

ReBUILD

ICT-enabled integration facilitator and life rebuilding guidance

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1 ABSTRACT

This deliverable is presenting the proposed framework and scheduling for performing the test of the Rebuild toolbox modules developed in Phases 1 and 2 of the project to provide the technical implementation partners with feedback on usability, accessibility, and user acceptance.

This deliverable is mainly based on the findings and inputs from WP2 (Co-design Processes) and WP 5 (Integration and technical validation). However, the testing itself will focus also on assessing and providing feedback to WP4 (Digital companion), to WP3 (Data analysis and skills matching), and WP7 (Ethical impacts).

The actual scheduling and performance of the testing will be reported in D6.2, according to the development status and progression of the Rebuild Toolbox modules, as well as the practical situation in the project pilot countries.

The proposed scheduling takes into consideration the changing environment currently affecting (at the time of this writing) the target countries and the possible restrictions due to the Covid-19 national or local response plans.

2 TESTING APPROACH

2.1 Introduction

The overall objective of ReBUILD is to improve migrants' and refugees' inclusion through the provision of a toolbox of ICT-based solutions aiming at the enhancement of both the effectiveness of the services provided by local public administration and organizations as well as the life quality of the migrants and refugees.

This project follows a user-centered and participatory design approach, having the ambition of addressing properly real target users' needs, ethical and cross-cultural dimensions, and of monitoring and validating the socio-economic impacts of the proposed solution. Both target groups (immigrants/refugees and local public services providers) are part of a continuous design process which includes the gathering of their feedback and

suggestions to inform the development process, with the aim of creating and maintaining their engagement throughout and after the project timeline.

The Consortium's capacity to engage relevant stakeholders external to the project is a key factor in the three main piloting countries: Italy, Spain and Greece, chosen due to their geographic situation, i.e crucial points with regards to the main immigration routes. During the first phase of the project, users and stakeholders have been engaged through interviews and focus groups in the design of the Rebuild toolbox application, through the Co-Creation Workshops organized in each of the countries. The testing and pilot phases, in years 2 and 3 of the project respectively aim at helping the Consortium fine-tuning the ReBUILD ICT toolbox before the end of the project.

The main components of the Rebuild Toolbox to be tested are:

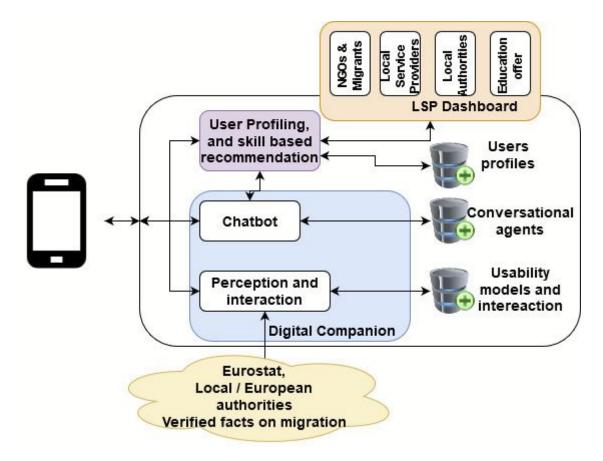


Figure 1. General Overview of ReBUILD

- The local service providers (LSP) dashboard, allowing the inclusion of services data in the Rebuild Toolbox



The Rebuild Digital Companion, a mobile application for migrants enabling personalized two-way communication using chatbots to provide them with smart support for easy access to local services (training, health, employment, welfare, etc.) and assessment of the level of integration and understanding of the new society, while providing local authorities with data-driven, easy to use decision supporting tools for enhancing capacities and effectiveness in the service provision. The Digital Companion shall also provide an interface for intermediary process agents, such as volunteers, mentors.

The testing shall also provide means to assess and refine the functioning of the following technology solutions, taking into account the actual level of development:

- GDPR-compliancy of migrants' related background information (user consent and anonymization of personal information);
- AI-based profile analysis enabling both personalized support and policy-support data reporting on migration-related issues;
- AI-based skills/needs matching tool and recommender system, to match migrant needs and skills with services provided by local authorities in EU countries and labour market needs at local and regional level;

2.2 Overall approach

The testing phase aims at providing feedback to the developers from the stakeholders, e.g. the local service providers (LSP) and the migrants. In particular, the tests will assert the functioning of the Minimal Viable Product (MVP) version of Rebuild App components underlining in controlled the and services scenarios environment, and acceptance/feedback by the target users. As initially planned, the tests will be conducted in autumn (September 2020) and will last for at least a month. The user test phase will be preceded by a stakeholder mobilization and consultation with LSP with a view to locally plan the testing of the different scenarios.

In order to cope with the Covid-19 situation, which remains uncertain, tests will be organized locally in the target countries by the consortium partners. In this view, informational material allowing for self testing will be prepared in order to minimize the need for direct assistance: App and scenario leaflets as well as short explanatory videos, will allow linking the test phase, where possible, to the previously organized Co-design workshops, by engaging with the same group of persons. This would ensure at least some of the testers have a good knowledge and understanding of the project.

2.3 Scenario Based Prototypes

As presented in D2.5 - Services scenarios and prototypes, during the first phase of the project, the field data collected have been used as input for Scenario-based design, a set of scenarios addressing ReBUILD service and user experience deriving from the requirements for the three pilot countries. The use of scenarios (Carroll, 1999; 1995) allowed to structure data gathered through activity analysis while envisioning the role and functionalities of the ReBUILD system, and assessing and validating the envisioned solutions from a technical perspective. In this way, scenarios worked as a design tool along the overall design process.

The plot of the scenario unfolds when the actor starts to perform activities aimed at achieving his or her goal, when the product responds to these actions and/or when outside events (changes in the setting) trigger or interrupt the interaction between the actor and the product.

The analysis of the narrative scenarios enabled the identification of the different steps for the corresponding type of user/perspectives:

- involved actors (migrants/volunteers/service providers)
- services touchpoints
- system components
- support policies/procedures

The analysis also enabled the identification of questions/open issues in the process, including potential critical issues as well as ideas/opportunities.



Scenarios represent the tool used to develop a consistent user experience across the diversity of the different ReBUILD software services and contexts of use. In particular, the scenarios present design concepts to seamlessly support the users in moving across different domains such as language and culture, social integration and job seeking. The narratives developed are envisioning scenarios, meaning that the most useful and viable scenarios envisioned are available to represent the characteristics and role of the future system.

2.4 Scenarios / Service Blueprints

Deliverable D2.5 detailed and analysed the ReBUILD envisioning scenarios developed in D5.1 with a view to informing the development of a prototype implementation. These scenarios represent and design detailed interaction paths with the objective to allow for the refinement of the interaction modalities and the technical features of the Rebuild application prototype. Scenarios thus represent the detailed mapping of the workings of a given "service" explicating the link between the actual service provision flow (the way the service is actually provided in the real world) and the actors involved in the service provisions (the providers, the receivers and any middle-man, third party or external precondition conducive to the service provision, or affecting the service delivery or enjoyment).

Following the phase of service co-design, the "Service Blueprint" unveils the user experience and the related internal processes. The Blueprints thus aim at showing/explicating the different steps of the user journey, most of which will remain invisible to the final user, once the application is released. This mapping tool therefore reveals and describes the interactions between the different actors of the action (i.e. the service), from different angles.

In architecture, the word "blueprint" indicates a technical plan of a building. In this context, the blueprint of a service is therefore the plan of the service. The service blueprint extends the user journey to the interactions and processes allowing the delivery of a service to the user.

The process of designing a blueprint involves the consideration of several issues (Shostack, 1984), of which the first of which consists in mapping the processes that constitute the service. These processes may be visible (front-stage) or invisible (backstage) actions. Moreover, intangible elements underlie these processes, such as specific rules and regulations, availability of documents, availability of persons, office opening hours, or even budget provisions.

Blueprints may also help discover weaknesses in the processes or enable a better understanding of the whole process. Poor user experiences are often due to non-optimal process organization: while it may be relatively easy to quickly understand what may be wrong in a user interface (unfriendliness, or actions not performing the intended task), determining what causes a systemic issue is much more difficult as invisible elements may come into play, such as insufficient or corrupted data, potentially resulting in process bottlenecks, sensitive data exposure or infinite process loops. Blueprinting exposes the big picture of the intended processes and offers a map of dependencies while exposing weaknesses.

Building on document D2.5, the following scenarios were developed in "service blueprint":

Scenario	Responsible partner
Healthcare	CIDAS (Italy)
Healthcare	OMNES (Greece)
Access to Higher Education	Uninettuno
Mentoring, Counseling	Uninettuno/University of Barcelona
Social mentoring	University of Barcelona
Language courses	Uninettuno
Job seeking	Uninettuno
Social Housing	CIDAS (Italy)

Table 1. Scenarios developed in the ReBUILD Service Blueprint

The ReBUILD Service Blueprints describe each service according to the following schema:

Description	Phase	Awareness	Onboarding	Recommended procedure info and suggestions	Closing
Definition of the Scenario steps	Step				
Describes the actors taking part in the actions	Actor				
Where the given step takes place	Touchpoint				
Lists the systems that interact for the step to happen	System				
Written or unwritten rules impacting the step process	Policy/Procedure				
Missing elements that may influence the step process elements	Unknown				
Critical conditions that may prevent the system from delivering results	Critical Moments				
Potential for improvement	Opportunities				
Visual support to the user for each step	Pictograms				

Table 2. ReBUILD Services blueprint schema

The actual Service Blueprints are in Annex to this document (in the PDF version).

The following Figure illustrates an example of Service Blueprint (excerpt from CIDAS - Housing Service).

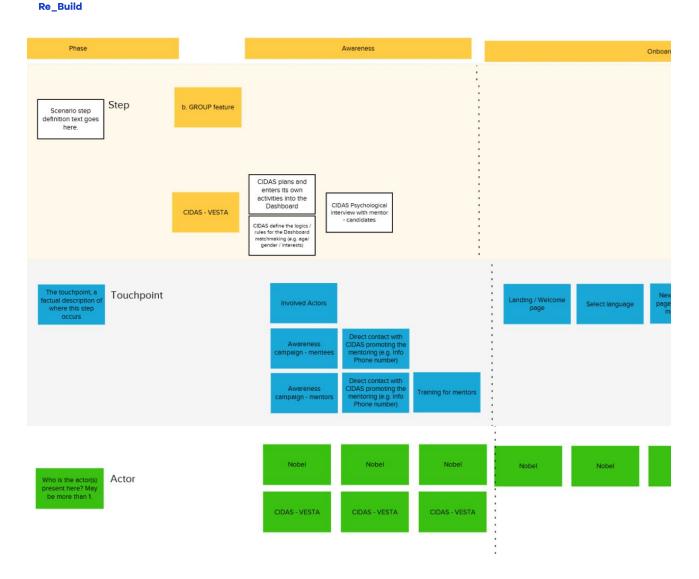
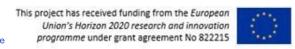


Figure 2. Example of Service Blueprint

Service blueprints describe the digital companion smart support for migrants by enabling personalized two-way communication using the intelligent chatbot to provide them information about available public services. The ReBUILD smart support is designed to effectively access and interact to those services and with the local context of services providers along three different perspectives:

- a. informative support, by providing contextualized and rich information to the end-users,
- b. functional support, by accompanying the end-users in accomplishing their operational tasks,



c. intelligent support, by enacting empowering strategies in order to let the end-users gain autonomy, self-efficacy and trust.

2.5 Validation Methodology

The ReBUILD validation methodology aims to demonstrate how a system, a methodology or an operational procedure can function in real life conditions with the required level of performances, security and operability.

The Operational Validation can also be defined as the process of answering the question "Are we building the right system?" in addition to the Technical Validation and Verification that deals with answering the question "Are we building the system right?".

The main goal of the validation process in ReBUILD is to conduct an evaluation of the platform to determine the appropriateness of the applicative scenarios selected in D2.5. Thus, a systematic approach to the Operational Validation has been planned. It applies state-of-the-art validation methods, like the European Operational Concept Validation Methodology¹, E-OCVM, that can be used for all the various contributions and results of any R&D Projects. E-OCVM methodologies are integrated with User Centred Design approach and techniques, and customised for Information and Communication Technology-oriented projects.

Based on E-OCVM, validation relates both to the identification of the operational needs of the stakeholders and to the establishment of appropriate solutions to the problems and issues identified. A validation process is an iterative process that ensures the needs are properly understood, the solution is well adapted and adequate supporting evidence has been gathered.

The high-level Validation dimensions that we have taken into account to define the ReBUILD validation process are:

- 1. **user acceptability**, ease of use and suitability of the system for supporting cognitive task requirements, job satisfaction and acceptability,
- domain suitability, the suitability of the content of information, display representation and system functionalities for the selected applicative domain, its work-practices and internal procedures,
- 3. **technical usability**, the property of a tool to be effectively used, understood and learnt by the people for which it has been designed, including look&feel aspects of the prototype as well as on the way the users will be requested to interact with it. Four key aspects of the technical usability are:

¹ https://www.eurocontrol.int/publication/european-operational-concept-validation-methodology-eocym



- a. Usability and Memorability: How easy is it for users to accomplish tasks of different level of complexity? How easy can be established/re-established proficiency?
- b. Efficiency: Once users have learned the design, how quickly can they perform tasks?
- c. Errors: How many errors, how severe are these errors, and how easily can users recover from the errors?
- d. Look and feel: how is the HMI design, use of colors, shapes, layout (the "look"), and how they relate to the behaviour of dynamic elements such as buttons, boxes, and menus (the "feel")?

In particular, in the following paragraph the User Acceptance Testing method will be described.

2.6 User Acceptance Testing (UAT)

2.6.1 Definition

User acceptance testing (UAT) is the last phase of the software testing process that ensure the new system does what it set out to do and meets the requirements the business has of it (Hambling, Brian; van Goethem, Pauline, 2013). User Acceptance Testing refers then, to the process to ensure that the user "accepts" or rejects the software product after having used it for a certain period of time. If the software passes this testing, the product is released for production/dissemination.

In the ReBUILD project context, this phase is actually split into two parts: the testing phase and the piloting phase.

User acceptance testing can be defined as (ref. ISO 24765²) being the formal testing with respect to user needs, requirements and business processes conducted to determine whether or not a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine whether or not to accept the system.

Accessibility refers to (ISO 25010³) the degree to which a component or system can be used by people with the widest range of characteristics and capabilities to achieve a

² https://www.iso.org/standard/71952.html . As June 2020

³ https://iso25000.com/index.php/normas-iso-25000/iso-25010 . As June 2020

specified goal in a specified context of use. This is particularly important as the ReBUILD project addresses specific user categories, such as migrants, that are at risk of social exclusion, using technologies to tailor services provision in a pervasive and inclusive way taking into account each migrant skills and background.

Whereas the term "user" is typically understood as the person using the actual software product, in this context, it refers to the different actors participating in the action and having a relationship of cause and effect as providing inputs to the ReBUILD application.

The main focus of UAT is then to verify that the developed product meets the requirements and expectations of the different kinds of users and that they feel comfortable in using the application and performing their tasks with it.

As a result, UAT provides the developers with reports of any issues, change requests, or even, in some cases, requests for new functionalities which did not appear in the use case analysis. The UAT feedback then, constitutes the input for refinement of the product.

The piloting phase (year 3) of the ReBUILD project will be seeking the final acceptance of the ReBUILD toolbox and companion application by all the involved users in real case scenarios.

2.6.2 Validation Criteria

In particular, the UAT feedback shall enable to measure the degree of validation of the MVP ReBUILD toolbox, that is to which extent the product is working for all the users and is meeting their requirements. For the purpose of this user testing, a validation response is sought for the following criteria:

- Concept: the overall understanding of the process (input and output) by the users
- Services: the tool is effectively matching each given service implemented processes
- Usability: the tool allows a seamless user experience and is self explanatory
- Response time: the time-length of the processes is in line with the expectations

2.7 UAT TEMPLATE

The Service Blueprint and the scenario based provide the necessary elements to elaborate a UAT template, namely:

- User and User Roles: these are clearly identified in the Services Blueprint depending on the use case scenarios (i.e. beneficiary, LSP, intermediary, volunteers)
- Test Cases, stories: these are embodied in the Phases of the Service Blueprints and generically divided in: "Awareness", "Onboarding", "Recommended Procedure, information or suggestions", "Closing".
- Language/visuals: as UAT is not performed by professional testers, but actual users, the Rebuild Companion does not make assumptions on the language skills of the user, as immigrants or refugees are not necessarily fluent in the language of the destination country or could be illiterate. In this respect, specific features are developed in WP4, including scripted multimedia and pictograms.
- UAT template: a tool guiding the user through the use case scenario as per the Service Blueprint. As users cannot be expected to execute test cases and report the issues like professional testers, it may be necessary to organize adequate support to ensure a usable test reporting.
- Hands-on Test documentation/training: a simple set of material (printed or video) guiding the users through the phases of the test cases. The offering of a "guided" introduction or training to the software will depend on the actual situation at the time of the testing (lockdown, restrictions, ...) and will be determined by the responsible local partner in the country.

2.7.1 Tests supporting documents

The IEEE developed the 829 Standard for Software Test Documentation for any type of software testing, including User Acceptance Testing, that can be adapted to the Rebuild toolbox user testing. The standard includes different types of supporting documents, which can be used in three distinct phases of software testing: preparation, running, reporting.

As the tests are to be conducted based on use cases scenarios, at the level of the end users, for each of the use cases phases, the Test Plan will include:

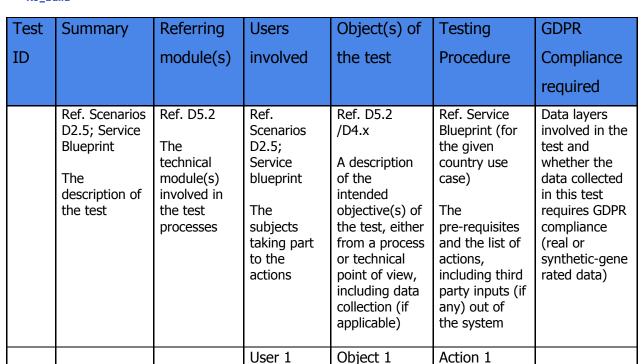


Table 3. Test description

Object n

Action n

User n

Test	Description	Input	Action	Expected	Pre-	Result	
ID				Output(s)	conditions		
	Description of the action and procedure for the users	Ref. Service (for the give use case) Description of expected use and actions	n country of the	As expected in the Service Blueprint, description of the expected output(s)	Assessment of actual pre-requisites of preconditions	Assessment of the matching, ref. Service Blueprint / User feedback / Validation	

Table 4. Test file

2.8 PROVISIONAL TEST SCHEDULE

As mentioned hereinabove, the tests will be conducted in autumn 2020 and will last for at least a month. The user test phase will be preceded by a preparatory phase, to set up the UAT test plan:

- Mobilization of the relevant stakeholder: depending on the scenarios:
 - o the LSP, for preparing for the test scenarios, which may involve different persons/services/offices;



- o the migrants or refugee-groups (possibly involving those who participated in the co-design workshops)
- o supporting persons/organizations (volunteers, third-party services)
- Mapping of the Test objectives by the development partners, in particular to define as clearly as possible, the objective of the single test, any particular testing procedure, and the desired expected result.

Tests will be organized locally in the target countries by the pilots' consortium partners. In this view, informational material allowing (as much as possible) for self-testing will be prepared in order to minimize the need for direct assistance: App and scenario leaflets, and short explanatory videos.

At the end of the test phase, a final event is expected to be organized in the target countries so as to enable an consultative first-hand exchange on the tests findings. This will close the testing phase, and virtually launch the third phase of the ReBUILD project, the Pilots.

Test phase	Period
Local Service Providers engagement for test phase setup (Italy, Spain, Greece), populating the app with local services	July - September 2020
Target users outreach and test phase startup (Pilot partners in ReBUILD organizing target groups, no launching event)	September - October 2020
Information gathering and insights from users and LSPs directly through the application	November - December 2020
Wrap-up and restitution events with users and LSPs - validation of findings and participatory design sessions for elaborating and informing next phase	January 2021

Table 5. Main testing phases

				Nov	Dec
Access to National Health System					
Local Service provider		Χ	X		
Migrant Test Group			Χ	Χ	X
Medical appointment					
Local Service provider		Χ	X		
Migrant Test Group			X	Χ	Χ
Access to Social Mentoring					
Local Service Provider		Χ	Χ		
Migrant Test Group			Χ	Χ	Χ
Access to Language courses					
Local Service Provider		Χ	Χ		
Migrant Test Group			X	X	X
Access to Higher Education					
Local Service Provider		Х	Χ		
		^		V	V
Migrant Test Group			X	Х	X
Support to Job Seeking					
Local Service Provider		Χ	Χ		
Migrant Test Group			X	Χ	X

Figure 3. Detail of planned test periods

REFERENCES

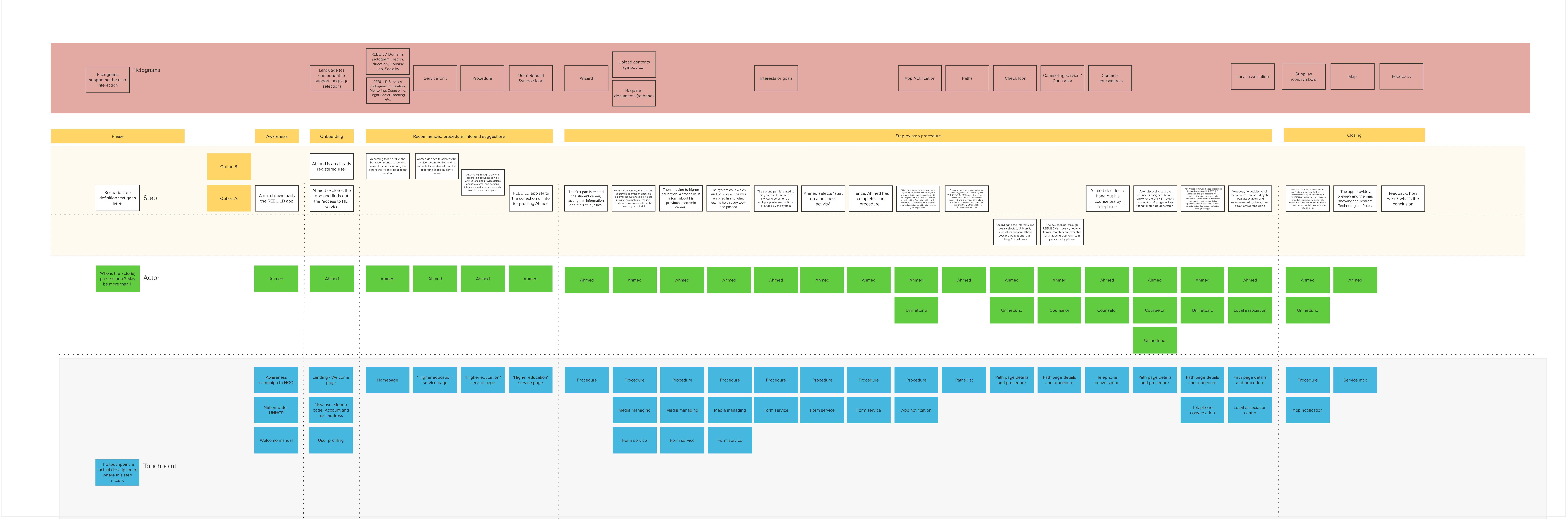
- Designing Services That Deliver, G. Lynn Shostack, 1984, Harward Business Review, https://hbr.org/1984/01/designing-services-that-deliver
- User Acceptance Testing: A Step by Step Guide, B. Hambling, P. van Goethem,
 2013, Swindon: BCS Learning and Development Ltd. ISBN 978-1-78017-167-8
- Scenario-Based Design: Envisioning Work and Technology in System Development,
 J. Carroll, 1995, Wiley

ANNEX 1 - SERVICES BLUEPRINT

- Rebuild_Blueprint Education
- Rebuild Blueprint Access to available job positions
- ReBUILD_Blueprint_Access to language courses
- Rebuild_Blueprint_Access to the national health system
- REBUILD_BLUEPRINT_ITALY ACCESS TO THE NATIONAL HEALTH SYSTEM CIDAS
- REBUILD_BLUEPRINT_CIDAS SOCIAL HOUSING
- ReBUILD_Blueprint_Italy_Spain Mentoring programme Counseling
- REBUILD_BLUEPRINT_SPAIN ACCESS TO SOCIAL MENTORING

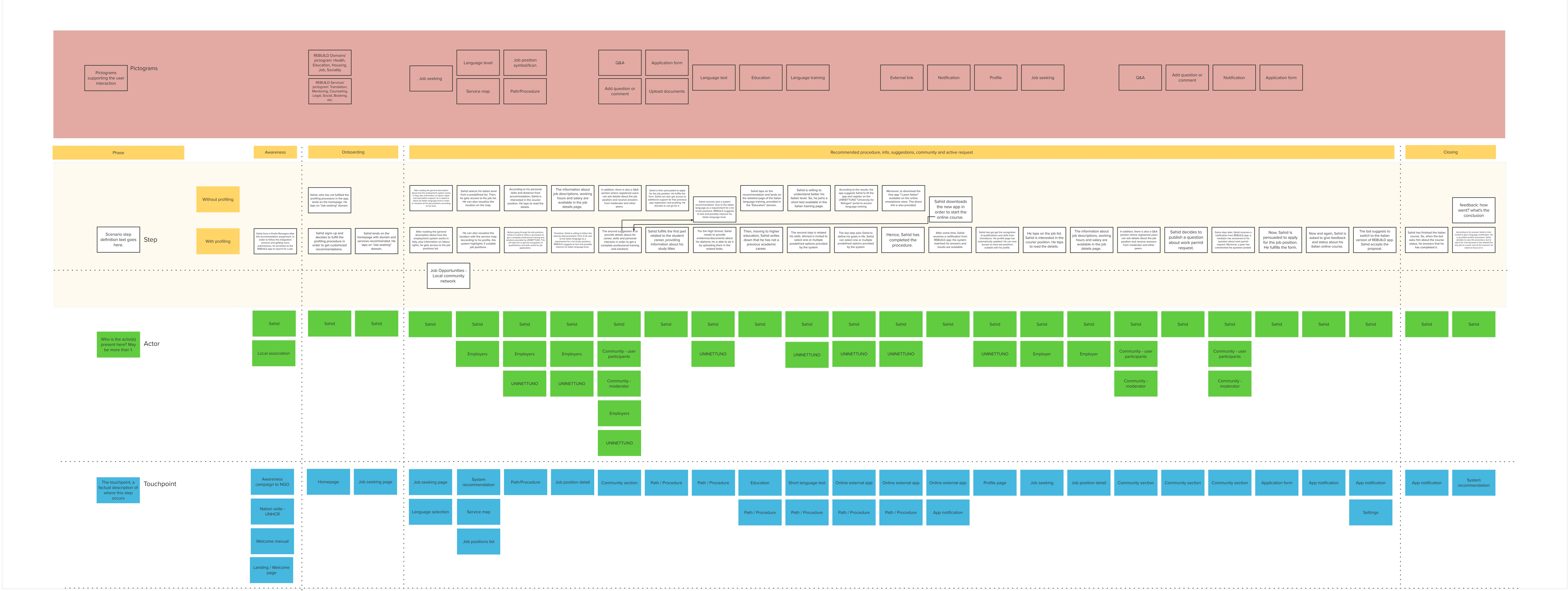
Education

Access to Higher Education - Skill Matching & Counseling service



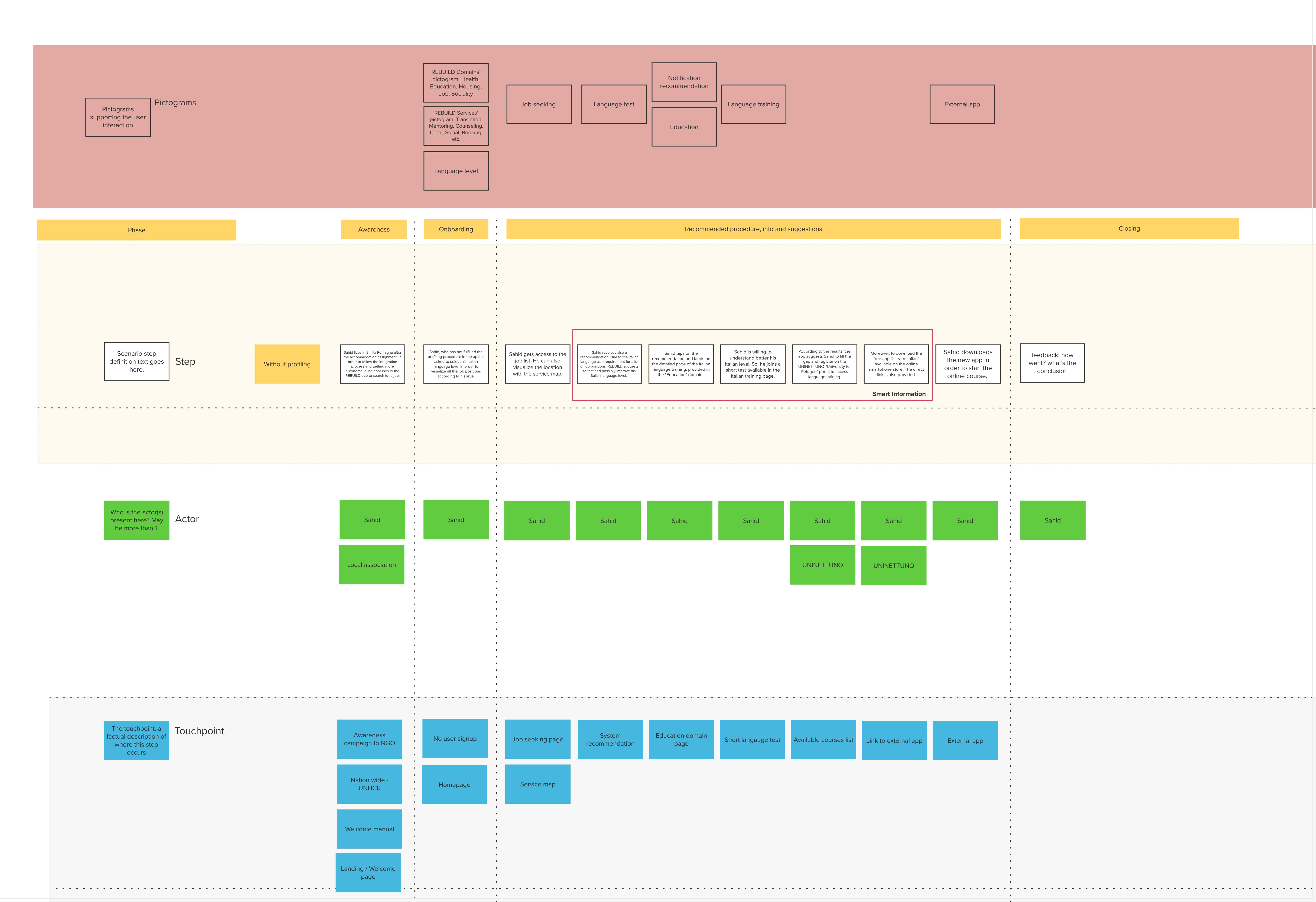
Access to available job positions

Sahid, as a migrant, looks for effective access to job opportunities in his new country



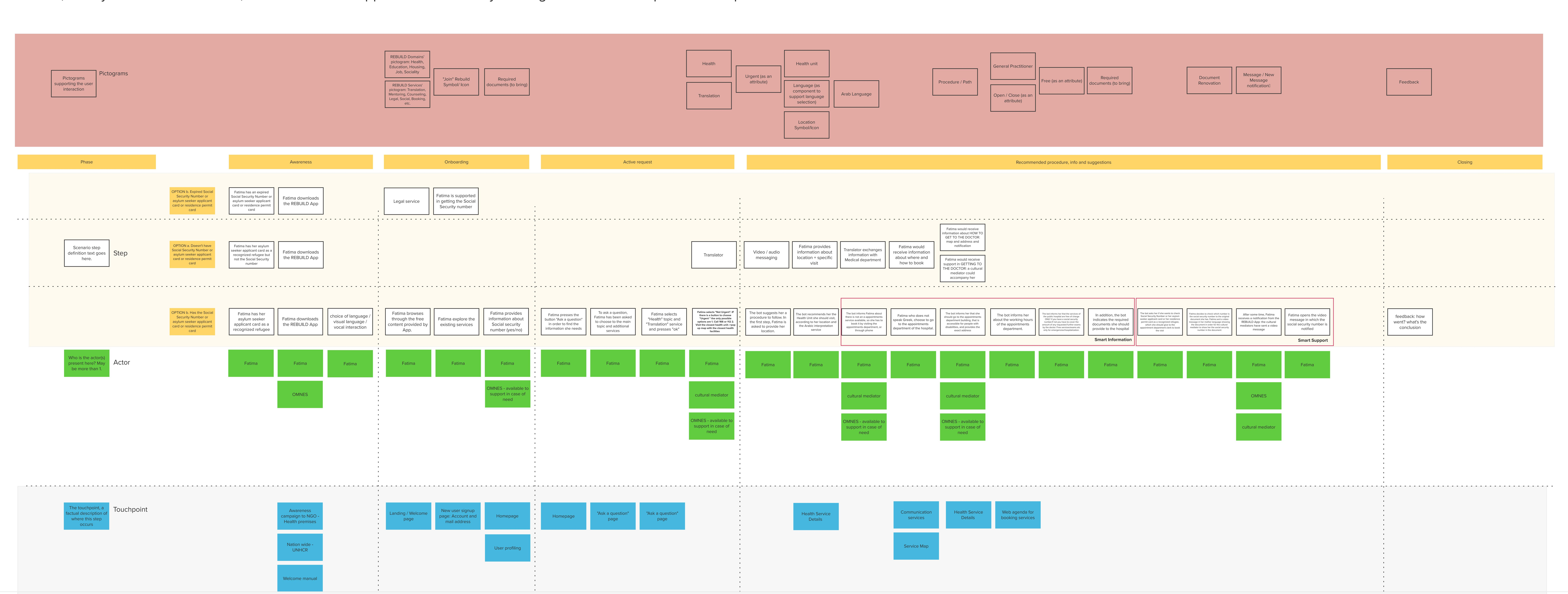
Access to language courses

Sahid, as a migrant, needs to learn Italian for a faster and effective access to other opportunities in his new country



Access to the national health system

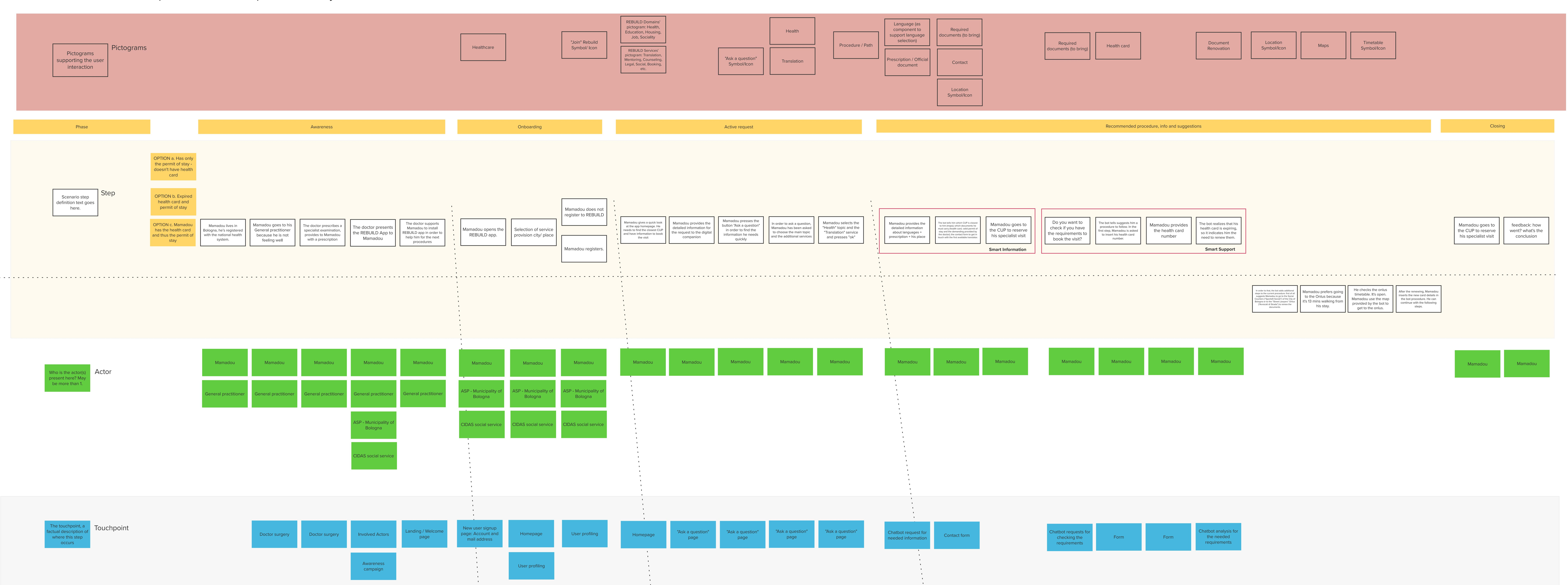
Fatima, an asylum seeker in Greece, wants to book an appointment to the Gynecologist at the nearest possible Hospital



REBUILD - ITALY

Access to the national health system - CIDAS

Mamadou has to reserve a specialist visit in the public health system.



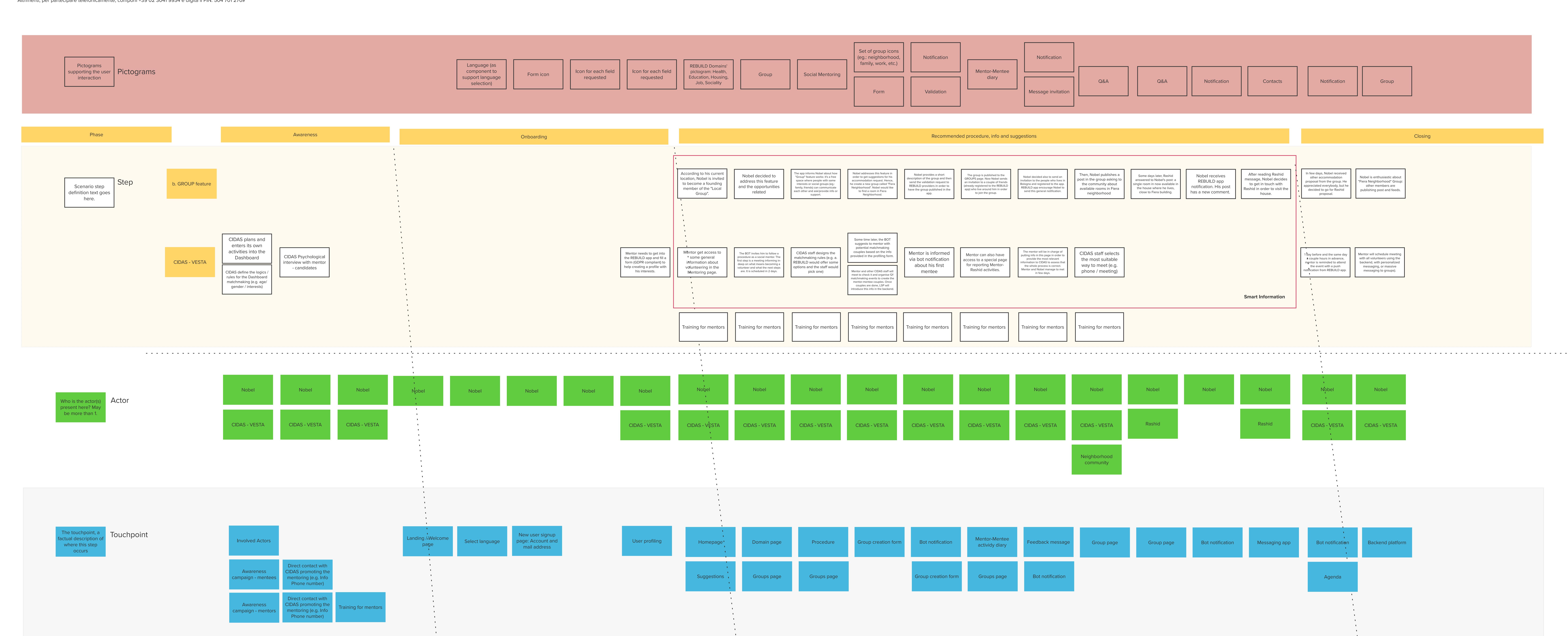
REBUILD - CIDAS

Social Housing

Nobel, as a migrant, would like to find a room in an apartment with other young people, by Social Mentor and Group support

Google Meet Link:

Per partecipare alla riunione video, fai clic su questo link: https://meet.google.com/tmk-aoab-ome



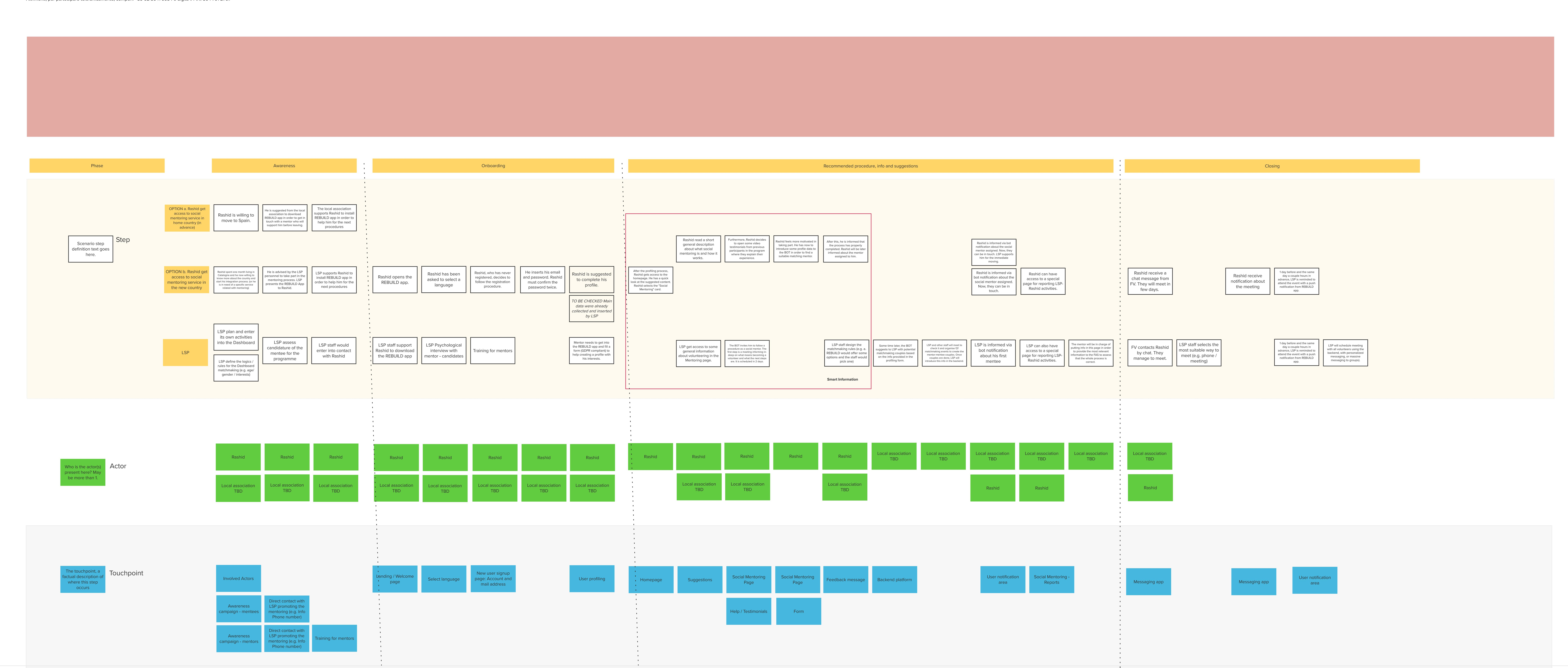
REBUILD - ITALY - SPAIN

Mentoring programme - Counseling

Rashid is proposed to take part in the mentoring programme - counseling with volunteers from Local Associations in order to better understand local culture, but also having someone to help him in his daily life.

Google Meet Links

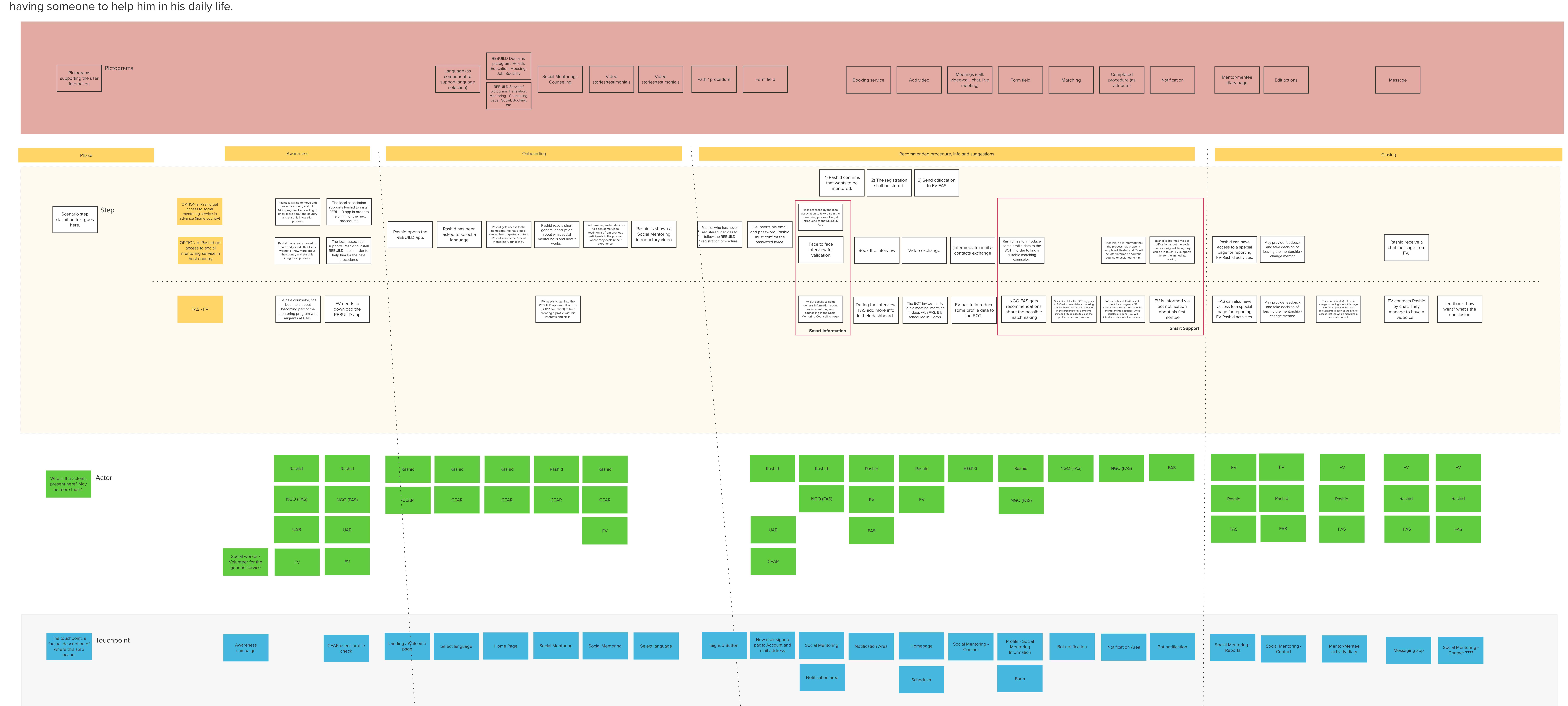
Per partecipare alla riunione video, fai clic su questo link: https://meet.google.com/tmk-aoab-ome Altrimenti, per partecipare telefonicamente, componi +39 02 3041 9934 e digita il PIN: 504 701 270#



REBUILD - SPAIN

Access to Social Mentoring

Rashid is proposed to take part in a social mentoring with volunteers from FAS in order to better understand local culture, but also having someone to help him in his daily life.



ReBUILD

ICT-enabled integration facilitator and life rebuilding guidance

Deliverable: D6.1 Test Strategy



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