests in addition to our social media handles. The reviews included a tour through its design. It was very straightforward and good at first, but after trying a different, unconventional idea that did not look very good in the second round of changes, the reviews remained consistent and settled on a straightforward design that was similar to the first one. Lastly, the footer containing Psymment's contact information was absent from the initial prototype, but like any other business or product, it was required to have Psymment's contact information, including email, phone number and location as well as links to the most frequently asked questions (FAQ) and a help feature.

We enhanced the readability and usability of the tablet landing page design by incorporating the design decisions and enhancements made to the computer mockups. Still, there are a few things that must be changed to fit the screen size for which the design is intended. Aside from the apparent modifications in comparison to the computer mockups, one of the biggest changes in this instance was the sidebar menu. At first, it was a rectangle with rounded corners that formed a shape with semicircles at its top and bottom. This shape showcased orange shapes that corresponded to the topics that were addressed in this page. The user has to click on this sidebar menu in order for it to open and move all of the content on the page to the side, displaying the subjects covered on Psymment's landing page. After that, the user could choose their desired topic and the landing page would automatically scroll to that area. Nevertheless, based on Nielsen's heuristics, this was insufficiently clear or effective. We need to give our users recognizable elements and make them visible and simple to find [102]. Therefore, to fix that, it was changed into a hamburger button, a symbol that is widely recognized on the internet and that most users of it are familiar with. Norm Cox designed this button for the

Xerox Star in the 1980s, which consists of a widget with three horizontal lines that give it a hamburger-like appearance [104]. These lines were meant to represent a drop-down menu that revealed a hidden menu with more buttons [104]. The differences between the first sidebar menu and the last hamburger button menu are shown and highlighted in red below.

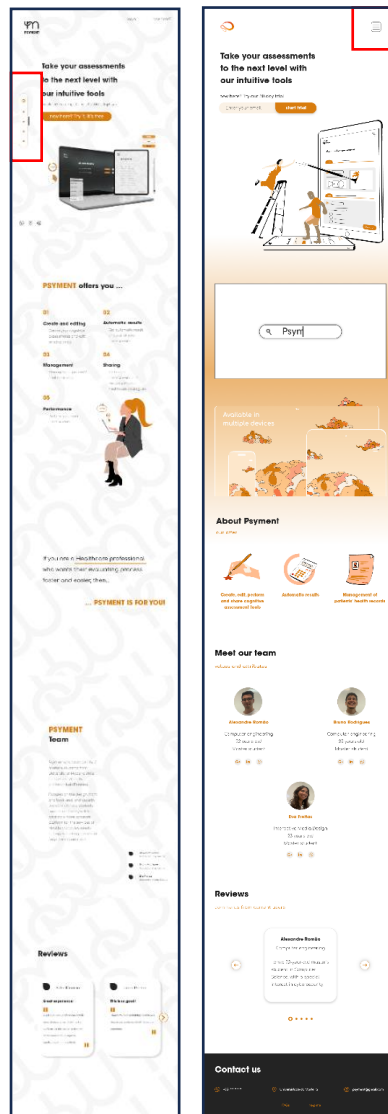


Figure 35. Figure 34. Initial landing page design with sidebar menu; and Final design of the landing page with hamburger button menu, Tablet design.

These adjustments were made in response to what we saw during user testing, as well as to make the content more informative and entertaining.

Log in, and sign up pages

The visual structure of the elements on the log-in and sign-in pages remained largely unchanged during the improvement process; nevertheless, there have been some noticeable changes between the initial prototype and the final version, as shown below.



Figure 36. Initial high-fidelity prototypes of the sign-in and log-in

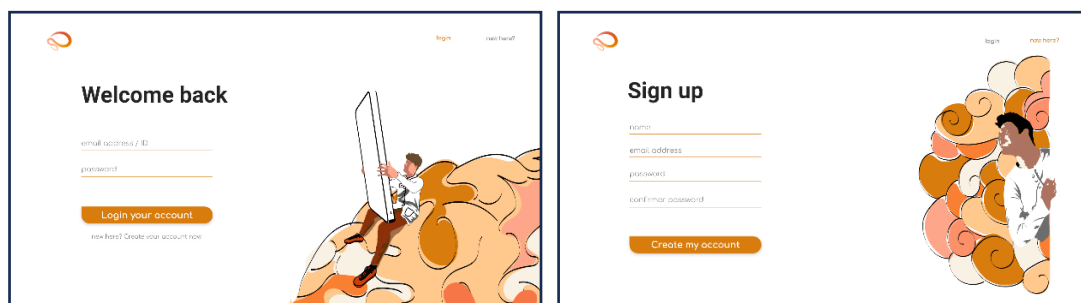


Figure 37. Final high-fidelity prototypes of the sign-in and log-in

The first change to be done was to take the background to obtain a clean, simple, and not obstructive to our eyes page. Nielsen's heuristics state that the content should only highlight the most important information while keeping it simple [102]. In the title “Welcome back” and “Sign up”, the final font selected was Roboto and changed from being all caps to not all caps. The button was then shifted from its original location on the right side of the page to its current location on the left, aligned with the other elements that required information. The final addition to give these pages some personality and colour was the illustrations. The individual in both illustrations is Bruno, a member of the Psyment team. Pictures of him were taken, edited using Photoshop, traced in Illustrator, and the "sketched art" option was used to give his image a black and white contrast effect. HP were drawn wearing clinic clothes and changed the colours to match our colour scheme. Since this platform primarily focuses on analysing people's cognitive problems which are related to the human brain, in addition to his drawings, some Illustrator

drawings of brains were created using our colour scheme as a guide for filling in the shapes inside them. These shapes were purposefully not filled in correctly and were drawn in an asymmetrical and aleatory fashion.

As can be seen below in *Figures 38 and 39*, the tablet version's design turned out to be essentially the same as the high-fidelity computer prototypes.

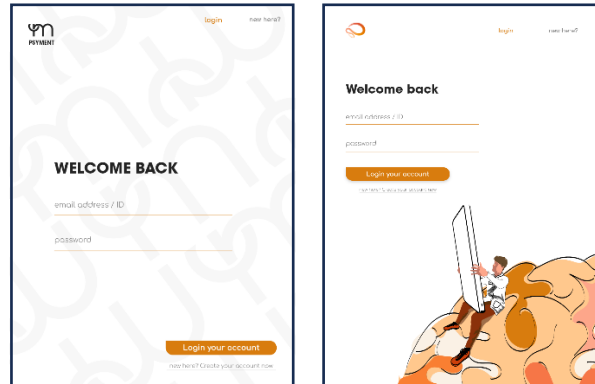


Figure 38. Initial design of the log-in page on the left and the final design of the log-in page on the right

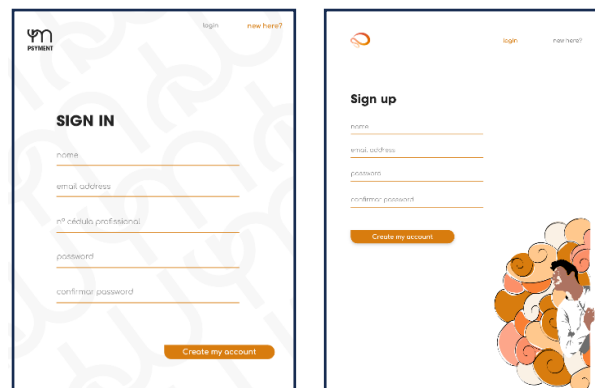


Figure 39. Initial design of the sign-in page on the left and the final design of the sign-in page on the right

Menu page

This page underwent numerous revisions affecting every aspect of it. The comparison side-by-side below in *Figure 40* makes those changes more obvious.

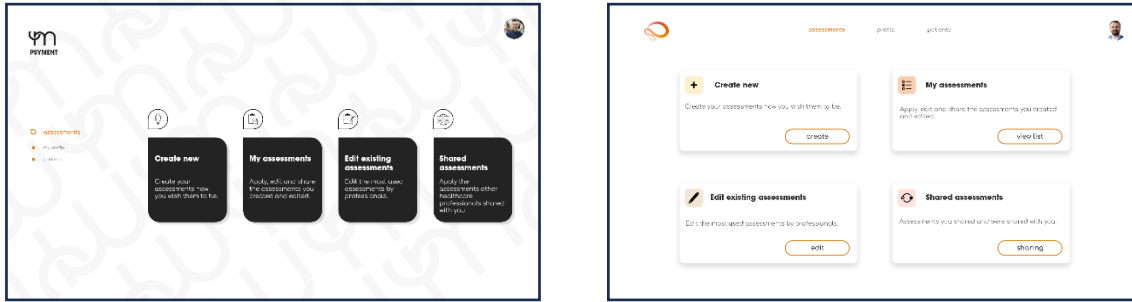


Figure 40. Initial design of the menu page on the left and final design of the menu page on the right

The structure, colour, and form of the four menu sections instantly alert users to a change that has been made to this page. In the original layout, these sections were arranged side by side on the page, with the upper left corner being sharp and the other corners all rounded, creating an uneven shape. In addition, each category contained a large amount of text, and the background was a dark colour. To get an idea of what could be added as an illustration, vector illustrations were downloaded from flaticon [105], [106] and Freepik [107] for free and placed it on top of these boxes. These vector shapes were used to see if those illustrations affected the HP experience, even though they would not be used in the final design. Later, new illustrations that more accurately reflected each category replaced these vector illustrations.

When users interacted with the platform, users' experience with Psymment was less satisfying. There was a lot of information to retain, the design was not clear and simple, the illustrations were inappropriate to visually identify each category, making it unlikely that users could understand the meaning without the assistance of word definitions, and the small size of the boxes gave the impression that there was an excessive amount of text inside [102].

In the previous design, the buttons were the dark coloured boxes; however, in the most recent design, a button to access each category is located within it. These buttons have rounded corners that form a pill shape, a white background with dark letters, and an orange border. The watermark of Psymment's original logo was removed from the background of this page, giving the elements more room to breathe and creating a cleaner, white-only design that makes the buttons and other elements stand out.

The last change made was the placement and appearance of the side bar menu, which was previously vertically aligned on the left side of the page and now sits at the

top in a horizontal line with the user's photo on the right and the logo on the left. The new adjustment persisted across every page of Psyment.

Like all the other pages, the menu page on the tablet was designed with the items resized to fit the screen, but the organization and elements are essentially the same as they are on the computer prototypes. The difference between this page's original design and its final design can be seen below, in *Figure 41*, with the final design located on the right.

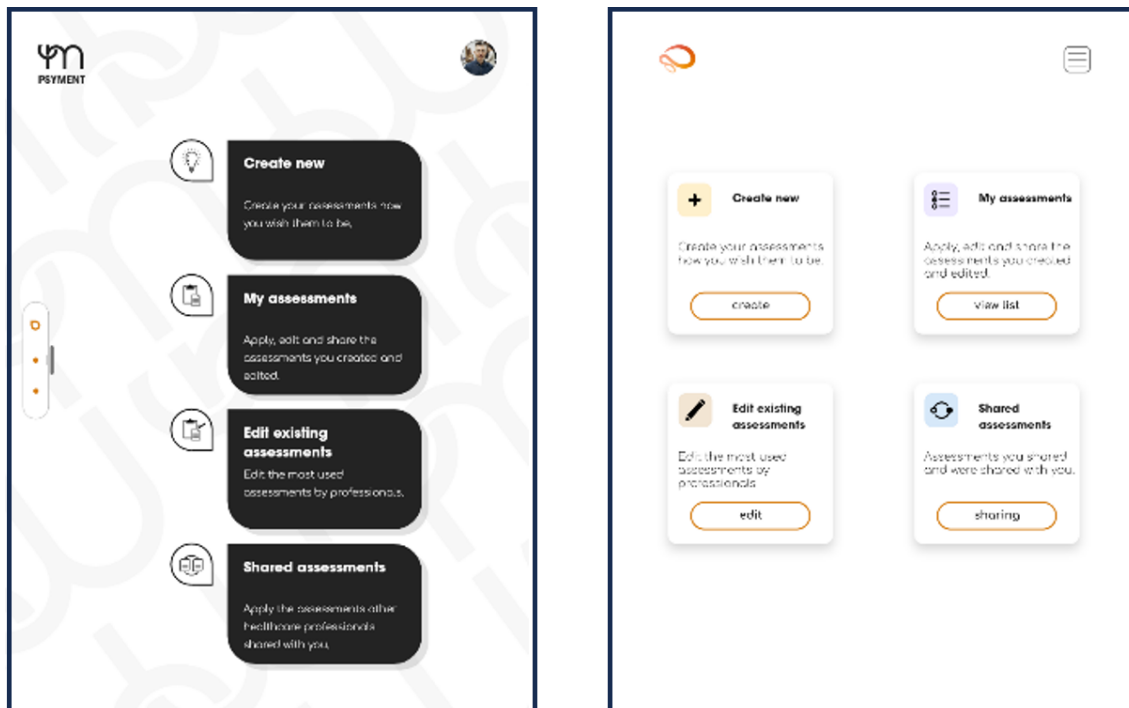


Figure 41. Initial design for the menu page for tablet on the left and final design of the menu page for tablet on the right

Create new, my assessments, edit existing assessments and share assessments

When the boxes on the first design of these four pages—the menu page's four categories—were opened, the corresponding page for that category had a dark background, as demonstrated in *Figure 42* below. However, the bright and dark backgrounds of the platform created an uneven visual style, not following the Nielsen's heuristic of maintaining consistency, which might impair users' eyesight and increase cognitive load while using our platform [102].

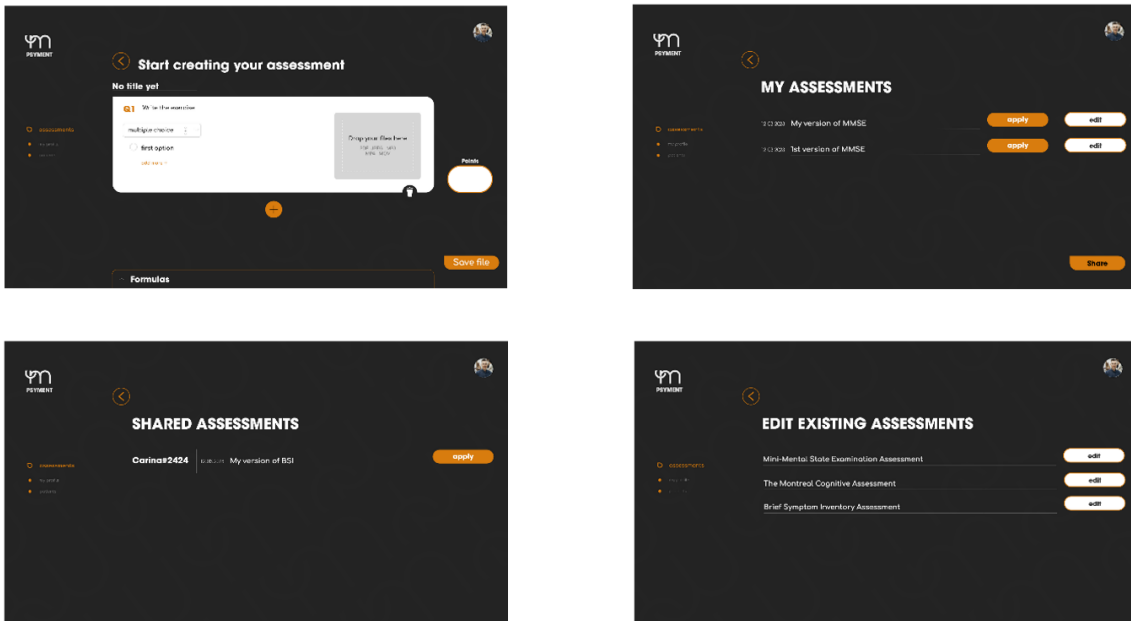


Figure 42. Initial high-fidelity mockups for each of the four menu categories

Below, in Figure 43, it is possible to verify that change of background colour.

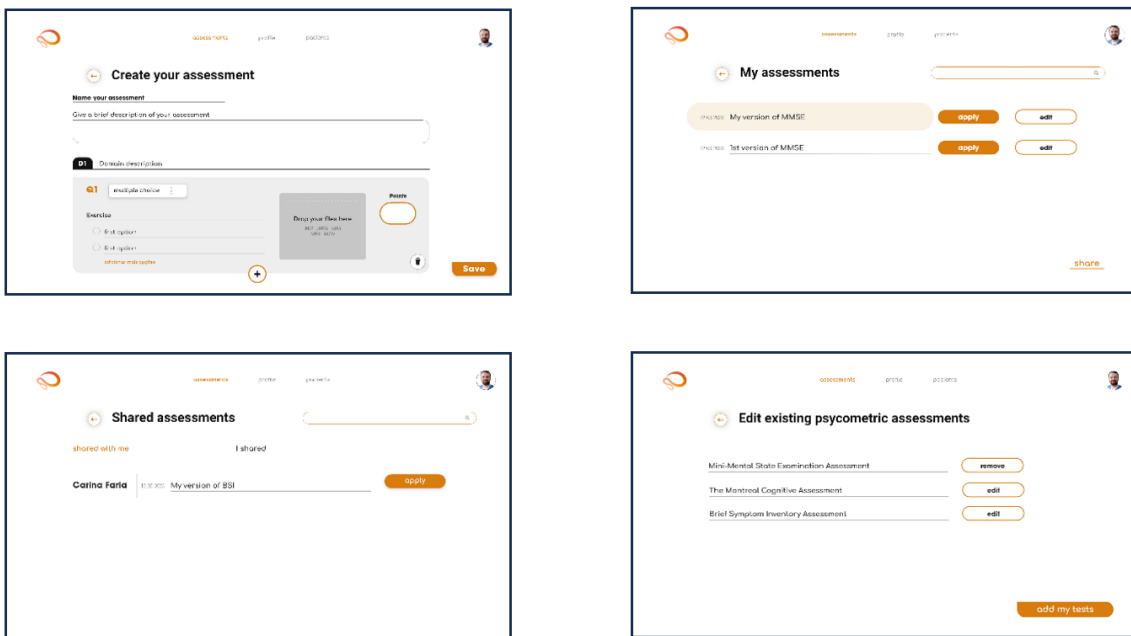


Figure 43. Final high-fidelity prototypes for each of the four menu categories

The menu bar was moved to the top of the page, giving the remaining components of that page more room and a less condensed appearance. Additionally, it was a good idea to switch from a dark to a light background because the lighter background showcases a more clean and consistent design.

Patient's page of results

Apart from the modifications implemented in the other pages, such as the rearranged menu bar and rearranged elements, this page also experienced some adjustments based on feedback from user testing. The HP claimed that they typically do not time assessments, so they felt that this functionality was a little pointless. As a result, we removed it from the page. However, they could only see the overall results; the only option available to them for viewing and analysing the results more precisely was to view each question's results individually in the original mockups. Therefore, if all they want to do is find out where the patient is most lacking, that is not practical. In light of this they advised us to include the outcomes of every category of the evaluation in addition to the assessment's final and total results. Furthermore, the area designated on this page for HP to take notes regarding this assessment evaluation has been removed; instead, the notes are now taken on the patient's profile page only. The comparison of this page's initial and final mockups below, in *Figure 44*, shows these changes.

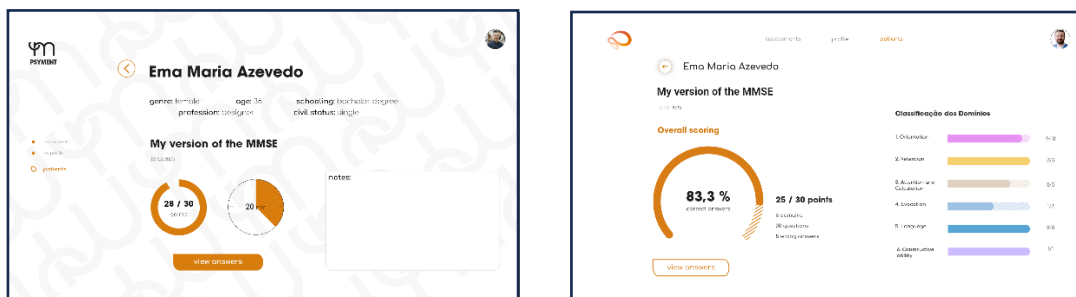


Figure 44. Results page on the initial prototypes (left) and on the final prototypes (right)

Additional pages of information, success and confirmation

If a user does not receive the proper kind of feedback from a platform to reassure them before committing to an action, it can be very easy for them to do unwanted actions on it. Situations where errors are likely to occur could arise from not giving the user options for confirmation or error messages so they can carefully review what they are doing. According to the usability heuristics for user interface design of Nielsen, there is two types of user errors: 1) Slips arise when a user plans to do something but ends up doing something else entirely; 2) Mistakes occur when a user consciously makes a mistake by misinterpreting or believing he is following the correct procedures but accidentally makes a mistake [108].

It is very easy to get lost in a platform if the user does not receive the right kind of feedback from it to reassure what they are doing before committing to an action. A page of confirmation will be displayed below, this page aims to allow users to double-check their action before unintentionally committing to it. This will give them time to reconsider before proceeding.

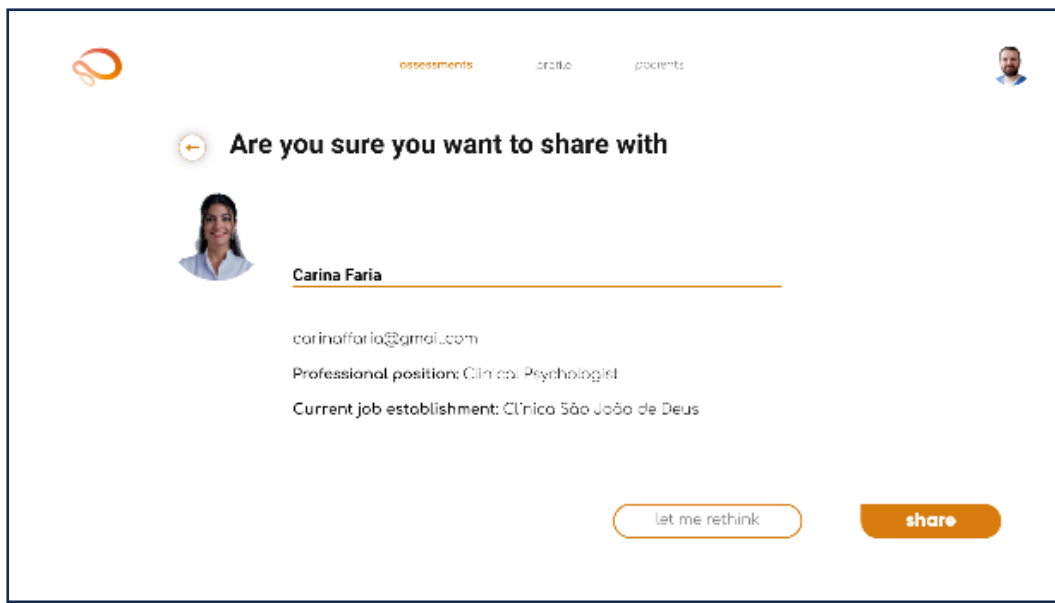


Figure 45. Confirmation of an assessment's sharing with another healthcare professional

When a user completes an action successfully, a few success pages will now be displayed. On these pages, the user will be informed that after completing the action, he can check the results or list by clicking the orange button, which will take him to an alternate page. By being redirected rather than needing to navigate to these different pages manually, the user will save time and clicks.

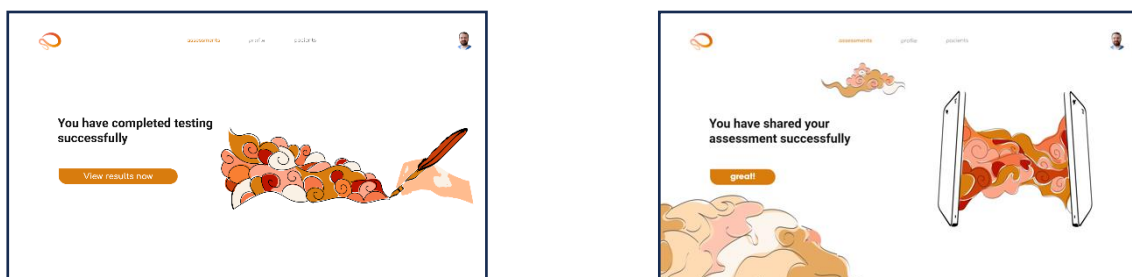


Figure 46. Pages of completing an action successfully

F. Promotional Video

Psyment required a strategy to attract new users to the platform in the future. For this reason, a promotional video that summarizes everything about the platform was made. The purpose of this short but instructive video hopes to accomplish interest from our target audience by informing and amusing viewers about what we have to offer [121].

Videos provide viewers with a quick and easy way to obtain information instead of having to spend time reading. With this strategic marketing tool, we can promote our brand more broadly by having it shared on digital platforms like social media and stand out in our target market [121].

A storyboard had to be created before the Psyment promotional video could be developed. By using this method, we managed to plan the sequence of scenes that would appear in the video, along with any potential camera moves that could enhance its dynamic quality, as seen in *Figure 64*. A decision was made that this promotional video would only use essential images, phrases, and words with background music rather than a script.



Figure 47. Storyboard of the Promotional Video

We were searching for some fresh and catchy background music, and found the ideal track on Pixabay for free [122].

The promotional video for Psymment was produced and edited in Adobe Premiere Pro. At first the video of Psymment was one minute and thirty seconds of duration due to explaining in detail how to create an assessment, how to save it and later how the viewers could view and analyse the results of the assessments. It followed the storyboard, but it needed some tweaking, especially after the redesign of the logo, and that's when it became obvious that the promo video needed to be brief and educational. As a result, the final promo video was shortened to fifty seconds long because we omitted the section focused on creating an assessment, which made the video seem more like a tedious tutorial than a succinct and understandable Psymment offer video. We uploaded the promotional video to YouTube, which can be viewed [here](#).

VIII.PSYMENT DEVELOPMENT

A. *Front-end development*

I was responsible for the front-end development of Psymment by turning the skeleton of this web-based platform into a more aesthetically pleasing, responsive and functional platform. We chose the open source code editor Visual Studio Code, also known as VS Code, by Microsoft, to develop Psymment [109]. This simple but powerful free source is the preferred development tool among professional developers, according to StackOverflow survey in 2022 [110]. Among the 53 168 responses by these professionals in this survey and 27 development tools, it is possible to verify that 74,48%, equivalent to 39 499 people, chose Visual Studio Code as the best Integrated Development Environment (IDE) [110].

For the development of this project me and my team used Node.js which is an “*open-source server*” [111] environment that allows web developers of both front and back-end to use the coding language JavaScript (JS) [111], [112]. Node.js is versatile because it can be used for desktop and mobile applications [111]. When installing Node.js, Node Package Manager (npm) was included. Npm is a package manager that offers thousands of packages, allowing us to download other functionalities within our code [113].

Then, to share the code within our team we used Github. As a team, we are developing Psymment, so it is essential to share new updates to the current code in our “master” main branch. This way, me and my colleagues can coordinate details regarding the changes that were made and then improve them [114]. This allowed us to create our platform much quickly and simply, as it updated our code automatically in Visual Studio Code from changes that were imported into our Github group project. To share the code securely when pulling requests, it provides us with other functionalities, such as advanced security to detect and fix issues within our code and code scanning to help find problems in our code more quickly [114].

To develop the front-end of Psymment, the following programming languages were utilized: HTML (Hypertext Markup Language), CSS (Cascading Style Sheets), and JavaScript. EJS (Embedded JavaScript) was used, as it is a “*template engine*” [115] that allows simultaneous integration of HTML and JavaScript [115]. Through EJS we can use tags such as `<% %>` and `<script></script>`, as well as “*conditional statements*” [115], and add logic to our website. It also allowed my team members, who worked on our platform's backend and security, to use those tags to control the structure and insert data into the EJS files [115]. CSS was used to gain “*aesthetic control*” [116] over elements like colour, positioning, size, width, and others [116]. We also worked with JS because after having the content and the design, sometimes it was needed to add some interactivity to the pages as well [117]. In some specific pages, such as *Creating a new assessment* and *Apply assessment*, I had to work directly with JS.

This platform's goal is to be responsive to different screen sizes to make it more reachable and versatile. To do that, a choice had to be made between media queries and Bootstrap. Bootstrap was chosen because it is a free front-end library that includes responsive functions such as pre-built and customizable elements with a “*pre-built grid system*” [118]. This toolkit allows me to have organized layouts in different screen sizes by resizing the elements automatically on the page [118]. Meanwhile, media queries require a manual implementation to define the CSS properties to certain conditions [119]. The screen size at which the changes will start must be specified to then define the desired changes. This makes the process of developing a responsive platform time-consuming and not easy. By using the Bootstrap library, we can find an extensive list of responsive elements with viewable examples that help us visualize what it is desired for our platform along with their corresponding code. This allows us to have responsive template elements

in the code and customize them as desired. We utilized the Bootstrap Content Development Network (CDN) by including the <link> tag in the <head> of my EJS file. This establishes a connection between the project and the specific Bootstrap version we are using, integrating its CSS and JS components into our code [120].

Some pages demanded additional consideration in the front-end development phase due to either complex coding requirements, their inclusion midway through development, or the necessity for a redesign to enhance usability. These pages are explained below along with their respective details.

My assessments page

This page's structure was altered in response to worries about its overwhelming quantity of buttons. In the prototypes, we anticipated at least two buttons for each assessment, and as this page's front-end was being developed, it was evident that the page needed even more buttons to add other functionalities that HP wanted. Undeniably, this would result in an excessive number of buttons on this page, making it possible to anticipate the confusion and disorganization our users would experience if there were more than 5 assessments on this page. It is possible to get a better idea of how the page would look like with the previous design in the *Figure 47*.

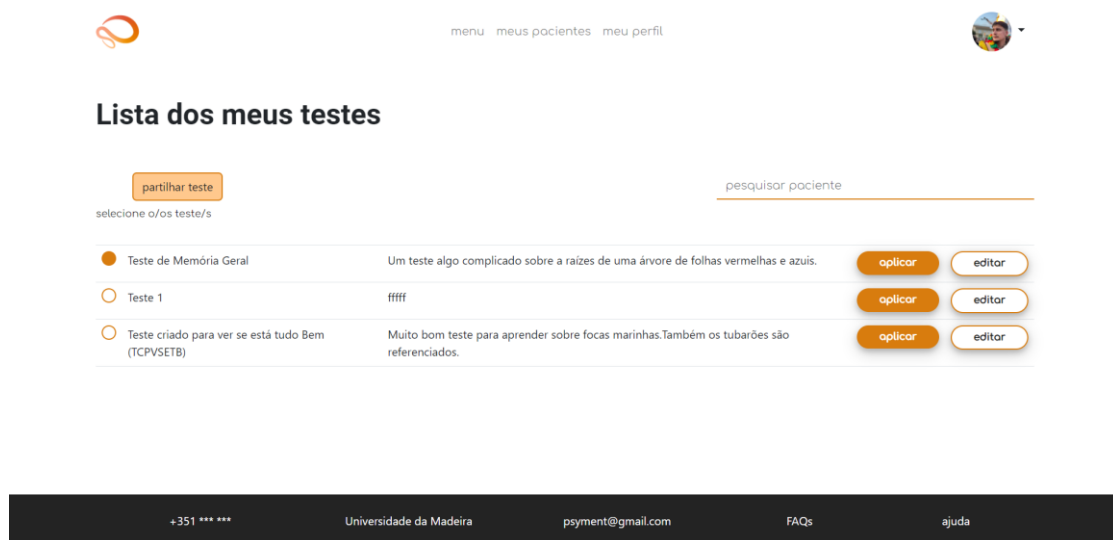


Figure 48. Previous design of the "My assessments" page

New design elements were added to the page and updated the code to address this issue. Among these adjustments was moving each assessment's button to the top of the

list of the assessments. It will be easier to use and less confusing to click on with fewer buttons available if all the buttons are in the same top row as the search bar as shown in *Figure 48*. A new feature was added to make this work more smoothly: the apply, edit, share, and delete buttons become active when an assessment is selected, but remain inactive otherwise.

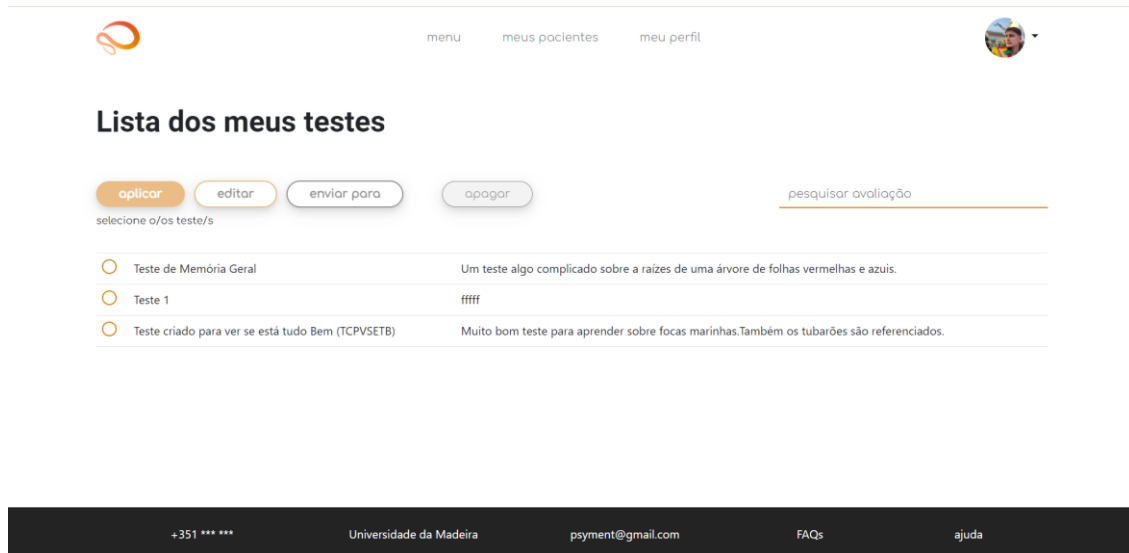


Figure 49. Latest design of "My assessments" page with buttons inactive

To help users understand that they must select an assessment to proceed with the action they wish to do—whether it is to apply, edit, share, or delete an assessment from their list—a design feature that keeps the buttons with 50% opacity and unclickable when no assessments are selected was implemented. In the meantime, the buttons highlight the selected assessment by turning bright and 100% opaque when clicked, as seen in *Figure 49*. Also, a feature was added in which each assessment row had a circle on the left that would eventually fill with the colour orange indicating that we had chosen that row, making it easier for the viewer to understand that they had chosen an assessment from their list. Users can choose more than one assessment; however, the only function that is available in which they are able to select more than one assessment is the delete function. Selecting multiple assessments to proceed with any other feature is not possible.



Figure 50. Latest design of the "My assessments" page with the buttons active

To organize the content on the page we had to use template grids from Bootstrap and adjust them as desired. The hardest part to implement on this page was the buttons, which required JS due to being dynamic elements. These dynamic elements are `addEventListener` methods that respect if/else conditions. As can be seen in the example presented below, if one or more assessments are selected, then the class “`btn-initial`” will be removed and the buttons will become active and clickable. Otherwise, if no assessments are selected, this class will be added to block the buttons with that class. It is important to note that all the buttons have the same class “`btn-initial`”, so the action happens to all the buttons at the same time in the same way.

```

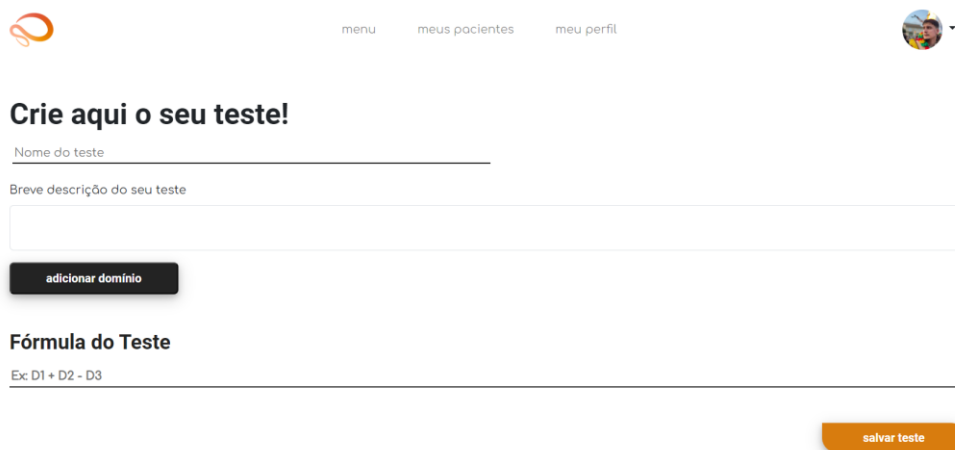
if (selectedTests.length > 0) {
    buttons.forEach(button => {
        button.classList.remove('btn-initial');
    });
} else {
    buttons.forEach(button => {
        button.classList.add('btn-initial');
    });
}

```

Create new assessment page

The page for creating a new CAT was among the hardest to develop. My colleague created this page using JavaScript, which is the coding language I find most difficult to use when working on a project like this. At first, I had trouble understanding what my

two engineering colleagues were saying, so they took the time to walk me through it and make it easier for me to work with. Even though it was difficult, once you understood the reasoning, it was simple to complete. To apply style to the elements, all we have to do is open the project in the browser and right-click on them. When the inspection window opened, it is possible to view the element's name, which could be used to find that element on the code. All that had to be done was call the class function and the element's name from there. Then go to that page's CSS file and style the element using the class name assigned to it, along with some other properties.



The screenshot shows a web interface for creating a new assessment. At the top, there is a logo on the left and navigation links for 'menu', 'meus pacientes', and 'meu perfil' on the right, along with a user profile picture. The main heading is 'Crie aqui o seu teste!'. Below this, there are two input fields: 'Nome do teste' and 'Breve descrição do seu teste'. A dark button labeled 'adicionar domínio' is positioned below the description field. Underneath, the section 'Fórmula do Teste' is shown with an example 'Ex: D1 + D2 - D3'. At the bottom right, there is an orange button labeled 'salvar teste'.

Figure 51. Create new assessment page

In *Figure 50*, it is possible to see the content that shows when the users select the option of creating a new assessment on Psymet. There are fields to place the name and brief description of the assessment, add domain button, the assessment's overall formula to calculate the results instantly and lastly the save assessment's button. After choosing a name for the assessment that is being created along with a brief description of it, they can proceed to add the first domain by clicking on the dark button, giving it a title and a brief description. Then, they will proceed to add a question field that contains content such as a drop down menu with 3 types of question for the user to select, a field to place selected files that might support the question the user is creating, a punctuation field for the user to manually apply the corresponding points of the question and lastly a delete button to delete the question from the corresponding domain. The three options in the drop-down menu, as seen in *Figures 51, 52 and 53* below, alter the appearance of the question on the page when chosen.

Figure 52. Open answer question

Figure 53. Multiple choice question

Figure 54. Linear scale question

Within that domain there are other features added outside the question's box, and these are more specific to the domain. There is an add question button, the formula of the domain, the total punctuation of the domain and a delete domain button. The way the formula of the domain works is by using each question's references, such as Q1 to inform the system that it is the question 1 they are calling, the same applies to the rest of the questions inside a domain. To calculate a formula the user can reference the question and do the calculation as he desires. The references for each question as "Qn", for example, to reference the first question it will be Q1, and the same applies to the rest of the questions inside a domain. Then the user applies these references to a formula as he desires the domain to be calculated. The *Figure 54* below shows this.

Figure 55. Domain section in the create new assessment page

To achieve this, classes were given to the elements in the JS document of the page to position the elements and style them. The following JS code shows an example of the “add question” button to which I added classes to then style the button in CSS.

```
var addQuestionButton = document.createElement("button");
addQuestionButton.textContent = "adicionar questão";
domainDiv.appendChild(addQuestionButton);
addQuestionButton.setAttribute("class", "addquestion1 rounded py-1
px-4 mt-3");
addQuestionButton.setAttribute("type", "button");
```

The CSS code I applied to the button was the one below.

```
.addquestion1 {
  background-color: white;
  color: #D87C0E;
  border: 2px solid #D87C0E;
  box-shadow: 0 4px 8px 0 rgba(0, 0, 0, 0.2), 0 6px 20px 0 rgba(0, 0,
0, 0.19);
  font-family: 'Comfortaa', sans-serif;
  cursor: pointer;
}
```

And by applying this code, the button on the page displays an appearance as follows, in *Figure 55*:



Figure 56. Add question button

I applied this process with the rest of the elements of this page.

Information and confirmation pop-ups, and error messages

Psyment must provide the user with information and confirmation pop-ups and error messages, like the examples in *Figures 56* and *57* below, to give appropriate feedback regarding their actions, whether it be a message about something that went wrong or simply an update on the outcome of their actions.

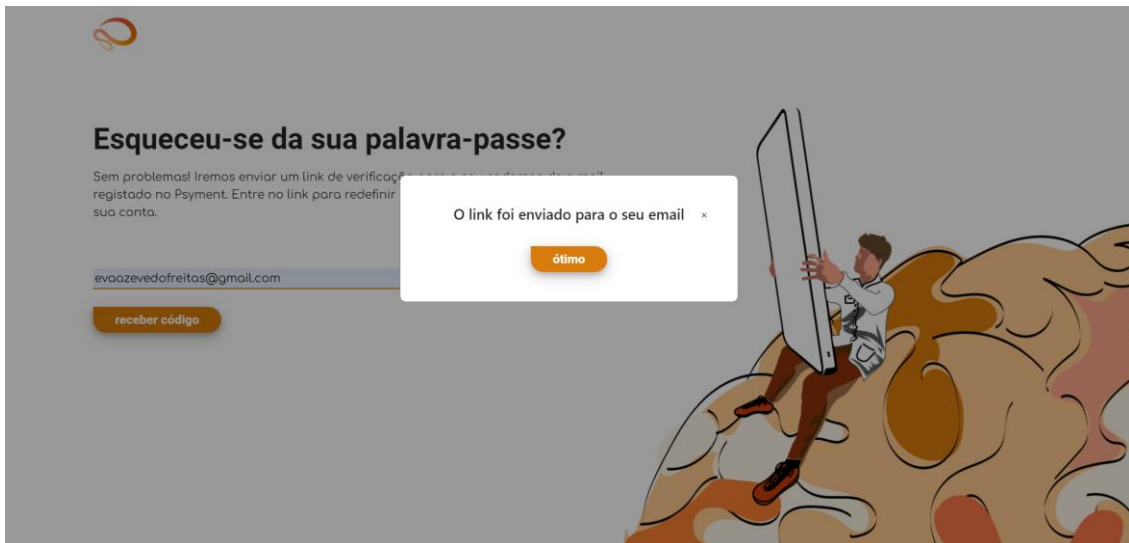


Figure 57. Information message pop-up



Figure 58. Information message to redirect HP to the page of the assessment's results

The information messages act as an alert to let the user know what they did, what happened, what they should do, where to go to continue their action, and other information.

Regarding the error messages, the user needs to understand precisely what went wrong during an action and how to solve the issue directly. To draw users' attention to bring caution to them about their actions, we chose to make these errors bold and red, as shown in Figure 58. However, my engineering colleagues wrote the code to implement this feature, and I only provided guidance on what was supposed to happen and where the warning messages should appear on the page, not code.



Figure 59. Error message

Regarding the confirmation pop-up messages, the idea was to alert the users about an action before proceeding with it. One of these confirmation pop-ups is seen in Figure 59 below. It reassures the users by giving them a choice between proceeding with deleting

the assessment(s) they selected or, give them the chance to change their mind and not proceed with that action. To avoid unnecessary mistakes that could have been prevented with the appropriate warning features is very important.

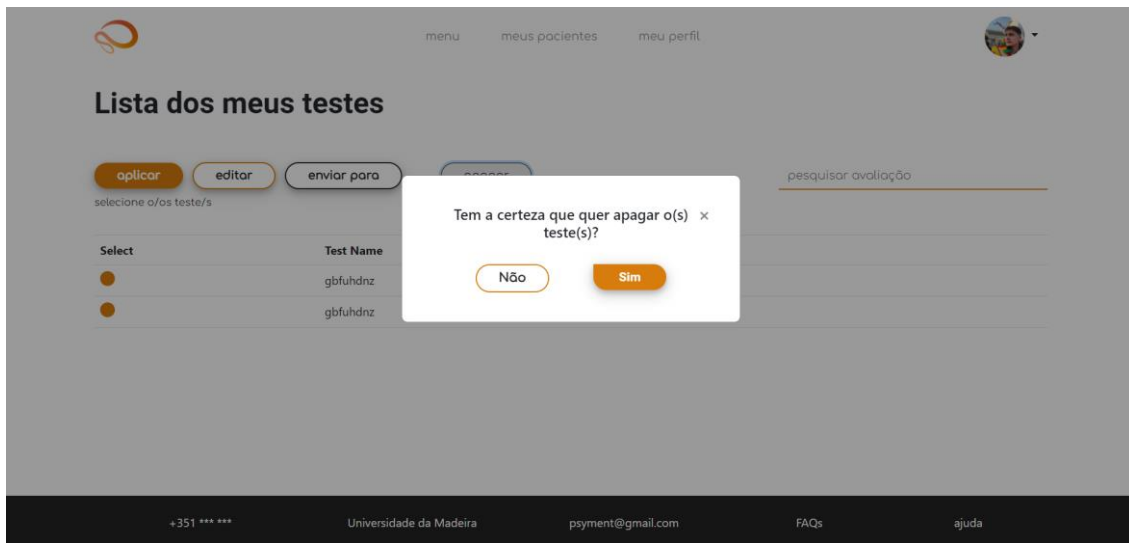


Figure 60. Confirmation message pop-up

The pop-up message is inside the same container that contains the remaining content of this page, and to implement there was a need to use EJS, CSS and JS. When the button to delete one or more assessments is clicked, I had to provide classes in the EJS code to style the messages box and buttons to close the pop-up, to cancel and to confirm the action.

```

<div class="modal" id="myModal">
  <div class="modal-content">
    <span class="close"
id="closeModal">&times;</span>
    <h5 class="popuptitle">Tem a certeza que
quer apagar o(s) teste(s)?</h5>
    <div class="row">
      <div class="d-flex justify-content-
evenly">
        <a class="mt-4"><button
class="popupbutton-cancel" id="cancelButton">Não</button></a>
        <a class="mt-4"><button
class="popupbutton" id="confirmButton" class="rounded-
pill">Sim</button></a>
      </div>
    </div>
  </div>
</div>

```

Then, to make this div into a dynamic element, JS had to be added. In order to put that into practice, I had to handle the click event for each button by calling it using its ID in the EJS, apply the click function to it, and inform the system to close the "myModal" pop-up window when the buttons "closeModal" or "cancelButton" are clicked, or remove the selected assessments when the "confirmButton" is clicked.

The header and footer

On every page of Psyment, the navigation bar (navbar), that includes menu, meus pacientes, meu perfil and logout, and footer, that includes the phone number, location, help and frequent asked questions (FAQ), are displayed. An include was required to implement the header, also known as the top bar menu, and the footer, which are visible both before and after the user logs in. This procedure was carried out to clean the code and reduce time and work. We coded the footer and navbar separately and added them to the views folder, which contained the EJS files for every page on Psyment. We also made a subfolder named include that contained all the include templates (navbar, footer, and footer2) we intended to use in our web pages, as shown in *Figure 60*.

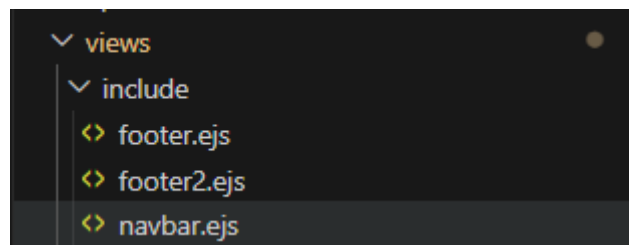


Figure 61. Navbar and footer files to include

The server is instructed to include the contents of the files located at "include/navbar," "include/footer," and "include/footer2" by using the "include" command. Because the navbar appears at the top of the pages and the footer appears at the bottom of them, these lines had to be inserted at the top and bottom of the code, respectively.

```
<%- include('include/navbar') %>
```

```
<%- include('include/footer2') %>
```

Moreover, since Psyment was promised to be a responsive platform, we had to organize the menu elements when the screen size became smaller for the tablet version. Therefore, we used the documentation available, by default, in Bootstrap to create a responsive navbar. This responsive navbar code will hide the navbar elements inside a hidden drop-down menu. Once the screen size gets smaller, the elements get hidden inside this drop-down menu and can only be seen once the button is clicked and the drop-down menu open, as seen in *Figure 61*. This button is used very frequently in websites and applications, making it easily recognizable by the user.



Figure 62. Hamburger button

Empty page message

When a user initially accessed Psyment, the pages containing lists were lacking any feedback to notify the user about the absence of assessments on those pages. Instead, a simple white background was displayed with no text or visual elements to indicate the user that he needs to create or add assessments to those pages because he does not have any at the moment, as shown in *Figure 62*.

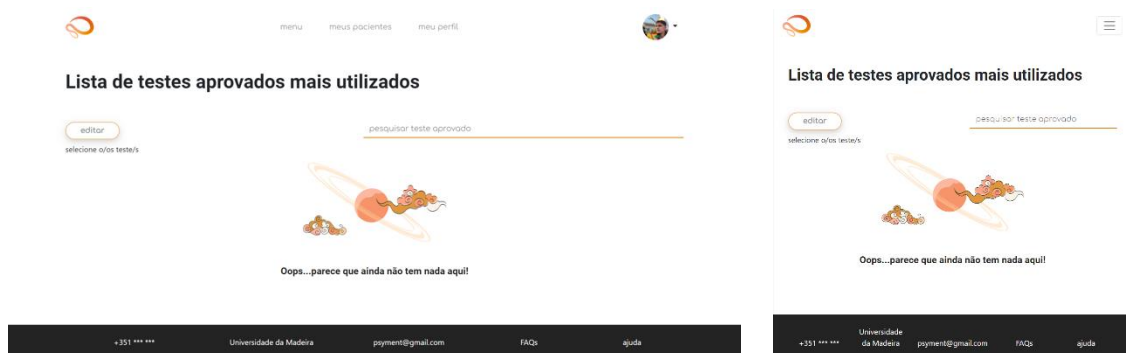


Figure 63. Empty content on the My Assessments list's page

To achieve this, the if-else JS condition had to be included to the assessments list's grid. It worked as follows: *if* the list contains assessments, the list is displayed; *else*, a message and an image informing the user that the page is empty will be shown. By using

this method we will avoid confusion from the user once the page is opened and only a plain white background is shown. The user will be aware of what is happening and what to do next, immediately. Below, it is possible to see a snippet of the code that activates the empty content message on the page by using the JS if/else conditions.

```
        </tr>
        <% }); %>
    </table>
<% } else { %>
    <div class="nothing">
        
        <h5 class="mt-5">Oops...parece que ainda não tem nada aqui!</h5>
    </div>
<% } %>
</div>
</form>
```

Apply test and view results

To provide the HP with the view results feature at the end of the evaluation and be instantly redirected to the results page of the patient after applying the assessment, it is preferable to choose the patient with whom the HP wishes to conduct the assessment before starting the evaluation.

This process starts when the HP selects the assessment he wishes to perform, and a page will open to make him select a registered patient he pretends to evaluate. That page is displayed in *Figure 63* below.



Figure 64. Select patient page to apply an assessment

The static content of this page, which includes the title, the description to inform the HP what needs to be done, a placeholder that allows the HP to search for the patient within the registered patients on his account and lastly the button to proceed, was made in EJS. Then to position the elements on the page I used default padding utility classes, such as “mt-3” to give an element a margin-top of 3rem as well as CSS to position and style the elements within this page. The dynamic content on this page was the search bar to which HP could search and select a patient. When a patient is selected, a new element is displayed on the screen, which is the “user-element”, which contains text contents such as the user name of the patient selected and an “x” to deselect the patient. Each element of the "selectUsers" array is iterated and works dynamically for each user/patient as the code below shows.

```
selectedUsers.forEach(user => {
    const userElement = document.createElement('div');
    userElement.setAttribute('class', 'user-element')
    userElement.textContent = user.name;
    const removeButton =
document.createElement('button');
    removeButton.setAttribute('type', 'button');
    removeButton.textContent = 'x';
    removeButton.addEventListener('click', () => {
        deselectUser(user);
    });

    userElement.appendChild(removeButton);
    selectedUsersContainer.appendChild(userElement);
    placeholderContainer.appendChild(userElement);
});
```

IX. DISCUSSION

With the results gathered on existing evidence, more specifically, the user testing, we were able to conclude that this project proves to be user-friendly and adequate to answer our target audience’s needs. We conducted user testing prior to implementation, enabling us to comprehend the project's evolution based on insights provided by the participants during the testing phase.

However, apart from the overall positive feedback we received from the HP at Casa de Saúde São João de Deus, there was still room for improvement in this process.

The reliability of these data is impacted by the limited range of professionals with which we conducted the user testing. Although the number of testers was enough to obtain a considerable amount of reliable feedback regarding their experience with Psyment, our testers were not diverse enough to assess the experience of professionals in various medical contexts and environments. Instead of having all our testers come from the same institution, it would have been interesting to conduct the user testing with medical professionals who work at different establishments, such as the public hospital or a clinic. Healthcare professionals from other medical institutions undoubtedly use different approaches, hold different beliefs, and have different preferences when it comes to the type of support Psyment must provide them in their evaluation process. In addition, as previously said, we conducted the user testing session before implementation. A second user testing session with Psyment's finished product, which included modifications based on their feedback as well as enhancements to the design and usability, would have been beneficial to understand if the changes made responded accordingly to their insights. Perhaps in addition to the seven HP from the prior user testing, we could also include HP from other institutions that were going to be experiencing Psyment for the first time. Two distinct groups might respond differently because of this. The group of 7 HP from Casa de Saúde São João de Deus would evaluate and experience an updated and improved version of Psyment. Meanwhile, the other group of HP from different institutions would be experiencing Psyment for the first time and could potentially find issues in the usability that could come unnoticed. Not to mention that the number of testers would be larger, which means our user testing would be more complete and with more trustworthy insights.

In addition to following the HP's feedback to start the implementation, throughout the process of development of this project, from start to finish, we had to follow certain requirements. My engineering colleagues made their list of requirements regarding the systems and software engineering of Psyment, while I had to list requirements regarding the design, the experience, the development of the front-end, and the versatility of Psyment. I managed to contribute to this project by doing the requirements on my list, although some requirements had to be achieved throughout the process of development of this project, some earlier than others. Overall, I believe I was able to make this platform user-friendly by providing my users with a consistent, visually pleasing, and easy-to-use platform and promoting a good experience. However, there were some challenges that I

was able to overcome and some that I know can be improved in the future. These will be listed below.

Creating a good and appropriate Psyment logo was one of the first challenges to overcome. One of the most important aspects of creating Psyment's brand identity was creating a memorable logo which, considering that it would serve as the platform's face, it was a long process of creation, as explained in more detail, previously, in the section of Psyment's brand identity. This long process of creation of the logo showed great results in the end, with my colleague's approval. However, it would be great to have the HP opinions on it, but maybe we could do that in a future user testing with the final version of Psyment.

As the first thing a user sees when they access our platform for the first time, besides the logo, is the landing page. Because of that, the design of this page was also a very careful and lengthy process. The user's chance of remaining on our platform depends on its design. If it is intuitive, simple to use, and aesthetically pleasing, the user is likely to stay on it; if not, the user is likely to become uncomfortable and leave, making the platform unsuccessful. A lot of thought had to be put in the design to prevent that, and it was a continuous process to make it better until we got a design we liked and saw fit to Psyment's ideology. Although we achieved a desirable design of the landing page, we wanted to include animations to bring some dynamic to the page but as it was not a priority, we chose to stick to a simpler design. However, it is believed that in the future we will fulfil this desire and add animations to the platform.

Regarding the requirement to make Psyment a responsive platform, thanks to Bootstrap, we were able to make it responsive for both desktop and tablet screens. However, as we experienced the platform ourselves, we were able to identify some opportunities of improvement in the design, particularly the layout of the tablet screen. Some titles that do not stay where we wanted them to, the length of the placeholders on the sign-in and login pages is shortened, removing parts of text, buttons that do not look the way we want them to or aren't placed where we want them to on the page, and content inside the hamburger button that could be better placed on the page are a few examples of that. But overall, the adaptation of the content using Bootstrap, worked nicely, except for a few minor improvements that can be easily held in the future.

Another requirement was that the front-end code should be easily modified to allow updates and improvements to the page's content or design. As Psyment had a lot of pages with repetitive content, such as footers and navbars, it was essential to apply some engineer knowledge to clean up the code of the pages and make this process less lengthy and time consuming. To accomplish that, I learned about the include templates which allowed me to include a file's code into other files. I did this to add a footer and a navbar to each page of Psyment, without the need to add the complete code on every page but instead only requiring one short line of code.

X.FUTURE WORK

Despite the fact that we were able to finish this platform by applying the desired requirements into the development process, there were still some requirements we wished to have accomplished and now are considered future work, such as 1) sharing the results of a patient's assessment with other registered HP; 2) implementing Artificial Intelligence for the platform to be able to evaluate and analyse open answers and drawings automatically enabling direct drawing by patients on a tablet; 3) visually represent a patient's evolution throughout the intervention period with graphics; 4) categorize the assessments conducted on a patient; 5) give a reminder message to the HP about an assessment that needs to be re-evaluated after the period of re-evaluation of a specific patient has passed; 6) In the page of creating a new assessment, allow the user to drag the questions up and down to replace them where they wish the questions to be on the assessment, without the need to delete them and redo them; 7) provide the new users with a tutorial based with highlights to guide step by step and with illustrative and informative gifs; 8) provide an option of limited time to share an assessment and also allow the user to cancel a sharing; and 9) provide an option to take assessment time into consideration during the appliance of the assessment on a patient (e.g. little time and low score = impulsive indicator).

Furthermore, some features from applications and web-based platforms mentioned previously (see Related Work) during our research may be useful to consider during the design of Psyment, such as the monitoring of the patients' medical history,

automatic grammar correction, and assistance for therapists in organizing each patient's data within the platform [15].

XI. CONCLUSION

Overall, I was able to conclude this project according to the requirements idealized in the beginning. The user testing showed good results regarding the users' experience with Psyment with mostly positive feedback. Even though we did not test the final version with users, we hope that the outcome will be better taking into consideration that we enhanced the platform by listening to their suggestions, documenting the changes they recommended, and adding new features to enhance the Psyment experience. Although we knew going in with the decision of discarding testing the tablet prototypes for user testing due to technical problems with opening the prototypes on the tablet.

XII. REFERENCES

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XIII. ATTACHMENTS

A. Formal Consent, Interviews;

Informação ao Participante de Investigação e Consentimento Informado

Título do Estudo: Desenvolvimento de uma plataforma web de criação e gestão de formulários
Investigador(es) Principa(lis): Nome: Alexandre Romão, Bruno Rodrigues, Eva Freitas
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Tel: 964099411, 968191201, 967022825

Objetivo do Estudo

O objetivo deste estudo é inquirir sobre o processo de avaliação de pacientes por parte dos psicólogos, metodologia, eficiência e possibilidade de criação de uma plataforma de suporte a este procedimento.

Procedimento

O estudo longitudinal destina-se a psicólogos. Vão ser realizadas entrevistas com o objetivo de recolher o máximo de informação conveniente necessária para os investigadores poderem prosseguir com o seu estudo e esclarecer dúvidas que os mesmos possam ter sobre práticas, processos e métodos de avaliação dos psicólogos aos seus pacientes. Após as entrevistas, os resultados são alvo de uma análise.

Crítérios de Inclusão

Será considerado elegível para participar neste estudo se:

- Possuir ciclos de estudos e/ou experiência relevantes na área de Psicologia.

Confidencialidade

A confidencialidade dos dados será mantida das seguintes formas:

Todos os **dados pessoais** fornecidos na experiência serão guardados e não serão partilhados com terceiros. Contudo, os dados recolhidos durante a experiência poderão ser usados/publicados para fins científicos ou educativos. Os nomes de **TODOS** os participantes serão **OCULTADOS**, incluindo nos artigos científicos publicados.

Autorização Opcional

Entendo que os investigadores podem querer usar fotografias, vídeo ou áudio por razões ilustrativas nas apresentações e publicações deste trabalho, para fins científicos ou educativos. Eu dou autorização para fazê-lo, **DESDE** que o nome e rosto **NÃO** apareçam.

Assine no lugar pretendido: _____ SIM _____ NÃO

Direitos

A sua participação é voluntária. Você é livre de interromper a sua participação em qualquer momento. A recusa em participar ou interrupção da participação não resultará em qualquer penalização, ou perda de eventuais benefícios ou direitos. O investigador principal poderá decidir, de forma fundamentada, interromper a sua participação neste estudo. Caso se verifique esta situação, esta não resultará em qualquer penalização, ou perda de eventuais benefícios ou direitos.

Esclarecimento de Dúvidas & Contatos

Se você tem dúvidas sobre este estudo, poderá fazer agora todas as perguntas. Se quiser fazer perguntas mais tarde, desejar obter mais informações, ou desejar interromper a sua participação no estudo, entre

Informação ao Participante de Investigação e Consentimento Informado

em contato com o Investigador Principal em pessoa, por telefone ou e-mail. A informação de contato está disponível no início da primeira página deste documento.

Consentimento Informado Voluntário

Ao assinar este documento, você confirma que leu a informação acima descrita sobre este estudo, e que todas as suas perguntas foram respondidas. Assim mesmo, você poderá fazer perguntas adicionais a qualquer momento durante o estudo, e mesmo após este ter terminado. Ao assinar este documento, você concorda em participar neste estudo de investigação. Irá receber uma cópia deste documento de consentimento informado assinada e datada.

ASSINATURA DO PARTICIPANTE

DATA

Investigador que Obtém o Consentimento

Como membro da equipa de investigação, confirmo que expliquei ao participante acima referido a natureza e finalidade deste estudo de investigação, e que esclareci quais os potenciais benefícios e eventuais riscos da participação no estudo. Todas as perguntas foram respondidas e estou disponível para esclarecer quaisquer dúvidas que possam surgir ao longo do estudo.

ASSINATURA DO INVESTIGADOR 1

DATA

ASSINATURA DO INVESTIGADOR 2

DATA

ASSINATURA DO INVESTIGADOR 3

DATA

Ao assinar este documento, você confirma que leu a informação acima descrita sobre este estudo, e que todas as suas perguntas foram respondidas. Assim mesmo, você poderá fazer perguntas adicionais a qualquer momento durante o estudo, e mesmo após este ter terminado. Irá receber uma cópia deste documento de consentimento informado assinada e datada.

B. Formal Consent, User Testing

Informação ao Participante de Investigação e Consentimento Informado

Título do Estudo: Desenvolvimento de uma plataforma web de criação e gestão de formulários
Investigador(es) Principa(lis): Nome: Alexandre Romão, Bruno Rodrigues, Eva Freitas
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Tel: 964099411, 968191201, 967022825

Objetivo do Estudo

O objetivo deste estudo é inquirir sobre o protótipo de uma plataforma, que visa o processo de avaliação de pacientes por parte dos psicólogos, metodologia e eficiência, desenvolvido pelos investigadores.

Procedimento

O estudo de usabilidade destina-se a psicólogos. Vão ser realizados *user tests*, através do método *Think Aloud*, com o objetivo de recolher o máximo de informação conveniente necessária para os investigadores poderem prosseguir com o seu estudo e esclarecer dúvidas que os mesmos possam ter sobre práticas, processos e métodos de avaliação dos psicólogos aos seus pacientes. O método terá a duração de 20 a 30 minutos e após o seu término, os resultados são alvo de uma análise.

Critérios de Inclusão

Será considerado elegível para participar neste estudo se:

- Possuir ciclos de estudos e/ou experiência relevantes na área de Psicologia.

Confidencialidade

A confidencialidade dos dados será mantida das seguintes formas:

Todos os **dados pessoais** fornecidos na experiência serão guardados e não serão partilhados com terceiros. Contudo, os dados recolhidos durante a experiência poderão ser usados/publicados para fins científicos ou educativos. Os nomes de **TODOS** os participantes serão **OCULTADOS**, incluindo nos artigos científicos publicados.

Autorização Opcional

Entendo que os investigadores podem querer usar fotografias, vídeo ou áudio por razões ilustrativas nas apresentações e publicações deste trabalho, para fins científicos ou educativos. Eu dou autorização para fazê-lo, **DESDE** que o nome e rosto **NÃO** apareçam.

Assine no lugar pretendido: _____ SIM _____ NÃO

Direitos

A sua participação é voluntária. Você é livre de interromper a sua participação em qualquer momento. A recusa em participar ou interrupção da participação não resultará em qualquer penalização, ou perda de eventuais benefícios ou direitos. O investigador principal poderá decidir, de forma fundamentada, interromper a sua participação neste estudo. Caso se verifique esta situação, esta não resultará em qualquer penalização, ou perda de eventuais benefícios ou direitos.

Esclarecimento de Dúvidas & Contatos

Se você tem dúvidas sobre este estudo, poderá fazer agora todas as perguntas. Se quiser fazer perguntas mais tarde, desejar obter mais informações, ou desejar interromper a sua participação no estudo, entre

Informação ao Participante de Investigação e Consentimento Informado

em contato com o Investigador Principal em pessoa, por telefone ou e-mail. A informação de contato está disponível no início da primeira página deste documento.

Consentimento Informado Voluntário

Ao assinar este documento, você confirma que leu a informação acima descrita sobre este estudo, e que todas as suas perguntas foram respondidas. Assim mesmo, você poderá fazer perguntas adicionais a qualquer momento durante o estudo, e mesmo após este ter terminado. Ao assinar este documento, você concorda em participar neste estudo de investigação. Irá receber uma cópia deste documento de consentimento informado assinada e datada.

ASSINATURA DO PARTICIPANTE

DATA

Investigador que Obtém o Consentimento

Como membro da equipa de investigação, confirmo que expliquei ao participante acima referido a natureza e finalidade deste estudo de investigação, e que esclareci quais os potenciais benefícios e eventuais riscos da participação no estudo. Todas as perguntas foram respondidas e estou disponível para esclarecer quaisquer dúvidas que possam surgir ao longo do estudo.

ASSINATURA DO INVESTIGADOR 1

DATA

ASSINATURA DO INVESTIGADOR 2

DATA

ASSINATURA DO INVESTIGADOR 3

DATA

Ao assinar este documento, você confirma que leu a informação acima descrita sobre este estudo, e que todas as suas perguntas foram respondidas. Assim mesmo, você poderá fazer perguntas adicionais a qualquer momento durante o estudo, e mesmo após este ter terminado. Irá receber uma cópia deste documento de consentimento informado assinada e datada.

C. Script for the interviews

Bom dia, obrigada por disponibilizar um pouco do seu tempo para esclarecer-nos dúvidas sobre o processo de avaliação dos psicólogos aos pacientes. A nossa tese consiste no desenvolvimento de uma plataforma que permite a criação de ferramentas de avaliação pelos psicólogos e investigadores de forma interativa e eficiente. Dito isto, gostaríamos de fazer-lhe algumas questões de modo a esclarecer algumas dúvidas que temos sobre a forma como o processo de avaliação de pacientes é realizado, desde a fase inicial de conhecimento do doente até a fase de análise e monitorização dos mesmos. Aceita, com base no seu conhecimento, contribuir para este estudo e permite-nos gravar as suas intervenções?

Ferramentas / Testes

Análise de testes tradicionais

1. Quantos anos de experiência tem na sua área?
2. Quantos testes, em média, costuma realizar por dia?
3. Que métodos de avaliação ou ferramentas de teste utiliza mais frequentemente?
- 3.1. Essas ferramentas estão publicamente disponíveis, são feitas por você ou ambas?
- 3.3. A validação de novos testes é um processo demorado?
- 3.4. Das que foi você que fez (métodos de avaliação), baseou-se num template ou foram feitas por si?
- 3.4.1. Costuma personalizar as ferramentas públicas que há?
- 3.4.2. As que foram feitas por si, demorou quanto tempo, em média, a criar os testes?
- 3.4.3. Utilizou papel ou um meio digital?
- 3.4.4. Utiliza outros recursos para avaliação do estado psicológico dos pacientes? Vídeos, imagens, áudios, Jogos, outros?

Análise de testes digitais

4. Sente-se confortável em utilizar meios digitais?
- 4.5. Costuma utilizar ferramentas digitais no dia a dia?
- 4.5.1. Utiliza essas ferramentas para realizar os testes? Se sim, quais?
5. Prefere uma interação direta ou indireta? Supor um tablet ou desktop/ laptop

Análise das respostas

6. Durante a avaliação dos pacientes, como regista as suas respostas?
7. Onde armazena todos os testes?
8. Tem hábito de ver registos antigos?
9. Faz comparação de testes do mesmo paciente? (Evolução do paciente)
10. Qual o tempo de análise, em média?
11. Como avalia os dados registados?

12. Utiliza cálculos?
13. Como avalia respostas abertas?
14. É hábito partilhar formulários de avaliação entre vocês, psicólogos?
15. Tem costume de partilhar resultados de um paciente, anonimamente, com outro psicólogo fora e dentro do local de trabalho?
16. Acha pertinente a criação de uma plataforma digital que permita a realização, gestão, armazenamento de testes e dados de saúde mental dos pacientes de forma interativa e eficiente?

Conclusão

17. O que acha essencial ter no seu método de avaliação psicológica de pacientes e que está em falta atualmente?
18. O que acha que pode ser melhorado no processo de avaliação que é feito por si?
19. Se houvesse um sistema que conseguisse facilitar e acelerar o seu processo de avaliação de pacientes, que funcionalidades gostaria que esta tivesse? realizar funções, tais como registar, armazenar, gerir, criar e partilhar avaliações

D. Interviews' transcriptions

1) 1st interviewee – Identifier 1 (ID-1)

Team: Bom dia, fale-nos um pouco sobre o seu percurso e que tipo de psicologia pratica atualmente.

Eu sou psicólogo com especialidade avançada em psicologia clínica e psicologia da justiça. Trabalhei durante 4 anos na comissão de proteção de crianças e jovens em Câmara de Lobos. Depois, decidi fazer PhD em Psicologia numa Universidade estrangeira na Suécia. Depois então, quando quis regressar à Madeira, (...) tive oportunidade de fazer um pós-doutoramento, que estou a fazer agora, na área de Reabilitação cognitiva na demência, ou seja, com idosos com demência para tentarem recuperar as suas memórias (...).

Team: Ou seja, costuma trabalhar com pacientes diretamente e realizar testes com pacientes (?)

Realizei testes, mais com adolescentes quando estava na Comissão de proteção de crianças e jovens sim. Neste momento, não estou diretamente ligado à clínica.

Team: Sabe em média quantos testes realizava por dia ou por semana?

Em relação a testes de avaliação?

Team: Sim, testes em que realiza perguntas para avaliar pacientes.

É assim, eu por dia recebia cerca de 5 adolescentes e digamos que a cada 5, 2 precisávamos de usar testes, porque nem sempre os psicólogos precisam de usar testes. Por exemplo, se existe a desconfiança de uma depressão severa ou de um início de uma depressão, às vezes é preciso validar esse diagnóstico com um teste para sabermos se estamos apanhar todos os sinais que o paciente nos está a dar e para saber se o teste vai de encontro aquilo que consideramos. Por exemplo, às vezes o tribunal pedia-nos testes de personalidade para saber, por exemplo, se um adolescente tinha determinada personalidade, que era necessário saber, e nós realizávamos esses testes chamados perícias.

Team: E esses testes, você ia buscá-los a alguma plataforma, online, ou fazia manualmente?

É assim, os testes para ser muito sincero com vocês, cá na Madeira, por falta de financiamento, muitas vezes não temos capacidade de comprar "legalmente" os testes como deveria ser feito, porque alguns destes testes estão protegidos por copyright e há outros que já expiraram. Há uns que conseguimos ir à net fazer o download. Eu já tinha a minha pasta no pc com os testes que precisava, abria a pasta, e imprimia e realizava o teste. (...) Já existem alguns testes que se podem realizar sem imprimir a folha, no próprio computador. Mas sim, a maioria é assim que se faz. (...) Há troca de conhecimento entre psicólogos, por exemplo, imagine-se que há um teste muito específico, por exemplo, para avaliar o autismo, e que o colega recebeu o paciente autista e não tem esse teste nem encontra na net que está protegido. Ele pede a um colega que trabalha com autismo e este colega envia por e-mail ou facilita de alguma maneira. Normalmente é assim que funciona. O ideal será as instituições terem os testes oficiais comprados, mas não é sempre assim que acontece.

Team: E esses testes específicos, havia a necessidade de criar alguma pergunta personalizada ou o teste era sempre feito de forma global e standarizada?

Há testes que tem respostas abertas, por exemplo um teste que estou a aplicar agora (...), tem respostas abertas em perguntas como "Que dia é hoje?", "Em que ano é que estamos?", "Qual é a estação do ano?", e há lá outras perguntas abertas que se pode colocar. Mas sim, existem alguns testes mais fechados, onde tem que ser aqueles parâmetros e perguntas que já veem incluídas no teste, definidas pelo autor, e depois existem outros testes e perguntas mais gerais. Uma coisa que os psicólogos usam

muito no início é chamado uma ficha de Anamnese, e essa ficha normalmente pergunta todo o historial de vida da pessoa, e às vezes somos nós próprios que criamos porque existe umas fichas mais completas, outras menos completas, uns mais para idosos, outras mais relacionadas com a violência doméstica. Dependendo do paciente, tem-se de acertar a ficha.

Team: Você falou em validação, ou seja, você quando realiza um teste necessita de validação de uma entidade? Ou simplesmente faz o teste e pode realizar o teste ao paciente?

Nós fazemos os testes, mas quando os recebemos já veem validados. Esses testes para serem validados, são alvo de estudos como se faz em instituições como ARDI-TI. Pegamos em 200 ou 300 pessoas, e utilizamos um teste, e validamos se tem qualidade, chamada validade externa e interna, e verificamos se o teste tem este tipo de validade. São investigadores que fazem isto. Se o teste for considerado válido, depois é disponibilizado no mercado geral. Alguns são gratuitos, outros são pagos infelizmente.

Team: E têm algum período para expirar a sua validade?

Sim, por exemplo, há quem faça uma patente. Por exemplo, imaginem que existem três investigadores (...) que fazem um teste em escala com 15 perguntas. Depois de testarem com 100 pessoas, veem que tem bastante validade (...) e vai ser aprovado para ser utilizado com pacientes. O que acontece é que eles para ganhar algum dinheiro, criam uma patente (...).

Team: Mas é o psicólogo que paga?

Depende, se eu trabalhar numa clínica no Funchal, em que eu trabalhe sozinho ou com 3 ou 4 colegas psicólogos, nós temos de pagar porque é privado e não temos ninguém a nos garantir nada. Agora se trabalharmos no hospital, ou no centro de saúde (...), podemos pedir à entidade (...).

Team: Que tipos de testes é que existem? E um teste em papel, você faz o teste e quem responde diretamente no papel é o paciente ou é o psicólogo.

É o paciente normalmente. É assim, se houver caso de pessoas que tenham dificuldade como pessoas idosas, nós podemos fazer as perguntas e ir anotando, assinalando. Mas normalmente pede-se ao paciente. Até existem alguns colegas que dão o teste para o pessoal levar a casa. Porquê? Porque estão a responder, inventam ou porque nas primeiras sessões, existe aquela timidez. Às vezes são perguntas profundas, muito íntimas, e as pessoas até preferem levar para casa. Já tive casos de adolescentes que respondi am ao

teste, dobravam, metiam dentro de um envelope e depois entregavam. Eles sentiam que era confidencial, e isso é muito importante. Sentir que há essa confidencialidade entre o psicólogo e o próprio paciente, mais ninguém tem acesso. Isso é outra questão sobre os testes, devem ser confidenciais, e ser destruídos após algum tempo. Ou seja, depois de serem respondidos. Não se deve, segundo a proteção de dados, manter por mais de 5 anos respostas de pessoas. (...) O psicólogo pode sair de lá e aceder a dados de pacientes que não são dele, isso não deve acontecer (...) Mas estavas a falar de que tipo de testes?

Team: De testes em papel, impressos, e testes no computador ou num tablet?

Eu sinceramente acho que falta dar passos no sentido de termos muitos dos testes informatizados. E não é só informatizados, é que, por exemplo, a coisa mais chata dos testes para o psicólogo não é dar o teste para fazer, é depois quando recebemos o teste, existem testes mais completos e outros mais simples. Temos um teste de personalidade que tem 90 perguntas. O que acontece? Antigamente, há uns anos atrás (...) havia umas folhas de acetato (...) e nós o que fazíamos para despachar trabalho, era meter o teste, de sim ou não, e ver os quadradinhos e nós sabemos qual a correta e a incorreta. Colocamos o acetato em cima da resposta, com as respostas corretas e conseguimos ver quais foram as que eles acertaram ou que não acertaram. Mas o nosso ideal, nós gostaríamos nos testes é que as aplicações informáticas nos cotassem automaticamente, tipo por exemplo, o paciente responde e dissessem logo "O paciente tem 16 pontos no BDI - escala de depressão (...) Mas o ideal é o paciente acaba de responder, e nós não mostramos a ele obviamente, mas clicávamos num botãozinho qualquer e obtia-se o resultado. Como não se pode fazer a cotação à frente do paciente, manda-se o paciente embora e agendamos uma segunda sessão. Sendo muito honesto com vocês, quem trabalha no privado, tem uma vantagem. Recebe mais um dinheirinho na segunda sessão, mas em termos de eficiência, a eficiência devia ser: nós aplicamos o teste e temos o resultado imediato. E nisso, os profissionais de design, informática e isso são uma grande mais valia para nós.

Team: Ao calcular se a pessoa por exemplo tem depressão moderada, é por cálculos mesmo ou é por resposta certa/resposta errada?

Há vários tipos de teste. Por isso, por exemplo, o que eu sugeria é que quem entrasse num projeto desses, fizesse um levantamento dos testes que são mais usados. Na Madeira, existem três tipos de psicólogos, das clínicas, dos alunos e das empresas para os recursos humanos, que trabalham no recrutamento de pessoal. O pessoal do recrutamento de pessoal também tem muito esse problema. Imaginem que vocês

entrevistam 60 pessoas em 1 semana e todos tiveram que fazer testes psicométricos, que eles chamam psicotécnicos. O que acontece? Aquilo é tudo em papel. Quando acaba a fase de recrutamento, todos os aqueles 60 testes vão ter que ser cotados um a um à mão, quando a pessoa a ser recrutada pode ficar 1 mês ou 2 a ser chamada, porque aquilo dá muito trabalho. Se fosse instantâneo, demoraria 1 dia ou 2, ou até é mais rápido. Se calhar, o programa já poderia dizer as pessoas mais aptas, ou a pessoa mais apta foi X. Isto no caso das empresas. No caso da clínica, o que eu recomendava é falar com alguns colegas de clínica, saber o top 10 dos testes mais usados com os pacientes no vosso dia-a-dia. Depois, vocês poderiam ver as perguntas dos testes, de resposta aberta, fechada, se são testes numa escala de 1 a 10 ou se são escalas abertas, se são testes de sim ou não. Ou até se são testes que obrigam a uma interpretação, por exemplo, existem testes em que o paciente pode responder o que ele quiser. Eu penso que esses testes são mais complicados para a informática, porque aí é mais complicado, mas todos os outros poderiam estar mais automatizados.

Team: Os testes de resposta aberta ficam sempre no caso da interpretação dos psicólogos.

Embora, (...) já tive colegas que trabalhavam com uns sistemas inteligentes, que detetavam as palavras na resposta do teste, um bocado como o Google faz. Acho que é Machine Learning, acho que tem a ver com isso.

Team: Mas isso não poderia dar alguns problemas? No sentido em que a palavra não podia significar negativo mas na frase ter outro sentido.

Sim, tens razão. Eu acho que como estamos a lidar com pacientes, e a única forma que temos de avaliar é a palavra, realmente é preciso um cuidado extra aí nesse caso. (...) De qualquer forma, esses testes informatizados precisavam de ser validados, validade interna, externa (...) Ou se tem a mesma qualidade dos testes em papel.

Team: E te costume de partilhar ou há algo que costuma partilhar o resultado do teste do paciente com outros colegas?

Às vezes o que se faz é (...) o scan e envia-se ao colega e ele manda de volta. Já se faz tudo por computador, envia-se aos colegas.

Team: Os dados pessoais do paciente não são revelados?

Não são revelados. Mas sim, existe partilha e existe também, não no meu caso (...), mas no SESARAM por exemplo, tem uma coisa que é chamada

supervisão, ou seja, imagina que eu aplico um teste e tive um resultado que não sei interpretar. Eu posso levar todos os meses, ou de 15 em 15 dias. Existe o que eles chamam a reunião com os membros mais antigos em que já estão há 20/30 anos (os experts), em que vamos a essa reunião e discutimos casos (...) resultados inconclusivos. "Alguém já teve um paciente parecido com estes sintomas?". Isso é muito importante. Na psicologia educacional, o psicólogo da escola reúne-se com a direção da escola, não divulga a identidade do aluno porque é proibido, mas sim isso acontece.

Team: Então acha pertinente a criação de uma plataforma digital que permite a realização, gestão, armazenamento de testes e de dados de saúde mental?

Com certeza que sim, sou a favor. A única coisa que acho fundamental neste tipo de plataformas é que cumpra sempre com a segurança dos dados dos pacientes, seguindo todas as orientações das leis de proteção de dados recente. O que acontece? Algumas apps que recolhem dados atualmente ainda não são programadas para esquecer os dados passado uns anos, e acho que os programadores devem ter em atenção.

Team: E esse esquecimento/delete, preferia que fosse automático ou manual?

Acho que poderia ser algo do género de um popup. "O paciente X tem dados cá há 5 anos e não visitam a clínica.". O computador normalmente que faz a gestão dos clientes consegue ver se o cliente já não vai lá há 4 ou 5 anos, vocês percebem disso melhor que eu. Era muito bom que fosse assim com um popup. Às vezes vamos a computadores com dados de 1900 e muitos e ainda estão lá esses dados, coisas que não devia acontecer hoje em dia.

Team: E em termos de análise, referia que gostaria de um sistema que cotesse automaticamente. E uma análise em termos de gráficos e tabelas, que acha disso? Facilita alguma coisa?

Depende muito de teste para teste. Existe um teste, BSI, eu utilizava muito, que é Brief Symptom Inventory (...), que em poucas perguntas consegue-se ver muitas sintomatologias: depressão, ansiedade, tendência suicida, pessoa a desenvolver mania, se tem traços de sociopatia (...) tudo num teste só em que a pessoa responde a umas perguntas. Depois, na cotação, a cotação funciona por thresholds, limites, valores de referência. Por exemplo, imaginem para paranóia o valor é 17 - o máximo, e uma pessoa teve 15, para a depressão grave é 28, se tem abaixo de 28 tem depressão moderada. Como esse teste faz tudo, se houvesse um gráfico no final que

mostra os resultados para todas as patologias com cores e aparece os que excediam.

Team: Você falou em intervalos, gostaria que no final do teste aparecesse apenas a resposta, ou o sistema pudesse ser configurado com os intervalos definidos pelos testes validados (...)

Por exemplo, existe um parâmetro para jovens, adultos, sêniores, e sêniores acamados, ambulatório, etc. Os números mudam. Se no início da aplicação do teste, se perguntasse o tipo de paciente, e depois fosse buscar os limites associados a esse teste era o ideal, mas não. Tem-se que ir à tabela do sênior ver os limites, naquela papelada toda. Acho que era muito giro um trabalho sobre o BSI, podem investigar sobre isso. É muito utilizado na psicologia clínica, é muito completo e a análise é um pouco complexa porque tem vários níveis. A nível informático deve ser um pouco mais desafiante que estar a fazer um teste mais simples.

Team: Uma das ambições que temos para este trabalho é a plataforma suportar qualquer tipo de teste, apesar de ser desafiante. Nem tanto a realização do teste, mas a parte da avaliação, por existirem tantas formas de avaliar o paciente, deve ser o mais desafiante.

Vou vos dizer também que por volta de 90% dos testes existentes em papel só avaliam uma valência, ou seja, são mais fáceis de informatizar. Agora os que avaliam mais valências talvez seja mais desafiante para depois introduzir nessa tal plataforma que vocês referem. São testes quase multinível.

Team: É frequente você realizar várias vezes o mesmo teste a um paciente de modo a ver se houve algum tipo de desenvolvimento, evolução. Por exemplo, esse BSI faz hoje um teste a um paciente e tem X resultados e em 5 meses volta a fazer esse teste e faz a comparação para ver se existe algum tipo de evolução?

Com certeza, isso é uma prática comum. Existe um teste muito comum que é o BDI que avalia a depressão, e por exemplo nesse teste é muito comum os médicos pedirem ao psicólogo para aplicar o BDI para ter a certeza que o paciente não deve tomar medicação anti-depressiva. Chega um cliente com depressão a uma psicologia, está 6 meses com esse paciente. O psicólogo faz o teste e um relatório de final de acompanhamento e manda ao médico. O médico pede alguma coisa ao psicólogo para justificar a paragem da medicação, e esse tipo de teste justifica. O grande problema dos testes psicotécnicos e psicologia clínica é que tem que haver boa fé da parte do paciente. Por exemplo, eu como trabalhava na Justiça muita gente não queria dizer a verdade, por

problemas com a justiça, no caso de jovens envolvidos com droga ou violadores. Eles podem mentir em muitas das perguntas. É diferente de um paciente que vem pedir ajuda, vai dizer a verdade se quer ser ajudado. Temos que ter em atenção se o paciente está mesmo a responder a verdade. Há pessoas que entram também em processo de negação, doentes depressivos em depressão severa, e vamos ver o teste e está tudo bem, parece a pessoa mais feliz do mundo. O teste foi manipulado, não se sente à vontade com o psicólogo, é mais uma curiosidade.

2) 2nd interviewee – Identifier 2 (ID-2)

Team: Entretanto, tem quantos anos de experiência na área?

Terminei o curso em 2008, portanto por volta de 13 anos, estou no Laboratório há 10, tive 3 anos de experiência mais no terreno, e estou na área de investigação há 10 anos.

Team: E durante a sua carreira, já realizou muitos testes de avaliação (?)

Sim.

Team: Quantos testes por semana/mês?

Numa semana, num contexto clínico, podia realizar cerca de 20 testes assumindo testes individualizados, visto que quando avaliamos alguém, recorremos a uma bateria de testes: avaliação da atenção, da memória, das funções executivas, da sintomatologia depressiva, ansiosa, funcionalidade, capacidade das pessoas para desempenharem as atividades de vida diária, neste caso questionários de auto resposta. Se me perguntar quantas avaliações no contexto clínico uma pessoa pode fazer numa semana, serão cerca de 5 a 6 pessoas e essas mesmas pessoas poderá se aplicar cerca de 20 a 20 e tal testes porque também é importante e depende daquilo que se vai encontrando, mas vamos pensar numa média de 20 a 30 testes por semana, portanto muito variável. Em termos de investigação, praticamente não faço avaliações porques estou a trabalhar na docência. Quando estava a recolher dados e trabalhava nas avaliações, se calhar tinha 4 a 5 pessoas por semana, e fazia cerca de 40 testes por semana, porque estava a aplicar baterias fixas para validar a eficácia de uma intervenção e então toda a gente fazia X testes antes e X depois, mais ou menos por aí, tendo em conta que há certos testes que levam 5 minutos a aplicar, pode parecer muito mas não estou a falar numa bateria.

Team: E que ferramentas usava para realizar os testes? Papel, folha, computador, tablet?

Portanto em papel e lápis, todos de avaliação. Embora eu trabalhe nas tecnologias, nós temos tecnologias para reabilitação. Quando falamos em avaliação, há a necessidade de ter uma base de dados normativos. Em princípio, se uma pessoa tem um desempenho de 26 em 30, para eu saber para aquela idade e escolaridade, se essa pontuação corresponde a um défice ou não. Portanto, não há muitos instrumentos de avaliação validados na área dos instrumentos computarizados.

Team: Era você que realizava as perguntas nos testes ou os testes já existiam?

Todos existentes.

Team: Mas adaptava alguma pergunta?

Não, são testes todos que já estão aprovados, com 50/60 anos e têm muitos dados normativos, e estão validados para a população portuguesa.

Team: E esses testes, ia buscá-los online, fazia o download e teria que imprimir, correto?

Alguns testes são de livre circulação e consegue-se encontrar online. No entanto, a maioria dos testes sendo ferramentas de trabalho específico da psicologia, psiquiatria e neurologia são de circulação restrita. Por exemplo, alguns testes são vendidos por empresas da área e é necessário enviar a cédula profissional para se poder comprar.

Team: E o processo é esse, encontrar o teste que pretende, imprimir e realizar o teste?

Sim, adquirei muitos testes ao longo do meu estágio curricular, durante o curso, depois na minha experiência clínica, fui adquirindo a testes de supervisores e colegas, e atualmente tenho acesso a um conjunto de testes. Se for planear um estudo, penso no que quero avaliar para aquele estudo, e dentro daquilo que tenho, é imprimir e utilizar.

Team: Tendo em conta isso, depois como era feita a medição dos resultados?

É uma correção de forma MANUAL. Existem manuais de correção.

Team: Em que sentido esses manuais de correção.

Por exemplo o teste do desenho do relógio, em que a pessoa tem que desenhar um relógio com os números todos e a pessoa tem que desenhar um relógio com todos os números das horas e que marque 11h10. Há manuais com vários desenhos de relógios e para não haver muitas dúvidas nos pontos e subjetividade na cotação, os números tem que estar alinhados nos 4 quadrantes, quanto vale determinado tipo de respostas. Há questões muito simples, se eu tiver a fazer um teste de memória em que digo 5 palavras e daí a meia hora a pessoa tem que voltar a repetir as palavras, é fácil cotar esta resposta. Quando se trata de capacidade visio-constructiva, há sempre um manual que diz quanto vale cada tipo de resposta, cópia do cubo, para ajudar a cotar de forma objetiva.

Team: Você ao criar um teste, é muito difícil que seja aprovado porque ainda precisa de resultados predominantes para servirem de comparação, correto?

Na área da avaliação, gostávamos de seguir esse caminho. Na área da avaliação computarizada, há uma grande vantagem, podemos criar um instrumento. No instituto Guttman em Espanha, eles tem o Guttman Neuro Personal Trainer. Eles criaram uma série de exercícios computarizados que podem ser utilizados. O Guttman é um instituto de reabilitação muito grande em Espanha. Estes exercícios são aplicados lá mas as pessoas também fazem em casa, para fins de estimulação e reabilitação cognitiva. Eles tem dados de milhares de pessoas. Através de técnicas de Machine Learning e inteligência artificial, é realmente possível começarmos a pensar numa validação remota. O processo da validação depende muito disto, de haver resultados de muitas pessoas e que se possa fazer uma comparação por idade e escolaridade. 24 pontos em 30 no Montreal Cognitive Assessment é pouco para um jovem com escolaridade mas é uma pontuação boa para uma pessoa de 70 anos com 4º de escolaridade, não apresenta défice. Estão a perceber aqui a questão dos dados normativos? Então passa muito por aí, e realmente sobre as novas tecnologias, gostaríamos de começar a apostar um bocadinho nisso, portanto poder utilizar os dados para neste caso uma validação mais robusta, apenas no contexto clínico, visto que sobre o que as pessoas fazem em casa, poderá ter uma margem de erro porque podem ter ajuda, poderão não ser tão fiáveis. Mas sim, acho que as novas tecnologias veem facilitar este processo de validação das novas escalas.

Se conseguir enviar estes testes remotamente para um grande número de pacientes, o teste é mais rapidamente validado. E mesmo que não seja para pacientes, para colegas noutros centros de reabilitação que vão aplicar nos seus pacientes.

Team: Falando nisso, alguma vez teve que partilhar os resultados de um teste de um paciente porque se encontrava com dúvidas ou porque tinha esse hábito de partilhar com um colega seu?

Portanto, durante a minha prática profissional, eu trabalhava com outra colega em que às vezes havia essa discussão. Agora na investigação, é um contexto diferente, é um contexto que não se aplica para fins de diagnóstico, mas para fins de intensidade dos programas de reabilitação, portanto nem se costuma olhar para os dados normativos.

Team: Entretanto, onde costuma armazenar os testes? No seu computador? Numa pasta?

Os testes costumo armazenar em papel e lápis. Tenho os que usei para investigação todos digitalizados no meu computador. Não é o ideal, mas não tem o nome das pessoas, tem um código. Na investigação, não identificamos as pessoas com dados pessoais.

Team: Então aquilo que você tem no computador, você não sabe de quem é?

Tem o ID, e esse ID tenho uma lista em papel.

Team: Já foi-nos dito que só se deve armazenar dados de pacientes durante algum tempo, isso é uma prática atual?

Sim, mas depende de para que fim for. Portanto, eu acho que não há um tempo limite. Eu tenho dados guardados de 10 anos em papel e lápis, e tenho digitalizados em computador. Se agora quiser fazer um estudo retrospectivo, posso fazer. No entanto, acredito que nos hospitais não se deva armazenar a partir de uma certa altura, também pela capacidade de armazenamento. Deve ficar lá apenas uma conclusão da avaliação, do relatório nos sistemas informáticos, mas o arquivo de papel e lápis não deve ser guardado depois de determinado tempo, não sei qual é o tempo de referência.

Team: E durante todo o tempo que realizou testes, quais eram os tipos de testes mais predominantes que realizou?

O Montreal Cognitive Assessment, um teste de screening cognitivo que nos dá uma ideia geral sobre o perfil cognitivo daquela pessoa. Depois, há uma bateria que é Weschler Adult Intelligence Scale, que é a escala mais utilizada em todo o mundo. Já foram realizados levantamentos pela Associação Americana de Psicólogos sobre as práticas da validação e é realmente a escala mais utilizada, é aquela que dá o quociente intelectual,

depois dá o quociente intelectual nas competências verbais, não verbais, vídeo espaciais, acaba por ser muito completa e é uma escala de referência com dados normativos em muitos países, e é a que utilizamos mais. Também o Trail Making Test, A e B, também é uma das mais utilizadas em todo o mundo. Também há a escala de Weschler para crianças e só para a avaliação de memória, são escalas mais standard. Não quer dizer que sejam as melhores, mas são as mais estabelecidas na prática, já são muito usadas. Mas vão aparecendo escalas novas. Fui fazer um estudo há pouco tempo e usei escalas muito novas, usei uma escala que encontrei muito boa do Reino Unido, mas que não é nada conhecida para avaliação funcional e coloquei num estudo. Depois, não há comparação com outros estudos.

Team: Ou seja, o que estamos a desenvolver, a plataforma de criação e de gerir formulários para testes e etc. e para visualização de resultados, vamos também tentar incluir a partilha de testes entre psicólogos e pessoas na área da saúde. Acha pertinente a criação de uma plataforma dessas e aqui na Madeira?

Acho pertinente, sim. Eu pessoalmente prefiro muito mais. Acho que papel e lápis está a ficar muito obsoleto, e dá muito trabalho. E acho que ajudaria, porque na prática, o que acontece, é que há muito poucas pessoas a avaliar uma avaliação neuropsicológica bem feita, no sistema público, devido a estes recursos muito demorosos. No privado, as pessoas acabam por ter ainda ter, a faculdade de psicologia da Universidade de Coimbra tem muito trabalho na área da avaliação psicológica, e sabem quantas sessões eles levam para fazer uma avaliação neuropsicológica, para aplicar uma bateria extensa de testes? 5 sessões, cerca de 1 hora, 1 hora e pouco, é muito tempo.

Aqui, não conheço ninguém que faça esse tipo de avaliações, estamos a falar num centro standard. Aqui no privado, as pessoas fazem 2 ou 3 sessões. Mas lá está, há testes para avaliar a validade de desempenho, se o utilizador está a colocar esforço suficiente na tarefa. Isto é importante para questões de tribunal, se as pessoas pedem avaliações para fins de tribunal, para justificar incapacidade, para ter invalidez, reforma antecipada, as questões de validade são importantes. Se nós usássemos mais tecnologia, sei lá eye-tracking, etc. quem sabe eletrofisiologia, resposta galvânica da pele, talvez não precisássemos de passar 30 minutos a fazer testes de validade de desempenho. Acho que ainda há muito a fazer nesta área.

Team: E o que é que acha essencial incluir nessa plataforma?

Visualização de resultados, essencial o armazenamento de resultados de forma que depois se possa tratar facilmente, ou seja, permita depois analisar os dados por variáveis importantes como idade, escolaridade, sexo

masculino, feminino. Normalmente os dados normativos estão divididos nestas variáveis. Isto em termos das tarefas.

Team: Sim, em termos de funcionalidades, o que gostava que a plataforma tivesse? Por exemplo a partilha de formulários entre profissionais.

O modo de visualização de são para são. Também quais os testes o paciente fez, ter os testes divididos por domínio, testes de atenção, de funções executivas. Acho que isso é o mais importante.

Team: E existir uma comparação, o paciente faz um teste e passado um tempo faz novamente o teste.

Acho isso importante, uma comparação entre o pré e o pós.

Team: Preferia também fazer os seus próprios testes ou utilizar já feitos e validados.

Pois, depende. É importante a variabilidade de estímulos. Vamos pensar numa tarefa de nomeação de imagens, em que há 10 imagens para nomear, o paciente tem de identificar o que é.

Uma limitação da avaliação neuropsicológica atualmente é o efeito de aprendizagem, um paciente faz um teste hoje faço uma intervenção, aplico daqui a um mês e tenho um efeito de aprendizagem de um teste, são todos semelhantes. Apenas o MoCA de triagem, tem três versões diferentes. Nas imagens, mudam as imagens, nas memorização de 5 palavras, mudam as palavras. Eu acho que a liberdade para fazer os testes, no fundo não é ter uma liberdade, mas ter uma base de dados para uma tarefa de nomeação, se eu preciso de 10 imagens, talvez ter uma base de dados de 40 ou 50 e haver uma aleatorização para que haja sempre variabilidade nos vários momentos, ou seja, não ser sempre as mesmas imagens no segundo e terceiro momento. Agora, eu ter a liberdade para na tarefa de memória usar três ou cinco palavras, a comparação... eu acho que nesta fase em que vocês estão, para validar, acho que deve haver alguma rigidez no sistema em si. Por acaso a liberdade para uma área em que estou a trabalhar agora, testes de avaliação para cirurgias com o paciente acordado, cirurgias com tumores em determinadas áreas e a pessoa fica acordada para remover o tumor de forma a deixar o mínimo de défices na pessoa. Então a pessoa fica acordada para garantir que os cirurgiões não mexam em áreas de funcionalidade. Utiliza-se muito tarefas de nomeação, nomeação de imagens na área da linguagem, e nós estamos a propor que isso seja feito através de óculos VR. E temos colegas em Lisboa que só querem utilizar imagens a preto e branco ou escala de cinzentos. Que a cor, a

tridimensionalidade, a tarefa vai deixar de ser tão pura de linguagem e vai interferir com outras áreas. Em França, um grupo que já usa VR, quer que seja o mais realista possível, a três dimensões e eles até gostavam de fazer a comparação, porque têm métodos de avaliação de neuroimagens muito bons. Então no sistema, estamos a pensar fazer as duas coisas, imagens a preto e branco, imagens mais realistas. A liberdade neste sentido de usar preto e branco, realista. Para fins de avaliação, a liberdade vai interferir com a questão da uniformidade e dos dados normativos. Se fosse para reabilitação, não tínhamos que estar muito preocupados com isso. rsfe zjhx a meu akvs

3) 3rd interviewee – Identifier 3 (ID-3)

Team: Comece por nos dizer quantos anos de experiência tem na sua área?

Tenho que pensar um pedacinho... se for a incluir o estágio profissional, 3 anos.

Team: E já realizou testes com pacientes ao longo desses anos.

Sim, já antes disso, no estágio curricular também já aplicava.

Team: E quantos testes já fazia em média por dia/semana.

Dependia muito do contexto por exemplo no contexto de estágio curricular, era diário, tínhamos sempre avaliações, tínhamos sempre depois a parte da intervenção mas quase sempre diariamente tinha-se um novo paciente para avaliar. No contexto de estágio profissional, talvez semanalmente, nem sempre havia novas pessoas e aí nesse contexto muitas vezes envergávamos pela anamnese, mais pela entrevista do que pela propriamente pela aplicação de testes. Mas haviam também alguns de rastreio. Em termos do que eu trabalhei a seguir, que foi num projeto de apoio domiciliário a idosos, era numa fase inicial e final de intervenção, e ali uma intermédia para ver um ponto de referência em relação ao que estávamos a trabalhar. Portanto aí já era muito menos frequente.

Team: E como adquiria os testes que pretendia fazer?

Portanto, no contexto de clínicas e casas de saúde, ou centros de reabilitação, que foi onde tive os estágios, eles próprios já tinham os testes e aí nós utilizávamos, tínhamos essa autorização. No projeto, alguns ou uma colega emprestava ou alguns tinham que aceder através da internet. Em termos de testes de rastreio que não implica material, é mais fácil obter,

não é a melhor forma, mas é a mais fácil de obter online. Aqueles que requerem material já tem que ser mesmo adquirido de algum lado. Nos outros lados, eles tinham, portanto, nós utilizávamos.

Team: E os testes, realizava alguma alteração no teste?

Por exemplo, se nós tivéssemos algum paciente analfabeto, com baixa escolaridade, às vezes tínhamos que fazer alguma adaptação nalguma questão, alguma modificação ligeira na maneira de apresentar, digamos. De resto, não. Adaptar às vezes a linguagem, é mais por aí.

Team: E realizar algum teste de raíz?

Se eu fiz algum teste mesmo? Não, nunca trabalhei nessa área da investigação, de construir mesmo testes.

Team: E acha que isso é algo útil?

Sim, sem dúvida. Quem trabalha nessa área, é importante porque há coisas que muitas vezes nós, ou pela experiência, vamos questionando as pessoas em alguns sentidos. Mais na parte da clínica. Damos as entrevistas estruturadas ou semiestruturadas que nos dão alguma orientação em termos de diagnóstico. Mas há outras coisas mais complexas, já temos que fazer ali mesmo uma avaliação e precisamos de teste. Não é só questionar, temos mesmo que optar pelos testes, portanto quando são desenvolvidos ou se notamos algum gap, digamos, em termos de avaliação há áreas que são mais difíceis como pessoas com afazias. É uma área para mim em particular, desafiante em termos de avaliação. Nem sempre é fácil, ah é este instrumento e aquele. Depende muito do que nos é apresentado à frente.

Team: Para ir buscar esses testes à internet, utilizou alguma ferramenta pública?

Depende, alguns os próprios autores disponibilizam, faço o download e utilizo. Como é para fins de trabalho, utilizo, não é para estar a divulgar em termos de investigação. Outros é um bocadinho tentar encontrar onde estão disponíveis.

Team: E os testes que são feitos, são sempre feitos pessoalmente através de papel correto? Ou há algum que é feito por meio digital?

Depende da intervenção. Em termos da neuropsicologia, eu acho mais difícil fazer online, há muita coisa para avaliar. Já vai sendo mais desenvolvido porque o covid exigiu isso. Acho mais difícil na psicologia

fazer online. Em termos de psicologia clínica, é mais fácil de fazer online. Se eu tiver a aplicar um questionário, é mais fácil de fazer.

Team: Mas pessoalmente, em vez de usar folha e papel, usar um pc ou tablet acha isso benéfico?

Sim, sem dúvida. Até é importante irmos tendo algumas alternativas e as pessoas muitas vezes dependendo da faixa etária estão receptivas a fazer, sim.

Team: E durante esses testes, como é feita a obtenção de respostas, ou seja, como regista as respostas dos pacientes.

Depende, se for por exemplo testes género questionário, aí escrevo as respostas das pessoas diretamente. Se for teste mais específico de memória, de atenção, mais dentro da neuropsicologia, depende do próprio teste. Há testes que são tão bem limitados a nível de tempo, cronómetro, apontar tempos, apontar por vezes respostas, cruzinhas consoante a resposta da pessoa. Depende muito do teste, uma opção correta, a opção que a pessoa está a dizer, depende muito do próprio teste.

Team: E onde é que armazena essas respostas de testes? Folha de papel? Computador? Formato digital? Digitaliza?

Quando estava no centro de reabilitação e casa de saúde, nós tínhamos sempre o suporte em papel mas depois inseríamos sempre essa informação no software que eles utilizavam. Tínhamos que fazer a cotação, e fazer um resumo, e depois colocar essa informação online, aquilo que fosse relevante para que outros técnicos que tivessem intervenção com esse paciente pudessem ter acesso a essa informação.

Em termos do projeto, tenho também todo esse material em suporte papel e nós utilizávamos, como não tínhamos um software específico, o google drive. Tínhamos pastas para cada utente e punhamos a informação em formato relatório, fosse o que fosse, sobre cada utente. Acaba por ser nos dois lados, é mais seguro também.

Team: E se pretender ver registos antigos?

Em casas de saúde e centros de reabilitação, temos a questão da confidencialidade. A partir do momento que deixo de trabalhar lá, deixo de ter acesso a essa informação. A menos que tenha algum material meu, mas mesmo os próprios testes e resultados ficam lá.

Do projeto, como era um projeto de apoio domiciliário, nós não tínhamos uma estrutura, uma sede, esse material ficou comigo também para garantir a confidencialidade dos dados.

Team: E como você referiu, você faz os testes iniciais, depois a meio do processo e no final.

Depende da duração da intervenção.

Team: Esses testes feitos nas várias etapas são os mesmos testes para servir de comparação?

Exatamente.

Team: Costuma fazer isso de forma regular? Ou é só com certos tipos de doenças/pacientes?

Normalmente, é mais regular. Em termos da psicologia clínica, dependendo do acompanhamento, nem sempre se justifica isso. Mas a nível da neuropsicologia sim. A menos que seja só uma avaliação. Mas se houver intervenção, há interesse de saber a evolução, se melhorou ou piorou. Muitas vezes há pedidos de relatórios por parte de médicos, de seguradores, depende. Mas mais na neuropsicologia que na clínica, é sempre possível.

Team: Para dar alta ou para ver se melhorou, a principal forma de fazer isso é fazer esses dois testes iguais e compará-los ou faz dois testes diferentes e no final esse teste já consegue aferir a melhoria?

Depende da intervenção e contexto. No contexto do centro de reabilitação, se nós já sabíamos à partida que aquela pessoa ia ter alta, já tínhamos que fazer essa avaliação, visto que a pessoa tem que sair de lá com o relatório com essa informação do que evoluiu e não evoluiu. Em casas de saúde, nem sempre isso é necessário. As pessoas muitas vezes tinham alta e não fazíamos isso, não fazia entre aspas do protocolo deles repetir tudo aquilo que tínhamos feito. Havia outro tipo de formas de avaliar, que eles chamam os PII's (Protocolos de Intervenção Individual) e aí nós fazemos uma avaliação dessa evolução. Neste caso por exemplo do projeto, nós em equipa íamos vendo se aquela pessoa realmente está a ter um benefício na nossa área. De qualquer forma, avaliamos para ver se houve evolução. Mas por exemplo, num caso onde tivéssemos algum utente com uma demência muito avançada que já não beneficiasse daquilo que estávamos a fazer, aí podemos nem conseguir avaliar dependendo do estado do

paciente. Mas tentamos sempre avaliar de alguma forma porque é importante para nós e para a pessoa ver essa evolução, e para a família.

Team: Essa avaliação às vezes tem respostas abertas? Como é que essas respostas abertas são avaliadas? De uma forma geral. Há palavras específicas que são procuradas?

Por exemplo, se nós tivermos a avaliar um rastreio em termos de sintomatologia ansiosa ou depressiva, podemos aplicar diretamente o teste e aí as respostas são mais fechadas, e mesmo que as pessoas fujam um bocadinho, podemos orientá-las. Mas se tivermos a avaliar um recurso da pergunta género do questionário mas mais em termos de conversa, existe palavras chave, em termos de resposta aberta que as pessoas dão, nós já identificamos em termos de resposta onde é que isso se situa. Mas eu prefiro usar o questionário porque é mais fácil orientar a nível de gravidade.

Team: E é hábito normal partilhar resultados de testes com outros profissionais?

Depende dos contextos e depende da autorização que as pessoas nos dão, os pacientes. Num contexto de centro de reabilitação ou casa de saúde, à partida as pessoas já dão esse consentimento e então nós partilhamos aquilo que é relevante com os outros técnicos. É importante por exemplo a nível de enfermagem saberem certas informações da psicologia para saber como abordar certas questões. No contexto do projeto de investigação, passámos um consentimento no início e só os elementos da equipa tinham acesso à informação. Para fora, só mesmo se algum dos pacientes tivesse que ir a um neurologista por exemplo, e pediam-nos um relatório. Pedíamos à pessoa se dava essa autorização, e então fazíamos o relatório e entregávamos.

Team: Portanto, acha pertinente a criação de uma plataforma digital que permitisse a criação e a edição de testes, de ferramentas?

Mas em que sentido? Para utilizar? Para ter fácil acesso?

Team: Para ter fácil acesso e utilizar os testes.

Sim, sem dúvida. Acho que iria facilitar imenso a nossa vida. Temos sempre essa questão de se eu não tenho determinado teste, tenho que ver aqui outra maneira de chegar a esse resultado. Se tivéssemos essa plataforma, já seria mais fácil em termos de acessibilidade. Por vezes, podemos mandar email a pedir autorização a um autor para nos enviar um teste, e se for preciso, temos resposta 1 ano depois. A questão tempo útil

também é importante, era bom. Ao adquirir esta plataforma, já sei que vou ter esta informação aqui. É muito mais prático. E sim, acho que em termos de organização, sei que tenho isto aqui nesta área em vez de ter na minha pasta, na minha cloud, apesar de fazermos a nossa organização, acho que sim, era muito mais prático.

Team: E acha pertinente essa plataforma ser não só de criação e de ir buscar testes para depois serem realizados, mas também para realizar mesmo na plataforma esses testes com pacientes?

Mas de quê? De forma independente?

Team: Ou seja, você realiza o teste na plataforma pessoalmente, e o paciente realiza o teste no pc e a análise de resultados é feita de forma interativa e eficiente.

Acho que sim, para já diminui a margem de erro, porque é claro que nós a fazermos cotações de uma avaliação longa, o cansaço pode nos atingir e pode ser suficiente para fazer uma soma errada e assim reduzia a margem de erro. E sim, é concentrar tudo num local, também facilita na questão do papel, reduz-se aqui um impacto, acho que sim, acho que seria útil e importante.

Team: Acha que o estado do uso de tecnologia na psicologia ainda é rudimentar? Ou a tecnologia já está bem presente na área da psicologia? Na área específica de testagem.

Em Portugal ou em geral?

Team: Em Portugal, ilha da madeira.

Ok, eu acho que ainda não está a ser utilizada o suficiente para o que já deveria. Pelo que vejo em outros países que já preenchem tudo online. Acho que ainda não estamos a utilizar o suficiente. Acho que já vamos tentando mais, mas acho que muitas das vezes talvez até mais a nível de intervenção que a nível de avaliação. São mais utilizados tablets a nível de estimulação do que a aplicar os testes.

Team: Você referiu que realiza somas, etc. Quais os tipos de cálculos que costuma realizar nesses testes?

Depende de cada teste. Depende, por exemplo, se nós utilizarmos aqui algum subteste da escala de Memória de Weschler, nós temos que fazer ali somas de pontuações, temos que ter em conta o tempo que as pessoas levam a realizar a prova, pode ser um fator para nem aplicar a prova toda,

mas normalmente implica somas, temos um resultado e depois temos que aceder a um manual específico em que existem lá as pontuações específicas de referência para aquela faixa etária, depende. E aí já vejo se aquela pontuação que eles chamam direta em termos padronizados, qual é o valor que dá. E para eu perceber o quão desviada da norma a pessoa está. Se é um desvio ligeiro, mais moderado ou mais grave. Se é um défice mais acentuado ou menos acentuado. As somas resultam numa pontuação direta que vamos enquadrar dentro do que já está estabelecido para aquela população. Existem algumas provas que já utilizei online, que também normalmente são de papel e lápis, que foram disponibilizadas gratuitamente por um centro de investigação, e aí já nos facilitavam muito a vida visto que já colocámos os resultados e já nos dava esse resultado padronizado. Facilitava bastante, não se tinha que verificar o manual. A plataforma seria bom nisso se já tivesse lá os resultados em termos de referência. Poupa tempo.

Team: Para além do referido, que é a criação e edição de testes, aplicar testes ver a análise dos resultados, temos a ideia de partilhar os resultados dos testes com os profissionais de saúde. O que acha mais essencial colocar na plataforma?

Vão ter já o consentimento incluído na plataforma?

Team: Não tínhamos pensado muito nisso. O consentimento do paciente?

Exato, poderia ser importante caso algum dia ele diga "ah mas eu não autorizei". Tem a informação disponível para toda a gente a quem autorizou. É importante. Acho que devo haver uma parte que seja mais privada, para os psicólogos, para colocarem as suas conclusões e outra que esteja acessível para os outros técnicos. Porque há informações relevantes para nós em termos de avaliação, mas que podem não ser relevantes ou podem em termos de consentimento, ter coisas que não são tão relevantes para passar às outras pessoas. Pode estar no limite do que se deve ou não passar para outras pessoas. Sempre que aplicarmos uma avaliação, referimos sempre essa questão da confidencialidade dos dados. Só existe situações em que se pode quebrar essa confidencialidade se houver ameaça à vida da pessoa ou de outra pessoa. Portanto há sempre questões importantes que sabemos, mas o resto não precisa de saber. Se houver essa maneira de salvaguardar informação só para o psicólogo, e outra para outros acederem.

Team: Outra questão, quais os testes mais predominantes que realizou?

Depende do contexto. Já trabalhei em diferentes contextos. Em termos de neuropsicologia, são muitos, por exemplo em termos de memória, existem

escalas mais abrangentes que avaliam um pouco de tudo, porque memória é um "Mundo" digamos, e está localizada em diferentes partes do cérebro. Temos que usar diferentes testes. Podemos usar escalas completas ou escolher subtestes, se já temos suspeita de algo em específico. Ou se queremos fazer uma avaliação completa abrangente. Se já temos suspeitas visto que houve uma alteração qualquer numa parte específica do cérebro, consoante o que já sabemos vamos sondar alguma coisa em específica. A escala de memória de Weschler é importante, existem várias dentro desta, existe escala de inteligência que não mede só inteligência, mas avalia outras coisas como a atenção. Estou a dizer a geral, mas depois existem vários subtestes. As matrizes progressivas de haven. A nível da atenção (...) existe o nível de toulouse pierron, o d2, o corte dos a's, o teste de strup, o trail making test. Um teste que eu acho bastante completo que é a figura complexa de rey que dá-nos informação sobre muita coisa, não sei se já existe uma versão online desse. Implica as pessoas desenharem, esse aspeto é interessante. A nível de rastreio, existe o MoCA, o Mini Mental, mas eu prefiro usar o MoCA ou o Adam-brooke cognitive examination. Porque o Mini Mental, apesar de ser muito utilizado a nível mundial, eu acho que não é dos mais fidedignos para nos dar ali informação sobre o declínio é subtil ou não. Aqui só nos dá se for mais acentuado. Outros testes... existe o teste de cancelamento de estrelas para neglet, existe também uma escala CBS que é também utilizada pela terapia ocupacional se não estou em erro, para perceber se as pessoas estavam a explorar o espaço, digamos que estava negligenciado ou não. São muitos testes...

Team: Utiliza o BSI?

Sim, na clínica pode se aplicar o BSI, o BDI-2 para rastreio a nível de sintomatologia depressiva. O EARES-21, Escala Ansiedade Depressão Stress. Existe o 21 e o 42, 21 é a forma reduzida e o 42 é a forma mais completa. Esse faz um rastreio de ansiedade, depressão e stress. De depressão uso mais o BDI, de sintomatologia ansiosa existem vários. Não me deparei com um que fosse mesmo bom, às vezes acabo por recorrer ao EADS e a mais algum, porque acho que falta ali qualquer coisa. Existe a escala de Zung, existe também a de Beck. Também existe a escala de pressão geriátrica específica para os idosos. Depois, existem várias provas se for algum mais específico, mais concreto. Gosto de aplicar essas para rastreio, porque muitas vezes é mais isso que me chega. Agora se for por exemplo alguém que já tenha sintomas positivos em relação a alucinações, delírios, alguma coisa que já envereda por outra parte específica da doença mental, aí ou utilizo entrevistas estruturadas, semi-estruturadas, ou tenho que recorrer a outros testes mais específicos. Agora não me estou a lembrar o nome, mas posso procurar e vos enviar. Podem aplicar em termos de auto estima ou qualidade de vida, esses também são importantes às vezes

para nos dar uma referência. Existe a Houckel-brave, que é o da OMS. Existe o outro SWLS, que é mais reduzido em termos de qualidade de vida. O de auto estima não me estou a recordar do nome. Estou aqui a pensar, são muitos testes e existem às vezes provas muito específicas de imagem corporal, existe 1001 coisas. Depois acho que isso é bom e pode ser um problema, há tanta informação e tantos questionários que por vezes já nem sabemos que eles existem ou não sei até que ponto, a menos que seja em áreas muito específicas, estão a ser utilizados. Existem escalas para tudo e mais alguma coisa.

Team: Pois, depende muito da área do paciente.

Sim, e depois depende muito, acho que aí vai muito da experiência do próprio técnico, uma pessoa com mais experiência com determinadas questões vai compreendendo certas coisas, não precisa de recorrer a tantos testes. Com menos experiência acho que é importante recorrer aos testes. E depois depende se há esse protocolo de ter mesmo que utilizar esses testes ou não.

Team: Mesmo assim, estaria disposta mesmo assim a fazer os seus próprios testes ou preferia que já tivessem lá feitos na plataforma?

Fazer não no sentido de criar testes novos ou é nesse sentido?

Team: É nesse sentido.

Eu não queria fazer porque sei o quanto isso implica em termos de investigação, leva muito tempo a validar um teste para a população portuguesa, para aquela faixa etária em específico. Isso implica muita testagem, muito tempo e recursos que eu não tenho nem quero ter, honestamente. Mas seria bom ter acessível aquilo que já existe numa plataforma, criar o meus testes eu acho que por aí na parte da entrevista nós vamos tentando obter alguma informação adicional. Há testes que levam anos a serem validados. Então, já tive essa dose para a tese e nem foi para validar testes.

E. Script for the user testing

Bom dia/ Boa tarde (*nome psicólogo*), este estudo está sendo realizado por um grupo de 3 elementos: Alexandre Romão, Bruno Rodrigues e Eva Freitas; e antes de começarmos o exercício para o qual pedimos a sua presença gostaria de lhe agradecer por disponibilizar um pouco do seu tempo para realizar este estudo de domínio acadêmico.

Para dar início ao nosso teste, preparei um pequeno resumo como contexto breve do que se trata o projeto. Para o desenvolvimento das nossas Teses de Mestrado, referentes aos cursos de Engenharia Informática e Design de media Interativos, orientadas pelo professor Engenheiro Luís Ferreira, iremos testar a facilidade e capacidade rápida de compreensão das funcionalidades e do design da plataforma digital Psymment. A plataforma Psymment tem como principal foco permitir com que o processo de avaliação dos profissionais de saúde, nomeadamente os psicólogos, seja mais fácil, rápido e eficaz. Dito isto, esta plataforma foi desenhada a pensar nas suas necessidades como utilizador e lhe irá dispor de funcionalidades como a realização, gestão, armazenamento de testes e de dados de saúde referentes aos pacientes. Isto tudo de forma interativa e eficiente.

O estudo de usabilidade da plataforma destina-se a psicólogos. A nossa plataforma vai ser testada pelo nosso público-alvo, com o objetivo de recolher o máximo de informação conveniente necessário para que nós, como investigadores, possamos lhe oferecer uma melhor experiência da nossa plataforma digital durante a sua utilização.

Dito isto, pedimos para que seja sincero/a ao avaliar as funcionalidades e organização do Psymment. Relembro que este teste não é para avaliar a sua performance, mas sim as funcionalidades da interface desenvolvida ao qual irá testar. Por favor, sintase à vontade para exprimir todos os seus pensamentos em voz alta, tanto sejam esses pensamentos negativos, positivos ou confusos. Isto irá nos permitir uma melhor compreensão do aproveitamento do utilizador ao manusear o nosso produto digital interativo. Gostaria também de salientar que ao longo da sua avaliação, se gostar de algo ou não justifique o porquê, indique algumas sugestões caso lhe seja relevante em ambas as interfaces e por fim não hesite em perguntar algo em caso de dúvida.

Tem alguma questão a fazer?

Se não tem nenhuma questão a fazer, então iremos dar início ao teste de usabilidade!

Tarefa 1

Primeiramente, qual é a sua primeira impressão desta interface?

Contexto

A/O (nome do utilizador) encontra-se na landing page do Psymment e pretende entender melhor sobre esta plataforma, desde os seus criadores até ao que esta tem para lhe oferecer. Isto para tirar as suas dúvidas referentes a esta interface e saber se a mesma satisfaz as suas necessidades antes de criar uma conta na mesma, tendo ainda como base as reviews de alguns utilizadores.

Você foi informado/a sobre a existência desta plataforma através da sugestão de outros colegas profissionais de saúde como também pela recomendação do seu estabelecimento de trabalho atual e decidiu experimentar.

Execução

1. Para dar início à sua experiência de navegação pelo Psymment você quer saber as promessas desta interface de modo a verificar se correspondem ao que procura. Indique onde estão representadas essas ofertas relativas à nossa proposta.
2. Agora deseja saber mais sobre a nossa equipa e o processo de desenvolvimento da plataforma. Onde deve carregar para verificar isso?
3. Posto isto, quer saber a opinião de outros profissionais de saúde que utilizam a plataforma?
4. Para o caso de querer obter mais informações, vai verificar os contactos que lhe disponibilizamos. Indique os contactos do Psymment.

Contexto

Agora pretende efetuar o registo/login na plataforma.

Execução

1. Imaginemos que quer realizar o registo na plataforma. Onde deve clicar?

1.1. Acha os dados de registo pertinentes? Deveriam ser adicionados ou removidos alguns dos dados?

2. Imaginemos que agora pretende efetuar o login na plataforma. Onde deve clicar?

2.1. Acha que deveria ser adicionado algum método de recuperação de palavra-passe ou outro dado essencial ao login?

Tarefa 2

Contexto

Encontra-se no menu **assessments**. Pretende criar o seu próprio teste (Cognitive Assessment).

Execução

1. Que informação está a visualizar nesta página?
 - i. Na sua opinião, o objetivo desta página e sua funcionalidade são fáceis de compreender?
 - b. Antes de começar a criar o seu teste deve nomeá-lo. Onde deve colocar o nome do seu teste?
 - c. Agora deseja adicionar uma fórmula para obter o cálculo automático dos resultados desse teste para quando for aplicá-lo num paciente. Onde clica?
 - i. Que informação está a visualizar nesta secção das fórmulas?
 - ii. Que cálculos acha que iria utilizar mais quando quisesse calcular os resultados de um teste?
 - iii. Para aplicar as suas fórmulas deve colocar o id/nº de cada pergunta correspondente a essa fórmula. Sabe identificar onde se encontram esses id's/nº em cada pergunta?
 - d. Após fechar a janela das fórmulas, vai começar a criar os seus exercícios. Para isso, vai ter de selecionar o tipo de pergunta que quer aplicar. Onde clica?
 - i. Acha que as ilustrações ao lado direito de cada tipo de pergunta ajudam-no a entender como as mesmas funcionam?
 - ii. Decide que o seu primeiro exercício vai ser uma pergunta aberta. Selecione essa opção e adicione mais uma pergunta na Q1.
 - iii. Após adicionar todas as suas perguntas neste exercício terá de colocar o valor relativo a esse mesmo exercício. Sabe indicar onde deve colocar esse valor? Como gostaria que estes valores fossem dados (percentagem, peso, qualitativo/quantitativo, etc).
 - e. Agora pretende adicionar mais um exercício, onde deve clicar?
 - 6.5.1. Na sua opinião, acha que os exercícios estão bem organizados? Concorda que estejam em secções separadas? Gostaria que houvesse a funcionalidade de fazer drag nos exercícios para organizá-los na lista de exercícios para ficar na ordem que deseja?

6.5.1. Se tivesse de apagar o último exercício que adicionou, o que faria?

- f. Para além da opção de pergunta aberta existem outras opções. Explore as outras opções de perguntas.
 - i. Na opção linear scale, o que visualiza? Descreva o que vê.
 - ii. Na opção drop down, o que visualiza? Descreva o que vê.
 - iii. Como a opção de desenho só está disponível na versão tablet, terá de usar a opção alternativa, multimédia. Aqui poderá adicionar imagens, vídeos e áudios. Para onde deverá arrastar a sua mídia no exercício? E para adicionar mais uma questão, caso queira mais do que uma pergunta e média no mesmo exercício?
- g. Quando acabar de criar o teste deverá salvar o mesmo. Onde você deve carregar?
 - i. Após clicar no botão “Boa! Entendido”, concorda com o redirecionamento para a menu de “**My assessments**”? Ou preferia que esta transição fosse feita de outra forma?

Tarefa 3

Contexto

Está / Tem de ir ao menu **assessments**. Quer fazer algumas alterações nos exercícios do seu teste “My version of MMSE”. Vai assim editar o teste “My version of MMSE”.

Execução

1. Encontra-se na página de edição do teste que criou. O que visualiza?

1.1. Não achou a segunda pergunta pertinente, então decide retirá-la. Como faz para apagar?

1.2. Passa directamente para o último exercício fazendo scroll na página (neste caso será clicar no ecrã). Descreva o tipo de exercício que visualiza.

1.2. Pretende verificar se os cálculos das fórmulas deste teste estão corretos. Onde pode verificar isso?

1.2. Após todas as edições, vai guardar as alterações feitas.

6.1.1 O que visualiza? Avance para continuar a efetuar outras tarefas na plataforma.

Tarefa 4

Contexto

Menu assessments. Deve partilhar um teste criado na secção “My assessments”.

Execução

1. Agora que deseja partilhar um teste seu, onde deve clicar?
2. Agora, está a ver a sua lista de testes de avaliação cognitiva (testes criados por si).
 - a. Acha que a lista de testes está bem definida?
 - b. Os dados dos testes listados (título e data) são suficientes para identificá-los facilmente?
3. Selecione os testes que deseja partilhar, neste caso, o primeiro teste.
4. Partilhe o teste com o colega José#1234.
 - a. Acha este tipo de ID adequado para identificar o seu colega?
 - b. Caso não, como gostaria de poder selecionar o profissional? (ex: a partir de uma lista / pesquisa pelo nome).
5. Agora, defina o tempo de acesso do seu colega José ao seu teste. Selecione 2 meses. Sentiu alguma dificuldade?
6. Finalmente, confirme a partilha ao clicar em “Boa, entendido!”

Tarefa 5

Contexto

Menu assessments. Deseja aplicar o seu teste “My version of MMSE”.

Execução

1. Para aplicá-lo o que deve fazer?
2. Descreva o que visualizou nesta página e indique o que deve fazer para poder prosseguir com a aplicação deste teste.
 - 1.1. Depois de colocar o nome do paciente ao qual irá realizar o seu teste, pode começar a sua avaliação.
3. Onde deve colocar as respostas do seu paciente às suas perguntas de cada exercício?
4. Onde coloca a classificação desse exercício?
 - a. Entende com facilidade o que deve fazer nesta página? Modificaria alguma coisa?
5. Após completar todas as respostas e dar a classificação correspondente a este exercício, quer passar para o exercício seguinte. Como faz?
6. Descreva o que vê nesta nova página.
 - a. Neste exercício o paciente terá de desenhar a imagem que se encontra abaixo no lado esquerdo. Para conseguir colocar esse desenho físico neste exercício digital, como faz?
7. Terminou a sua avaliação e pretende visualizar os resultados.

Contexto

Após a avaliação do/a paciente utilizando um dos seus testes, foi redirecionado/a diretamente para a ficha desse paciente para ver os resultados do mesmo.

Execução

1. Que informações consegue obter do paciente nesta página?
 - 1.1. Na sua opinião tem necessidade de acrescentar ou remover alguma coisa?
 - 1.2. Os dados relativos ao paciente estão completos ou adicionava mais algumas informações? Se sim, indique quais.
2. Agora quer visualizar o teste “My version of MMSE” efetuado ao paciente. Onde clica?
 - 3.1. Acha adequada a forma como os resultados do teste aparecem na página?
 - 3.2. Agora quer visualizar as respostas que o paciente deu nesse teste. Onde clica?
 - 3.2.1. Acha que a disposição e forma como as respostas aparecem é adequada?
 - 3.2.2. Se quiser editar as respostas do paciente onde carrega?
 - 3.2.2.1. Acha que se deve poder editar as respostas? Se sim, sob que condições?
3. Esta página está bem explícita para o seu propósito?
4. Após fazer todas as edições pretendidas, deve salvar as mudanças efetuadas. E assim abre uma página que lhe informa que essas alterações foram salvas com sucesso.
 - a. Confirme essa afirmação e clique em “Boa! Entendido”.

Tarefa 6

Contexto

Volte ao menu **assessments**. Agora pretende ver a lista de pacientes, visualizar os detalhes dos pacientes e os testes realizados. Além disso, ainda pretende visualizar as respostas dadas pelo paciente.

Execução

5. Para visualizar a lista de pacientes deve clicar onde?
 - a. Acha que a disposição e a organização da lista dos pacientes é boa e adequada?
6. Tem um paciente novo para adicionar à sua lista de pacientes. Onde deve clicar para o poder adicionar?

- a. Concorda com os dados necessários para adicionar este novo paciente? Adicionava ou removia algum destes pontos?
- b. Pretende alterar o género do paciente de feminino para masculino. Como faz?
- c. Após preencher todos os campos necessários para criar a ficha do paciente, clique em “adicionar paciente”.

1.2. Pretende filtrar a ordem pela qual os pacientes aparecem no ecrã. Onde deve clicar?

1.2.1. Os filtros são adequados?

1.2.2. Tem algum filtro para adicionar?

7. Quer visualizar o perfil do paciente “Ema Maria Azevedo”. Onde você carrega?

Contexto

Pretende comparar o resultado de dois testes de avaliação cognitiva aplicados por si.

Execução

1. Acha os dados sobre os testes listados (nome, data de aplicação e cotação) suficientes para caracterizar cada um dos testes?
2. De seguida, selecione os **2 primeiros testes da lista** e compare os seus resultados.
3. Que dados sobre os testes gostava de ver **referidos** na página de comparação?
 - a. O que acha dos dados que vê atualmente? (Cotação e tempo)
4. Após isto, analise as respostas do paciente ao primeiro teste.
 - a. Acha útil poder visitar as respostas dadas às questões do teste?
 - b. É válido ter a possibilidade de editar respostas aos testes psicológicos nestas circunstâncias?
5. A funcionalidade de comparação é satisfatória ou tem alguma sugestão? (Por exemplo o facto de poder ver os testes lado a lado para mais fácil análise).

Tarefa 7

Contexto

Regressa ao menu **assessments** e pretende editar um dos testes existentes na plataforma.

Execução

Para ir para a página de edição de testes existentes onde deve clicar?

1.1. Acha que a disposição e a forma como os testes aparecem é boa e adequada?

1.2. Olhou para a lista de testes e pretende editar o Mini-Mental State Examination. Onde deve clicar?

Tarefa 8

Contexto

Regressa ao menu principal e pretende aplicar um teste partilhado por outro profissional de saúde na plataforma.

Execução

Para ir para a página dos testes partilhados a si, onde deve clicar?

1.1. Que informações consegue ver nesta página? Acha que está bem organizada e explícita?

1.2. Pretende aplicar o “My version of BSI” partilhado por Carina#2424. Onde deve clicar?

Tarefa 9

Contexto

Encontra-se no menu **assessments**. Pretende alterar detalhes do perfil e depois cancelar a sua conta.

Execução

1. Navegue até à página do seu perfil.
2. Acha que os dados apresentados no perfil são úteis para definir um psicólogo? Falta algum dado? Cédula profissional é relevante?
3. Após isto, edite o seu perfil (clicar em **Edit profile**).
4. Depois guarde as alterações.
5. Agora, apague a sua conta através de um botão apresentado na aplicação.
 - a. Este botão é claramente visível?
 - b. ***Explicar que esta operação irá apagar os dados todos dos utilizadores e testes registados pelo profissional de saúde.***
6. Dado que esta é uma operação de grande importância, acha que deveria ser adicionada alguma medida adicional de confirmação? (ex: inserir palavra passe).
7. Confirme a operação feita e é redirecionado para a **landing page**.

Pedro Santos

35 years old;
Portuguese;
Master's Degree in Psychology;
2 years in clinical psychology and 12 years
in research psychology;
Arditi

Personality

- Serious, focused, curious

Motivation

- Explore and discover;
- Learn new things;
- Study;
- Technologies

Frustrations

- Process of evaluation and correction in Psychology is very primitive;
- Slow work flow.

Desires

- Innovative solutions to accelerate the process of evaluation in Psychology



Claúdia Pereira

26 years old;
Portuguese;
Master's Degree in Psychology;
3 years in clinical psychology;
Casa de Saúde São João de Deus

Personality

- Confident, nice, curious

Motivation

- Work performance
- Her patients
- Technologies

Frustrations

- numerous patients and limited time for analysis;
- computation technique;
- keeping the patient's diagnosis on file;
- Patients' privacy and confidentiality

Desires

- A digital platform to safeguard, store, compute, and simplify the process of evaluating patients.



Ana Azevedo

41 years old;
Portuguese;
Bachelor Degree in Nursing;
12 years in nursing
Casa de Saúde São João de Deus

Personality

- Always in a good mood, talkative, indifferent

Motivation

- Work performance
- Her patients wellness
- Her job;

Frustrations

- New technologies;
- Heavy workload;
- Learning something new;

Desires

- A simple fix for her overwhelming workload when administering CAT to her patients.




G. Customer journey maps

1) Pedro Santos – Without Psyment

Customer journey map

without Psyment



Pedro Santos
35 years old

Portuguese;
Master's Degree in Psychology;
2 years in clinical psychology and
12 years in research psychology;
Autist

Personality

- Serious, focused, curious

Motivation

- Explore and discover;
- Learn new things;
- Study;
- Technologies

Frustrations

- Process of evaluation and correction in Psychology is very primitive;
- Slow work flow.

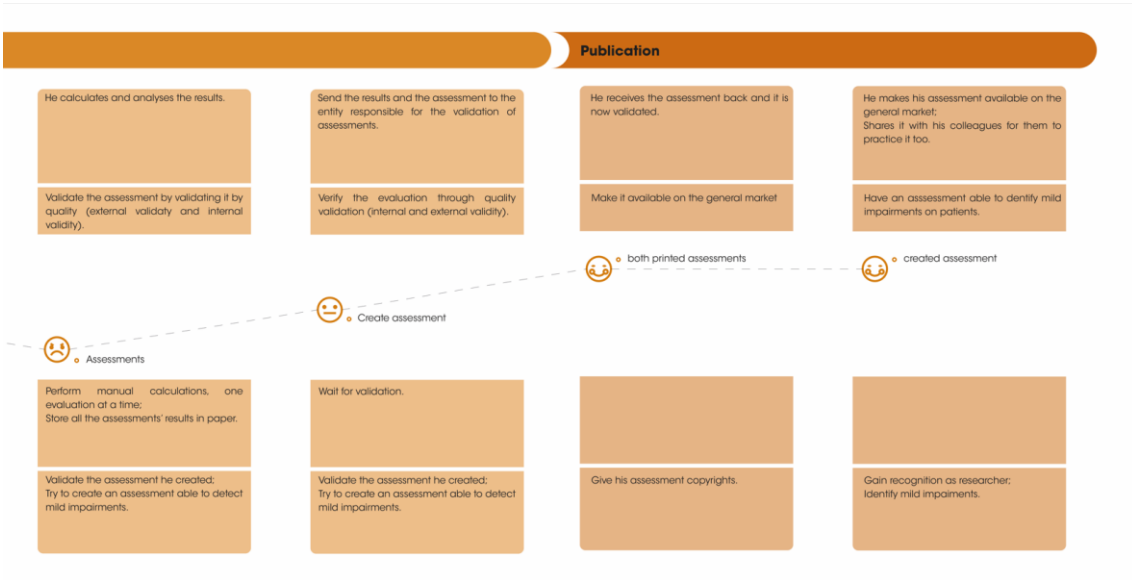
Desires

- Innovative solutions to accelerate the process of evaluation in Psychology.

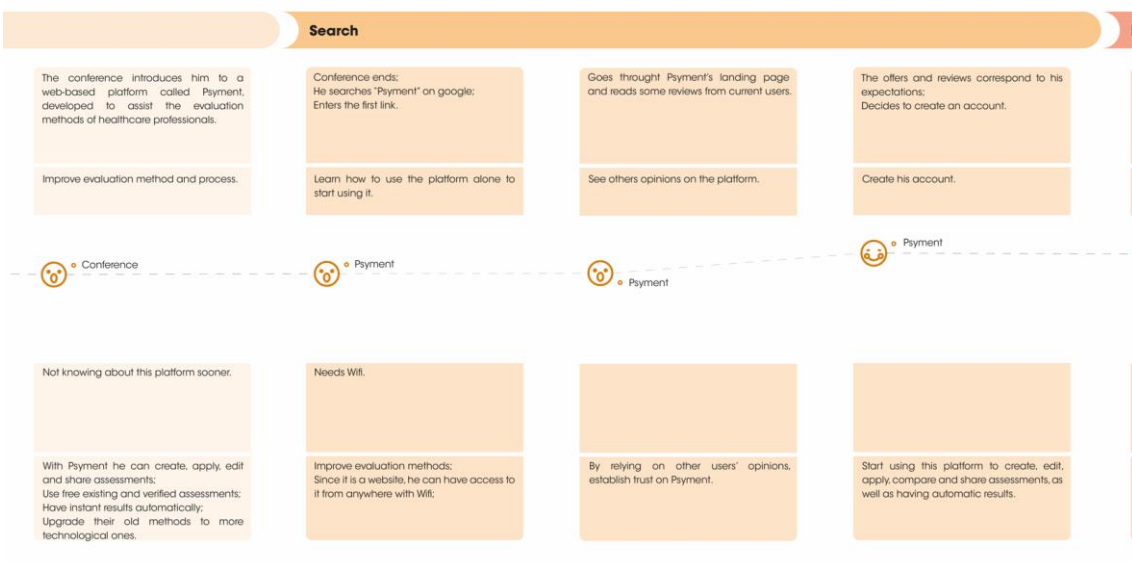
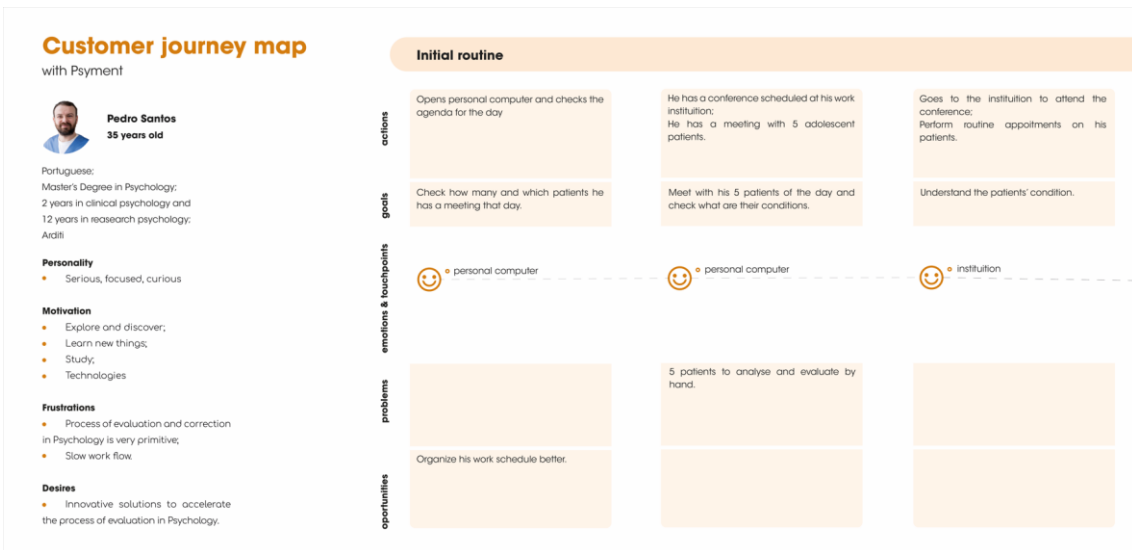
	Initial routine		
actions	Opens personal computer and checks the agenda for the day	He has a meeting with 5 adolescents patients.	Has routine appointments with his patients at the institution; Prints the assessments that are saved in a folder on his computer and are necessary to complete the evaluation; Lacks an evaluation tool to assess autism.
goals	Check how many and which patients he has a meeting that day.	Meet his 5 patients of the day and check what are their conditions.	Confirm the diagnosis if there is any reason to suspect mental health issues and ask a colleague for the assessment missing.
emotions & touchpoints	😊 = personal computer	😊 = personal computer	😊 = institution and printed assessments
problems		Analyse each patient and if necessary conduct an assessment if the HP wants to make sure they are validating the right diagnosis of the patient's condition.	Print the assessments: Time consuming and paper waste; Download assessments for free online; Lack of resources to pay for assessments; Usually via email, a colleague sends the missing healthcare assessment.
opportunities	Organize his work schedule better.		Knowledge exchange between HPs:

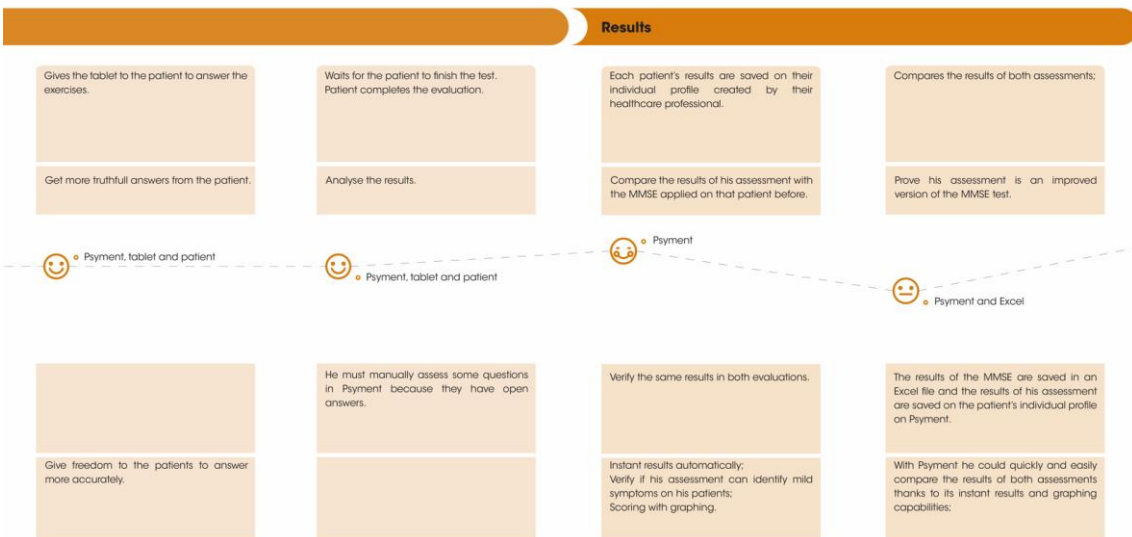
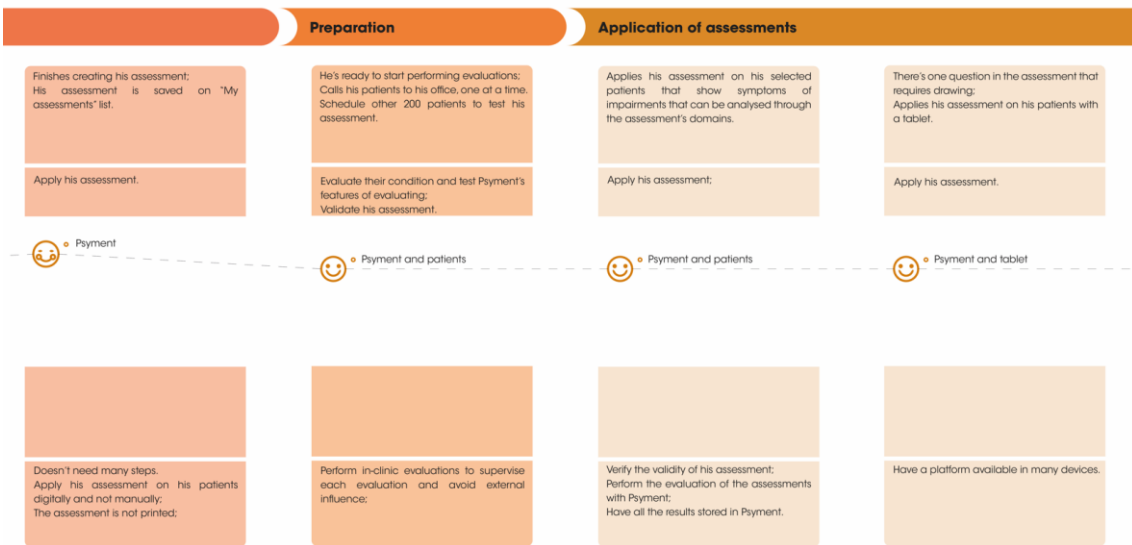
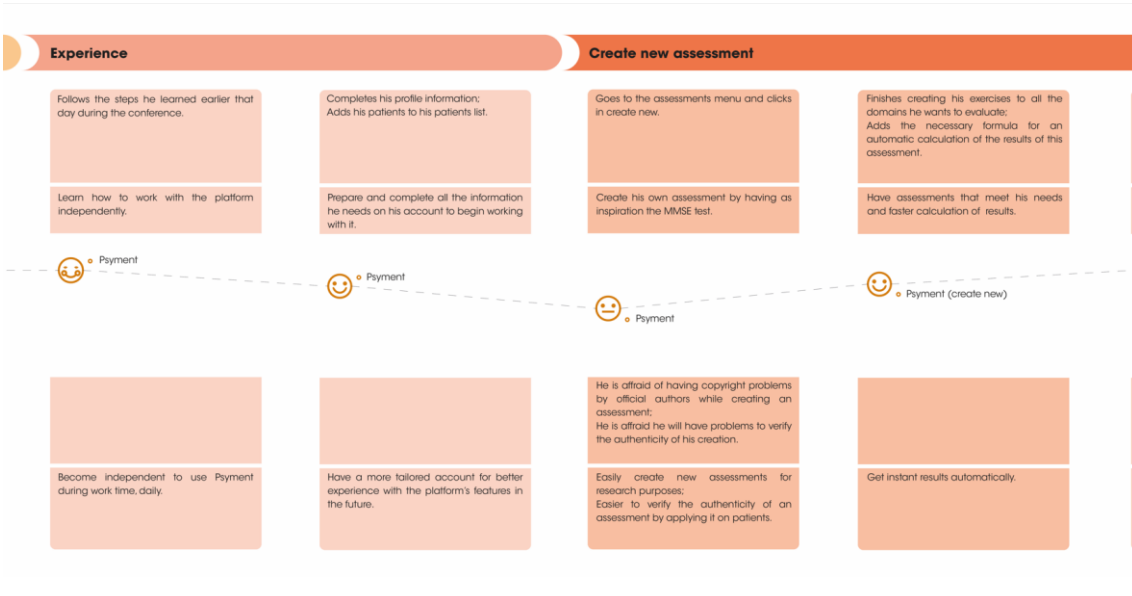
1st evaluation				Calculation
Greets the patients of the institution; Patients arrive for their appointments at his office on time.	Performs the evaluation; The patient carries out the assessment directly in the printed test sheet.	Waits for the patient to conclude the evaluation.	The patient finishes the testing, gives the answers to him and leaves the room.	He proceeds to calculate the final result.
Evaluate one patient at a time;	Evaluate the patients' condition.	Not interrupt the patient's thought process.	Calculate the results.	Understand the patients' condition.
😊 = patients	😊 = printed assessment and patient	😊 = printed assessment and patient	😊 = printed assessment and patient	😊 = printed assessment
During the pandemic he used to send the assessments to his patients and they completed it at home; They're easily distracted and can get outside assistance	Printed assessment.			Calculate the result by hand; Use a projector to overlay the answers to check which of them are correct or not;
The patients will be more concentrated in the test.	Get more accurate and truthful answers from the patients.		Calculate alone in the room. No distractions.	The correction is faster and easier.

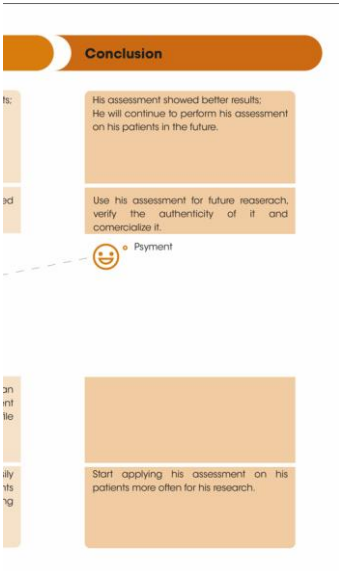
Search	Create assessment	Validation process
The assessment taken is not enough to detect mild impairments; He decides to create his own assessment and use it as research purposes on his patients.	He creates a new assessment; Wants to test it with 200 people.	He tests his assessment with 200 people, one by one.
Create an assessment that can detect mild impairments.	Validate the assessment by validating it by quality (external validity and internal validity).	Validate the assessment by validating it by quality (external validity and internal validity).
😊 = *	😊 = *	😊 = *
	😊 = Assessment	😊 = Assessment and 200 patients
Assess more deeply the conditions of his patients.	Assess more deeply the conditions of his patients.	Prints the assessments; He uses paper and pencil to test; Conducts manual analysis.
	Validate the assessment he created; Try to create an assessment able to detect mild impairments.	Validate the assessment he created; Try to create an assessment able to detect mild impairments.
Calculate the result by hand; Use a projector to overlay the answers to check which of them are correct or not;		
The correction is faster and easier.		



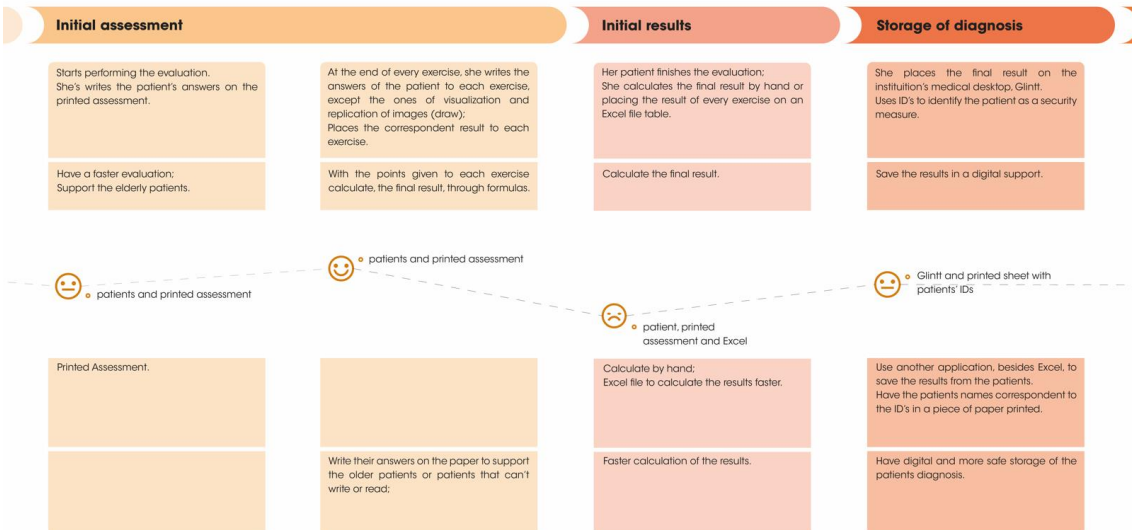
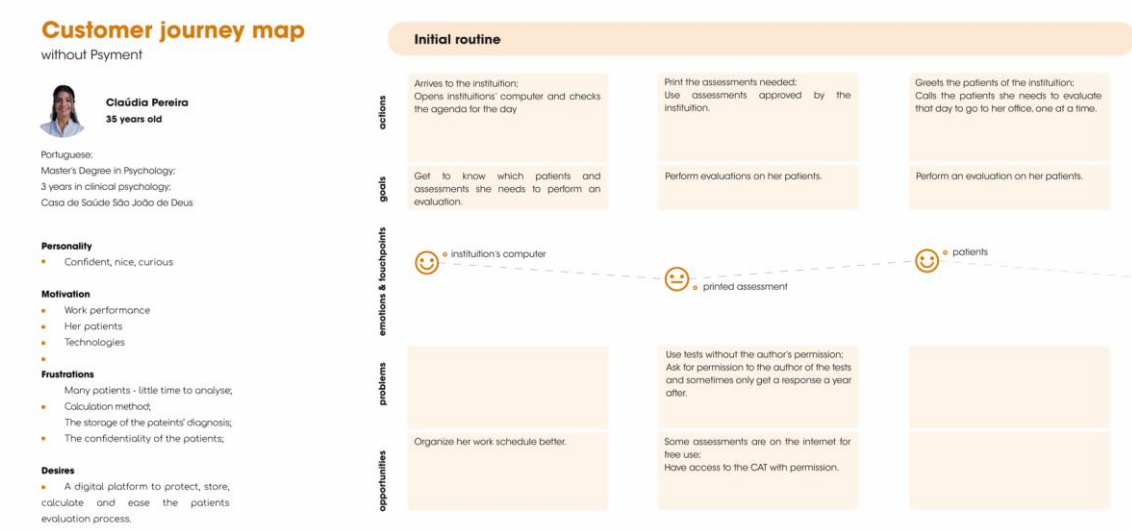
2) Pedro Santos – With Psymt

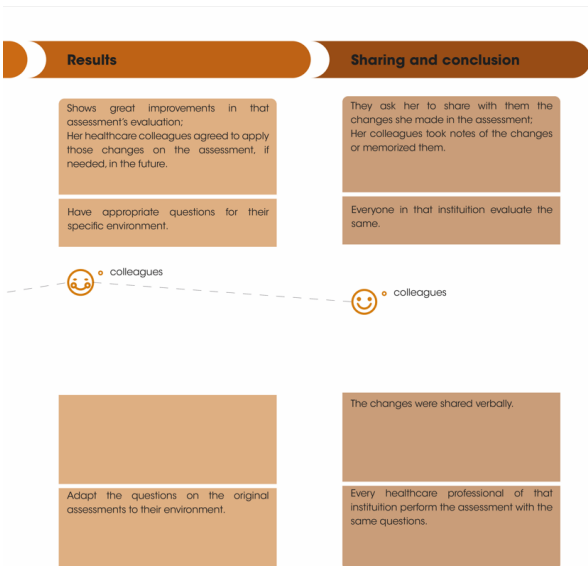




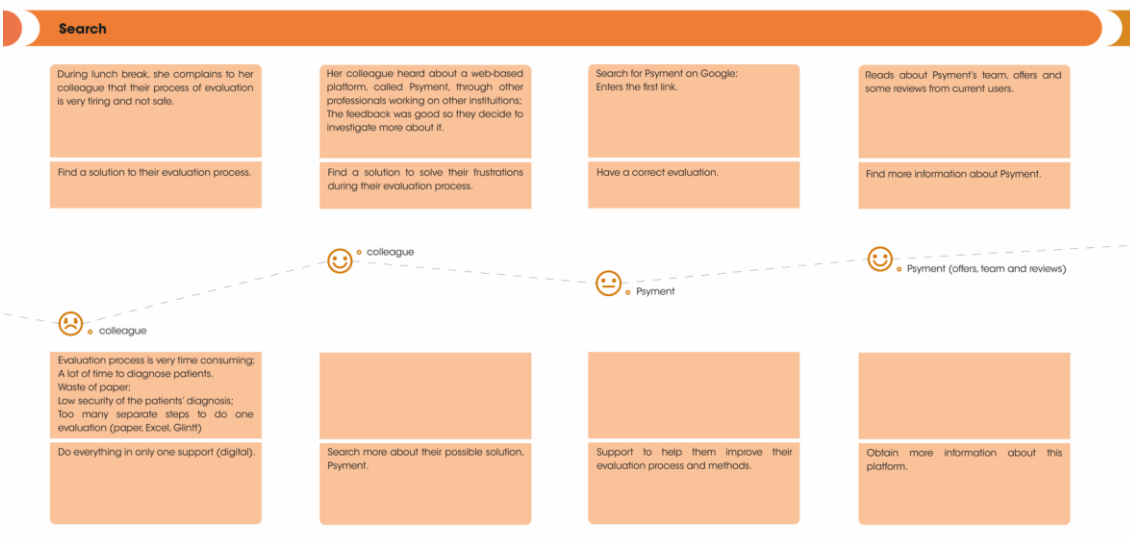
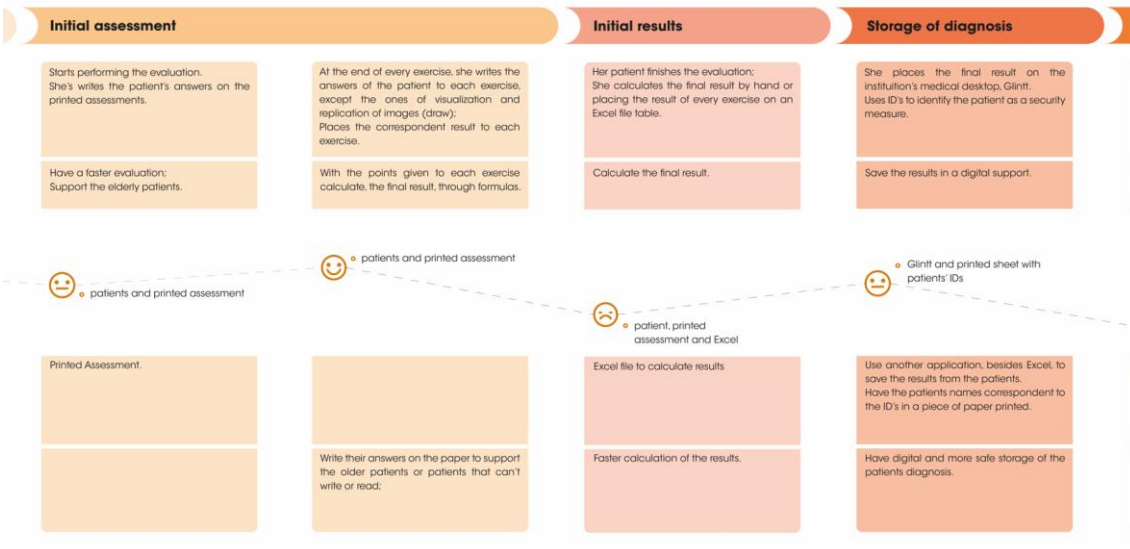
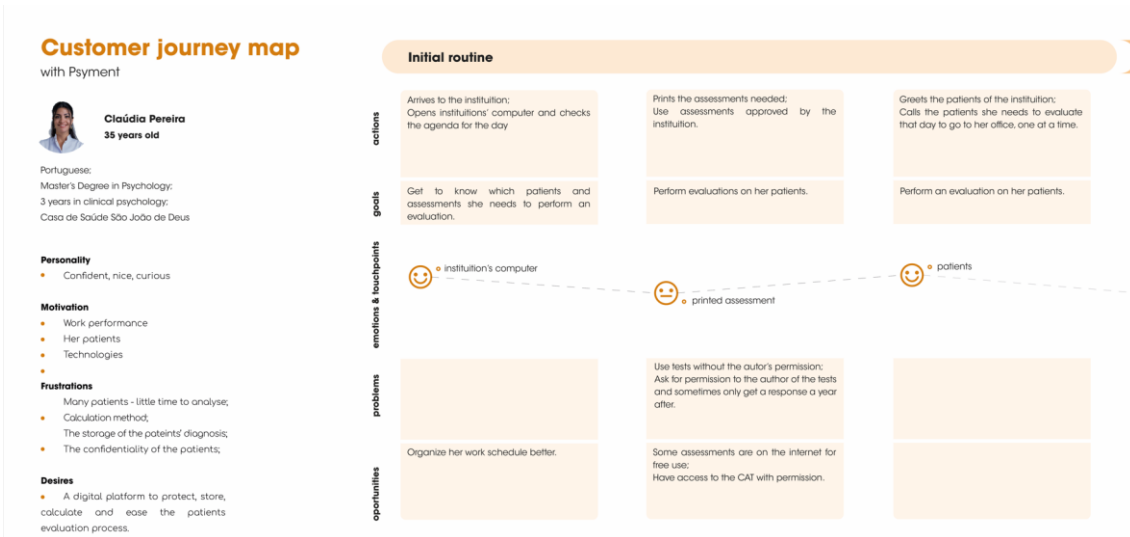


3) Cláudia Pereira – Without Psymt





4) Cláudia Pereira – With Psyment



Experience

Edition

The offers and reviews correspond to her and her colleague's expectations. Decides to create an account.

Create his account.

😊 Payment (create account)

Creates an account. Follows the initial tutorial to start learning how to work with Payment.

Learn how to work with the platform.

😊 Payment (initial tutorial)

Completes her profile information. Adds her patients to the patients list.

Have a more personalized and tailored account.

😊 Payment (profile and patients list)

She clicks in "Existing Assessments". She sees there is one assessment that she uses alot for evaluations, MMSE. Decides to edit some questions of the MMSE.

Have tailored questions to her patients, specifically designed to their environment.

😊 Payment (existing assessments) and MMSE

Knows what Payment offers but doesn't know how to work with it.

Start using this platform to create, edit, apply, compare and share assessments, as well as having automatic results.

Understand how to work with Payment.

Have a more tailored account for better experience with the platform's features in the future.

Edit the questions directly in the assessment file and not change verbally as before. Changes automatically saved. Edit at any time, anywhere with wifi.

Second evaluation

Starts editing the questions she feels the need to edit.

Fill the questions of MMSE better to the environment her patients are in.

😊 Payment (edit existing assessments)

Finishes the editing. Saves the assessment edited. Automatically saved in "My Assessments".

Have a faster and easier evaluation process.

😊 Payment (my assessments)

Calls her patients, one at a time, to go to her office to perform the evaluation of this edited assessment. She performs the evaluation using the institutions computer.

Faster a faster and easier evaluation process.

😊 patients, Payment (apply assessment)

While the patient gives her the answer to the questions, she writes down the answers in the digital assessment.

Write the answers and the same time give the correspondent result to each exercise.

😊 patient, Payment (apply assessment)

Make assessments suitable to their patients as they wish.

Apply that assessment with the changes. Edit some questions of other assessments if necessary.

Apply assessments digitally. Use devices such as computer or tablet.

Apply assessments digitally.

Results

In the drawing exercises she asks her patient to draw in a piece of paper. She takes a picture of the drawing and imports to test document.

Conclude the digital test.

😊 patient, Payment (apply assessment) and mobile phone

She concludes the evaluation using Payment as support. She is directed to that patient's diagnostic list to view the results of this assessment.

View the results.

😊 Payment (patient diagnostic list)

She views the overall score of that patient in that assessment as well as the individual scoring on each exercise.

Know the severity of that patient's condition.

😊 Payment (scoring)

She also views the answers of that patient again to see where he did less good on the assessment.

review the answers.

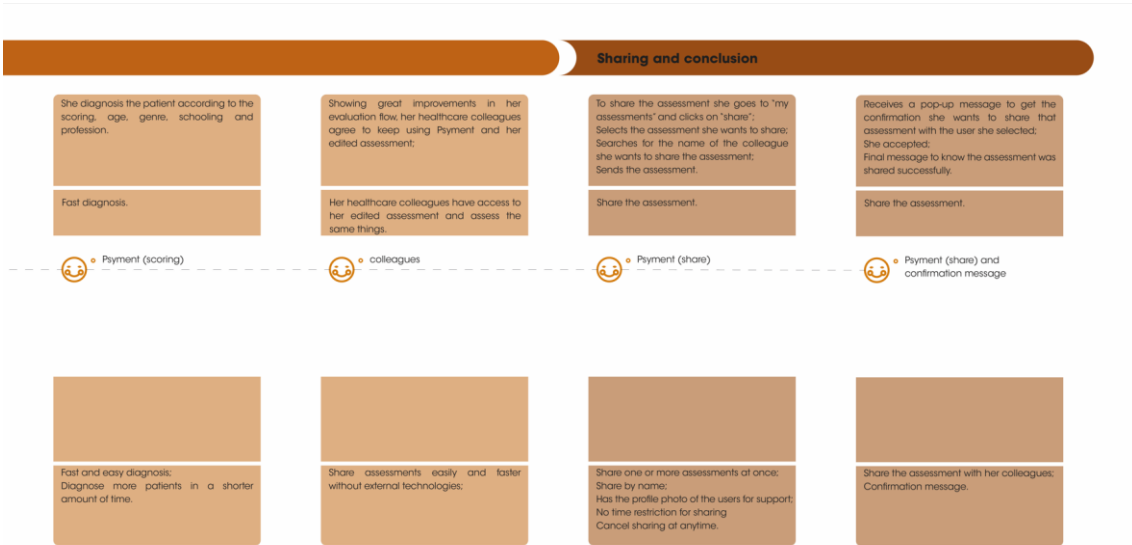
😊 Payment (view answers)

Import files. Have easy access to the answers of these exercises (drawing) later in the future.

Easy and fast to view the final results. Fast and automatic scoring.

Automatic scoring with graphing. Faster process to diagnose the patient's condition.

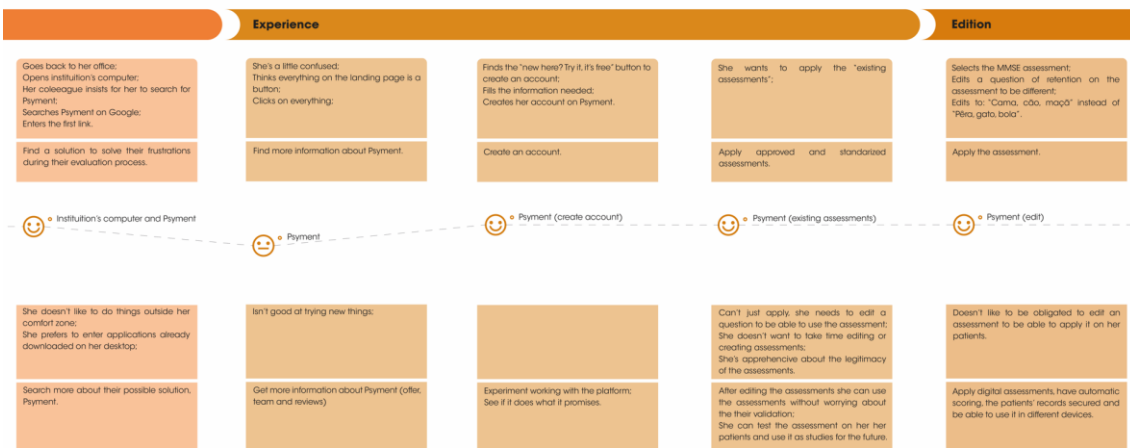
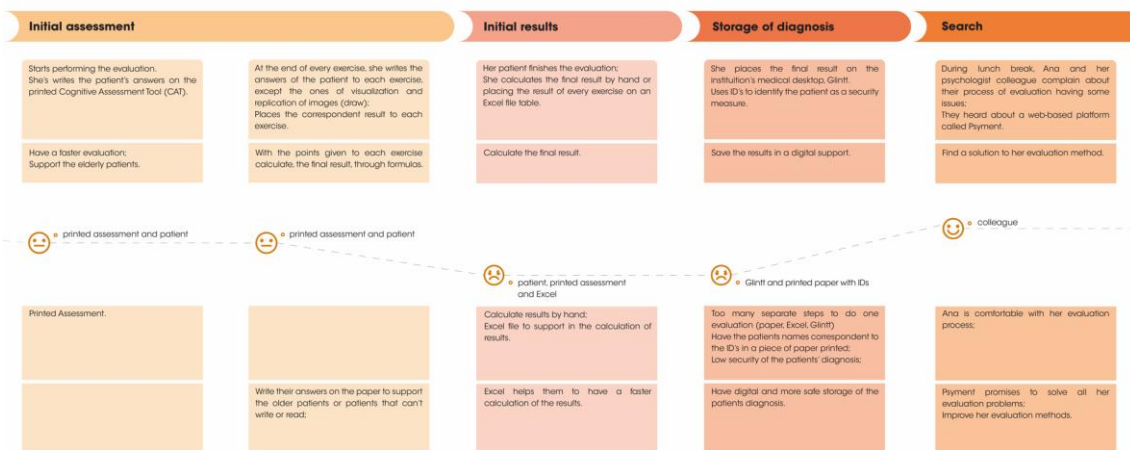
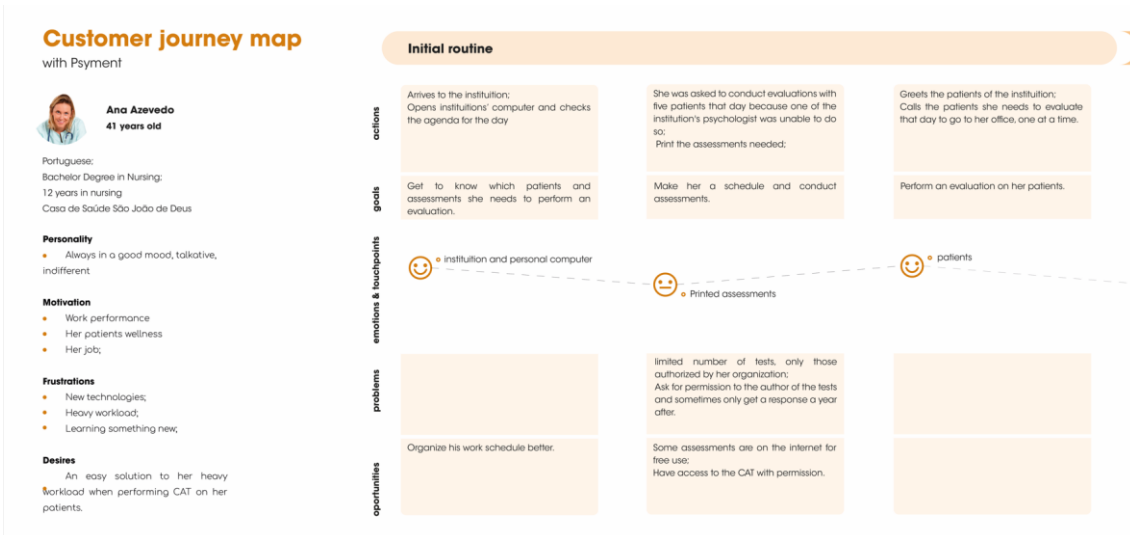
Review the answers.



5) Ana Azevedo – Without Psymnt



6) Ana Azevedo – With Psymt



Application of assessments **Results**

Saves the changes:
Saved automatically on her "my assessments" list.

Apply the assessment.

She calls some of her scheduled patients of that day to go to her office:
Applies the assessment on her patients, one at a time:
She writes the answers of her patients directly on the assessment in the computer.

Apply the assessment.

Finishes applying the assessment on her patient:
Is redirected to the patient's profile page:
Sees the results on that assessment.

Fast and easier calculation method.

She analyses the scoring of that patient having in mind the genre, age, schooling and profession:
Diagnoses the patient's condition.

Diagnose the patient easily.

😊 Payment (my assessments)

😊 Patients and Payment (apply "my assessment")

😊 Payment (patient's profile)

😊 Payment (scoring)

Have her assessments saved and listed in one place.

Has some difficulty in finding the assessment she just edited:
Only uses the computer and not the tablet.

No more waste of paper.

Automatic scoring:
Results with graphing:
Automatically redirect to the scoring page.

She sees herself using this platform in 5 years:
Feels comfortable with her current evaluation process:
Likes to do things the old fashioned way.

Automatic scoring with graphing:
View the individual scoring for each exercise:
View the answers of each exercise.