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Improving access to psychotherapy in a digital age: an exploratory design study based on five studio classes

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Abstract: Despite the efforts of governments, psychotherapy remains underused. Drug prescriptions are rising continuously in developed countries. Startups emerged over the last years, offering mostly online therapy services, but they strengthen the divide between the ‘online’ and the ‘offline. To tackle the multifaceted problem of psychotherapy and to avoid ‘digital dualism’, the question we addressed during three years is: ‘What design can do for psychotherapy in a digital age?’ From Fall 2016 to Fall 2018, we offered five student cohorts to work on this question in design classes. In this paper, we explain what is the problem with psychotherapy (section 2), how we conducted the five studio classes in order to explore this problem (section 3) and what are the main ideas resulting from this exploration (section 4). Finally we discuss the results both from an educational and research perspective (section 5).

Keywords: psychotherapy; mental health; e-health; design; studio class

1. Introduction

Drug prescriptions in the treatment of mental disorders are rising continuously in developed countries. However, for most common mental disorders such as depression or anxiety, psychotherapy is more effective and longer-lasting than medications. Some governments tried to curb the decades-long increase in antidepressant prescription rates, for instance in the UK with the *Improving Access to Psychological Therapies* program. But psychotherapy still remains underused. More than 300 million people are now living with depression worldwide, and nearly 50% of them do not get treatment (World Health Organization, 2017). If we want to improve the mental health of populations, it is essential to improve access to psychotherapy. In parallel, the emerging field of mobile mental health (Harrison et al., 2011) seems very promising in order to address the treatment gap (Chandrashekar, 2018). Mental health mobile apps are booming (Anthes, 2016) and are widely promoted as an opportunity



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to expand the availability and quality of mental health treatment (e.g. by the National Institute of Mental Health in the US, the National Health Service in the UK, or the Mental Health Commission of Canada).

Initiated in France in 2016, the research project PSYDIA (“**PSY**chotherapy in the **DI**gital **A**ge”) is a project-grounded research (Findeli, 2010) in interaction design and mental health that aims to improve access to psychotherapy through a mobile app. This paper is about the early stage of the project, which tackles this question: To what extent can digital technologies improve access to psychotherapy? How can we improve access to psychotherapy with a mobile app? What design can do for psychotherapy in a digital age?

We tried to address this question with students through five design studio classes. Our aim was not to provide a solution by the output of design student workshops, but to explore a large number of design ideas and to identify the most recurrent and relevant of them in order to guide further research towards meaningful solutions. The five classes have been developed during three academic years between Fall 2016 and Fall 2018: two in a bachelor of design program, three in a master of service design program.

In this paper, we explain what is the problem we wanted to address with students about psychotherapy (section 2), how we conducted the five studio classes in order to explore this problem (section 3), what are the design ideas resulting from this exploration (section 4), and finally we discuss the results both from an educational and research perspective (section 5).

2. Background: the problem with psychotherapy

2.1 Psychotherapy is effective, medication is on the rise

Drug prescriptions in the treatment of mental disorders are rising continuously in developed countries, and psychotherapy is continuing to lose market share to medication. For instance, in the US from 1998 to 2007, among individuals receiving outpatient mental health care, use of only psychotherapy (-5.4%) as well as psychotherapy and psychotropic medication together (-7,9%) declined, while use of only psychotropic medication increased (+13,3 %) (Olfson & Marcus, 2010). Decline is occurring as the evidence base for talking therapy has grown. For most common mental disorders such as depression or anxiety, psychotherapy is more effective and longer-lasting than medications, and is a more cost effective intervention in the long term (American Psychological Association, 2012). Furthermore, if given the choice, people express a 3-times-greater preference for psychotherapy over medications, because of medication side-effects and individual differences (McHugh et al., 2013).

2.2 Unmet psychotherapy needs and mental health facts

Considering this situation, some governments tried to curb the decades-long increase in antidepressant prescription rates, for instance in the UK with the *Improving Access to Psychological Therapies* program conducted by the National Health Service, or in Canada with the *Québec Psychotherapy Program for Mental Disorders* (PQPTM). However,

without the support of powerful industrial lobbies like those in the pharmaceutical sector, psychotherapy remains underused. Only in Canada, the cost of covering the unmet psychotherapy needs of Canadians is estimated at \$1.24 billion per year (Mental Health Commission of Canada, 2017). In addition, more than 300 million people are now living with depression worldwide, an increase of more than 18% between 2005 and 2015, and nearly 50% of people with depression do not get treatment (World Health Organization, 2017).

2.3 A multifaceted problem with eight major issues

If we want to improve the mental health of populations, it is essential to improve access to psychotherapy. Such a challenge remains very difficult to overcome since the problem is multilevel. We have identified at least eight major issues that make it complicated:

1. **Prices:** the average cost for a regular therapy session is \$75-150 (USD) in the US, €40-80 in France, £50-80 in the UK, or \$80-130 (CAD) in Quebec. For “top therapists”, it can jump to \$200-300 in New York City or £150-220 in London.
2. **Health systems:** there are very low health insurance reimbursement rates for therapy; most often, it is not covered by public health systems, or just for a few cases.
3. **Research:** with its various theoretical models of human mind, psychology fails to fully embrace an evidence-based approach, reinforcing the biomedical model in psychiatry.
4. **Marketing:** there is an important influence of direct-to-consumer drug advertising.
5. **Prescription:** it’s easier to write a prescription than try to find or help find a therapist.
6. **Ethics:** people feel stigmatised with mental illness and it’s hard to fight against that.
7. **Societal trends:** in a digital age where everything goes faster than ever, people want a quick fix, avoiding waiting lines.
8. **Technology:** new hopes come with Big Data, AI or robots for mental health, but coming with new ethical challenges related to data privacy and security.

2.4 Online therapies market

For the last 10 years, an online market for mental health has slowly emerged, especially in telehealth or teletherapy, trying to fix the price and waiting line issues. Beyond the increasing number of mental health apps dedicated to various self-management tools (stress, anxiety, mood, sleep...), a specific approach to psychotherapy has appeared: online therapy services. A range of startups have been founded, mostly in North America, for instance *Breakthrough.com* (USA, 2009) — acquired in 2014 by MDLIVE —, *MyTherapistMatch.com* (USA, 2009), *iCouch.me* (USA, 2010), *Ginger.io* (USA, 2011), *Talkspace.com* (USA, 2012), *BetterHelp.com* (USA, 2013), *Mindstrong.com* (USA, 2013), *Meetual.com* (Canada, 2015),

Foresightmentalhealth.com (USA, 2017). More recently, in Europe, a new app-based service for meeting doctors through video – *Kry.se* (Sweden, 2015) – launched an online psychology service and is now expanding in European markets such as France (*Livi.fr* is the french version of *Kry.se* and was launched in 2018). In 2019, as a sign of the growing emerging market in the field, a VC fund investing primarily in mental health was founded in the US (*Whatif.vc*). His founder, Stephen Hays recently tried to map the mental health startup landscape (Hays, 2020). It’s not yet comprehensive, but quite impressive: he could find 717 startups (Figure 1).

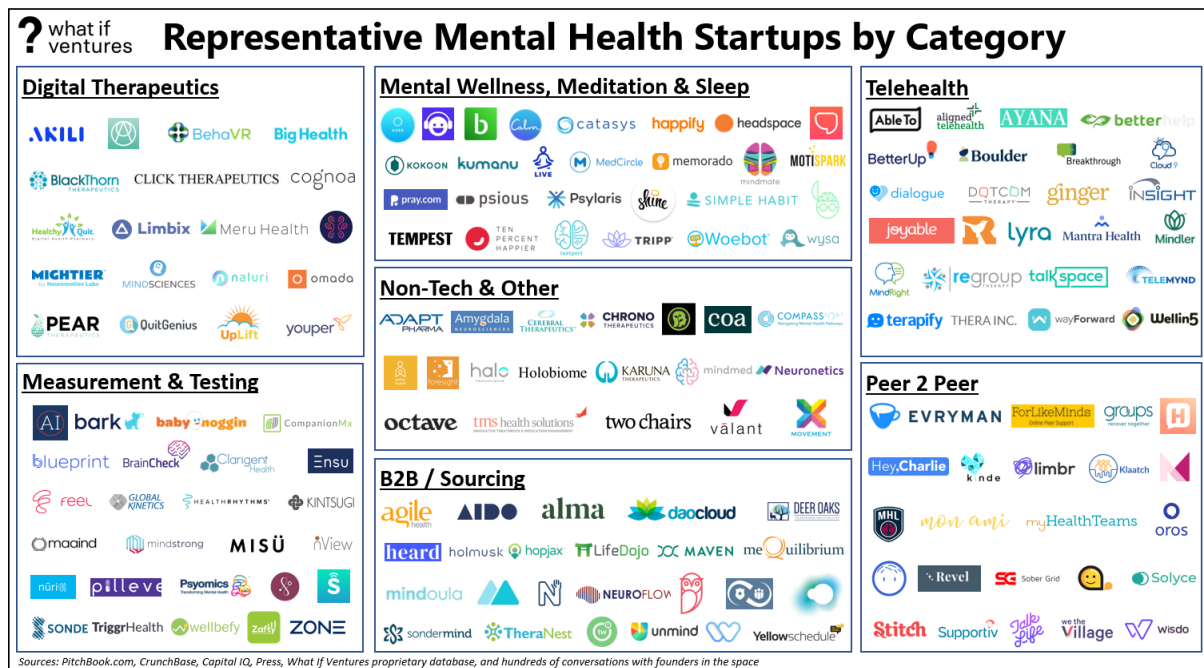


Figure 1 Mapping the Mental Health Startup Landscape, by Stephen Hays (2020) © What if ventures.

As we can see in Figure 1, Telehealth is only one area — the one addressed in this paper — of the mental health startup landscape, in which Hays says he found in total 114 startups. Such a landscape would need further research and analysis, but as a preliminary observation, we can mention that most of these startups offer online therapy in opposition to in-office practice — sometimes trying explicitly to put out of fashion face-to-face therapy in their communication. Some of them (e.g. *Talkspace.com*) dictate the therapy prices to therapists (payment is no more under their control) or control access to client records (therapists know patients only by their username and don’t have access to their contact information). Others (e.g. *BetterHelp.com*) share data with Facebook about how often a person is going to a session, when he/she booked appointments, his/her approximate location, how long he/her was chatting on the app (Osberg and Mehrotra, 2020). Perhaps because they do not use a codesign approach, many mental health startups are missing a deep understanding of stakeholders needs (patients, therapists, caregivers, health system professionals and many other actors of such a complex field). As well said by Prof. Paul Yock, “the ‘move fast and break things’ approach that works in tech doesn’t translate well to healthcare” (Yock, 2018).

2.5 Beyond the divide: avoiding digital dualism

“Online therapy” is a term that presupposes a divide between the online and the offline, the digital and the physical. Talking about “online therapy” means separating “online therapy” from “offline therapy”. Research has shown that “digital dualism”, a view of the digital and physical as separate spheres, is a fallacy (Jurgenson, 2012) and that the distinction between the real and the virtual is faulty (Bonenfant, 2011 ; Vial, 2019). If it could make sense at the beginning of the computer era and of the internet in the 1980s and 1990s (Turkle, 1984), today it is no longer possible to separate digital users from non-digital ones: they are the same persons, living an unbroken experience that is partly online, partly offline.

As postphenomenology studies show, technologies always play a mediating role in human experience (Verbeek, 2015) and human perception (Vial, 2019). Psychotherapy is not only a treatment, it is also a user experience, which is always technology-mediated, either it happens online (with screens and interfaces) or offline (with walls and chairs). In this research, we assume that improving access to psychotherapy in a digital age is based on a subtle and creative mix of digital and non-digital solutions. Exploring what design can do for psychotherapy in a digital age means going beyond the merely online therapy approach.

3. Cases: five design studio classes

Ideation is widely recognized as one of the core strengths of any design activity (Brown, 2008; Mulgan, 2014). Designers brainstorm, explore new ideas, expand alternatives. From Fall 2016 to Fall 2018, we conducted an exploratory study through five design studio classes involving 102 students during 3 academic years, making a total of 69 projects delivered within 181 hours of classes (Table 1).

Table 1 Overview of the 5 design studio classes

#	Term	Program	Class duration	Students	Mode	Projects
01	Fall 2016	Bachelor	50 hours	40	in team	12
02	Fall 2016	Master	27 hours	9	individual	9
03	Fall 2017	Master	27 hours	7	in team	2
04	Fall 2018	Bachelor	50 hours	32	individual	32
05	Fall 2018	Master	27 hours	14	individual	14
Total			181 hours	102 students		69 projects

The expected result was to discover innovative ideas that can address one or several of the eight major issues that have been identified in this research (Section 2.3) and that have been presented to students at the beginning of each class. Especially, we expected ideas about how to experience psychotherapy in a way that is easier, less stigmatizing, less expensive, and more powerful (i.e. able to reach much more people in need).

In this section, we will describe the design activities that were implemented with the students, how they were organized, which stakeholders were involved, what were their goals, and what kind of deliverables were produced. In order to do so, we will refer to Kees Dorst's "descriptive framework" of design (Dorst, 2008), according to which there are four elements in any design activity: the object, the actor, the context and the process.

3.1 Object

The design question presented to the students was the following: what design can do for psychotherapy in a digital age? In order to address this question, students were asked to create an app prototype. Not an app prototype that would be a ready-made operational solution, but that would explore and open possibilities, or push the limits.

The purpose of these classes was both education-oriented and research-oriented.

From an educational perspective, these classes aimed to: 1) approach interaction design through a social design lens thanks to a mental health care topic; 2) develop skills in UX/UI design methods and in the design of qualitative user experiences; 3) offer students the opportunity to contribute to a research project through a design class that is research-driven.

From a research perspective, these classes aimed to: 1) generate a large number of ideas on how to improve access to psychotherapy through a mobile app from the perspective of young connected people; 2) get inspiration in order to guide further research towards meaningful solutions for the design of the Psydia app.

Regarding the object, students were asked to integrate two main requirements:

- 1) to address one or several of the eight major issues previously identified (Section 2.3); in the last year, for the classes 04 and 05, students were specifically asked to address issues 1 (Prices) and 2 (Health systems) related to financial access to psychotherapy;
- 2) to take for granted that it is more relevant to mix digital and non-digital solutions than offering merely online services (Section 2.5).

3.2 Context

The five studio classes took place at the University of Nîmes, in Southern France. Two of them were developed within the third and last year of the Bachelor of design program with Concentration in "Design and digital culture", within the main design studio course of the Fall term. The three others were developed within the first year of the Master of design and social innovation program, within the short course "Service design and digital technologies" of the Fall term. In France, a university course can last the whole term or not. In this case, it was not. The duration of each course was quite short (Table 1). For most of students, it was their first course in interaction design.

Regarding the context, the students were asked to imagine that they were working on an innovative project within an incubator or accelerator, as if they were social designers-entrepreneurs who would launch their own business.

3.3 Actors

The class was led most of the time by the lead researcher and professor alone (classes 02, 03, 04, 05), and sometimes in co-teaching with other design instructors (class 01). The design projects were all conducted and executed by students, either individually (02, 04, 05) or in teams (01, 03) (Table 1). For few classes (03, 04, 05), students had to make an interactive prototype and to conduct interviews with potential end-users in order to test it. Around 15 persons were invited in class, most of them were random people on the campus such as students or teachers from other departments. In addition, mental health professionals were invited from time to time as counselors, either at the start of the project in order to present their activity and inspire students (Figure 2), or at the end as jury members (Figure 3).

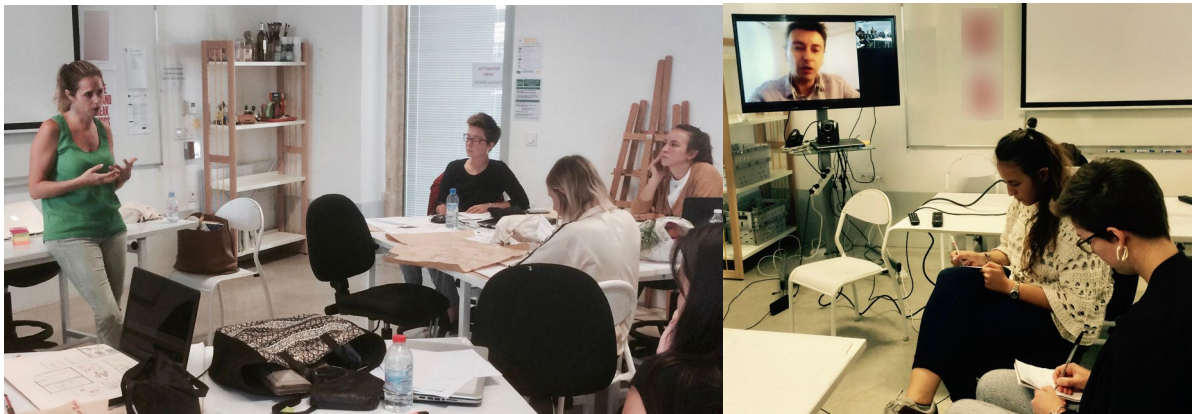


Figure 2 *Psychologists presenting (in-person or remotely) their practice to master students (September 15 and 21, 2016).
Psychologist 1 (on the left): Marion Logerot. Psychologist 2 (on screen on the right): Rémy Potier.*



Figure 3 *Jury session in the bachelor program with a psychologist, a co-teacher and students (November 24, 2016).
Psychologist (on the left): Emmanuelle Toujas. Design co-teacher (both images): Benjamin Servet.*

Regarding the actors, students had to explore one or several of the three following options:

- 1) to connect patients with psychotherapists;
- 2) to connect patients with patients;
- 3) to connect psychotherapists with psychotherapists.

3.4. Process

Entitled RESPY for “**REde**Signing **PsY**chotherapy”, the project of the two first classes (01, 02) was organized as a classical studio in a service design program, based on a design brief. After a presentation of the problem with psychotherapy (Section 2), including presentations and testimonials from invited psychologists, the students were asked to imagine how to reshape the experience of psychotherapy through an app-based service.

The requested deliverables were quite conventional and in accordance with established practice in service design (Table 2), including personas, customer journey maps, wireframes and graphic mockups (Figure 4).

Table 2 Overview of the deliverables from the 5 design studio classes

#	Term	Program	Deliverables
01	Fall 2016	Bachelor	Personas, journey maps, paper wireframes, mockups, jury presentation
02	Fall 2016	Master	Use cases, personas, paper wireframes, final presentation
03	Fall 2017	Master	Design sprint: journey map, sketch, storyboard, prototype, interviews
04	Fall 2018	Bachelor	Design sprint: journey map, sketch, storyboard, prototype, interviews
05	Fall 2018	Master	Design sprint: journey map, sketch, storyboard, prototype, interviews

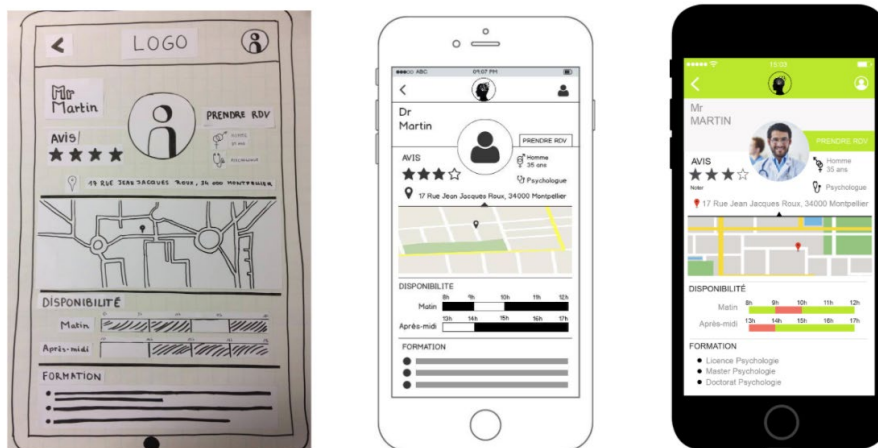


Figure 4 Paper wireframe / Screen wireframe / Graphic mockup, by a bachelor student (November, 2016)

Entitled PSYDIA for “**PSY**chotherapy in the **DI**gital **Age**”, the project of the three last classes (03, 04, 05) was organized as a design sprint (Knapp et al., 2016), a five-day process

for addressing a long-term goal through design, prototyping and testing through user interviews (Figure 5). In order to adapt the sprint process to each class schedules, it was sometimes shortened with only half a day for each day-step (classes 03 and 05) or extended with several days for each day-step (class 04). It was also adapted so that students can do projects either individually or in teams.

For each class, the long term goal systematically offered to students was the same: “how to give more power to psychotherapy?”. In 2018 (classes 04, 05), it was a bit more specific by focusing on the financial aspects of accessing to psychotherapy: “how to improve access to psychotherapy and how to help people fund it?”. This question of funding was explicitly related to two of the eight major issues: the ones of prices and reimbursement (Section 2.3).



Figure 5 Master students in a design sprint in class, overview of the 5 steps (October-November, 2017).
User interview: random user Susana Paixão-Barradas (left) with design student Marylou Planchon (right).

Although the design sprint format sounds like a questionable trend, there is some great value in it both for educational purposes (make students produce something very quickly) and for research purposes (generate a lot of ideas in a short time in order to explore a problem). During these design sprints, students often said they were surprised by themselves with all that they made in only a few days, compared to other classes lasting all the session.

Regarding the process, students had to explore one or several of the 3 following stages:

- 1) before therapy;
- 2) during therapy;
- 3) after therapy (ended).

4. Results

4.1 General overview: very various ideas generated by students

Through the three-years exploration among the five design studio classes, a large range of ideas have been generated by students in order to address our initial question “What design can do for psychotherapy in a digital age?”. They are presented as raw data in Appendix 1, where all projects are numbered from P1 (Project 1) to P69 (Project 69). A few general comments can be made at first glance.

Not all students really understood the design question and the two related main requirements (Section 3.1). As an example, we can mention here the My Psy project (P24), which offers just another online therapy service “as usual”, with a design that fits more a service for meeting physicians than therapists. Many students had the same commonplace ideas, such as finding a therapist through a map, checking his/her profile and making an appointment (for instance, P11, P25, P27, P43, P47, P64). As an example, we can mention here the Sporty psy project (P27), which is quite well designed for a bachelor student who never took an interaction design class before.

Some students had the same commonplace ideas but enriched them with a more original one, such as a follow-up tool for the therapist (P2); a focus on patient orientation (P5); a patient questionnaire or mood test or symptom description or diagnosis test (P8, P12, P31, P35, P44, P46, P48, P53, P54, P62); a focus on a specific disorder (P9); a focus on a better information on therapy or mental disorder (P34, P38); a focus on a friend recommendation or friend help (P36, P65, P67); or an orientation video call (P61). We can mention here the **E-Psylon** project (P2), that offers clear patient profiles management for the therapist with integrated clinical notes on each patient; or the Perfect Psy project (P61) that offers a video call for the first contact and then bring to see a therapist face-to-face.

In the last year (classes 04 and 05), when they were asked to address financial issues such as prices (issue 1) or health systems support (issue 2) (Section 2.3), some students successfully tried to tackle the complex problem of funding therapies (P29, P33, P35, P46, P49, P57, P65, P66, P67). We can mention here the À vos dons project (P66), which offers patients, in a very poetic way, to pay a bit more each therapy session by adding a kind of tip that goes to a collective nest egg represented as a tree; or the Online therapy project (P46) which offers to match patients with therapists through a symptom description test and offers reimbursements via partnerships with mutual funds.

Finally, a few students came with very original and atypical ideas, sometimes a bit weird, sometimes very relevant. We can mention here: a patient record sharing at the emergency room (P3); an access to psychotherapy for migrants and refugees during their journey (P6); a taxi service to go to the nearest psychotherapy center (P10); a psy speed-dating-like service (P18); a psychotherapy service for LGBT+ (P26); a service aimed to funding your therapy in exchange for service in a non-profit (P33); a service for reducing the cost of psychotherapy by watching commercial videos (P45); a mental health self-management tool (P56); a chatbot (P63); online circles for relatives (P69).

4.2 Synthetic overview: five main categories of ideas

Ideas generated by students can be sorted in five main categories:

Ideas related to **information, orientation and online support**: everything that helps suffering people understand the complex field of mental health and therapies, trust a therapist, find reliable information, get online help from peers or professionals...

Ideas related to **search and appointment**: everything for finding a therapist, making an

appointment, getting in touch with him/her, which includes typically features such as cartographic search, scheduling, messaging...

1. Ideas related to **supporting the therapy process**: everything that helps patients keeping engaged in therapy after started, such as mood follow-up, private notes, video calls between two sessions, and that keeps patients and therapists connected.
2. Ideas related to **focusing on targeted people**: everything that is dedicated to specific persons and adapted to their needs, such as persons suffering from particular disorders, people with particular identity characteristics, or therapists themselves.
3. Ideas related to **costs and financial issues**: everything that helps funding and paying your own therapy, including payment process, reimbursements, financial helps, partnerships with employers or insurances.

A total of 63 in 69 projects match with these five categories. Table 3 offers a synthetic overview sorted by these five categories, in order to better understand the most repeated and original ideas and to compare ideas coming from students alone with those from teams.

Table 3 Synthetic overview of students' projects sorted by categories

Category 1: Information, orientation and online support (9 projects)		
Project type (nbr)	Individual (9)	Team (0)
Major issues addressed	Research, Marketing, Ethics	n/a
Common solutions	e.g. online personality tests, articles on mental disorders, friends groups...	n/a
Original solutions	e.g. digital kiosk in the street, ads at physicians office, therapy explorer, daily goals...	n/a
Category 2: Search and appointment (31 projects)		
Project type (nbr)	Individual (23)	Team (8)
Major issues addressed	Prescription, Societal trends	
Common solutions	e.g. find a therapist, therapist profile, appointment management...	e.g. orientation form, find a therapist, therapist profile, appointment management
Original solutions	e.g. mood diary, online diagnosis, online chat, speed-dating-like psy meetups...	e.g. car ride for joining a therapy center, follow-up tool for therapists...
Category 3: Supporting the therapy process (7 projects)		
Project type (nbr)	Individual (7)	Team (0)
Major issues addressed	Prescription, Societal trends, Technology	n/a

Common solutions	e.g. mood diary, private notes, goals to reach, video calls, shared agenda...	n/a
Original solutions	e.g. therapy organizer for patients, communicating with therapist between two sessions, feedback years after...	n/a
Category 4: Focus on targeted people (7 projects)		
Project type (nbr)	Individual (4)	Team (3)
Major issues addressed	Prescription, Ethics, Societal Trends	
Common solutions	e.g. find a therapist for kids...	e.g. online chat, appointment tools...
Original solutions	e.g. refined gender profile for LGBT+, counselling for sportspersons, SEO tools for therapists...	e.g. map of camps for migrants, goals to reach for children with ADHD, chat with mediators for harassed kids at school...
Category 5: Cost and financial issues (9 projects)		
Project type (nbr)	Individual (9)	Team (0)
Major issues addressed	Prices, Health systems, Societal trends	n/a
Common solutions	e.g. collecting money features...	n/a
Original solutions	e.g. reimbursing 50% of sessions through insurance partnership, support from employers...	n/a

Only 6 projects remain uncategorized because of their uniqueness, which are: data sharing for professionals at the emergency room (P3), post-hospitalization patient follow-up (P4), follow-up after therapy is ended (P23), associate psychotherapy to wellbeing practices (P32), becoming a “listener” and getting trained to listen to patients (P59), online counselling through a chatbot (P63). To be noticed: only 14 in 69 projects were managed in teams, all others were conducted individually. This is mostly due to the pedagogical approach since the classes 04 and 05 (46 in 69 projects) were asked to work primarily on an individual basis.

4.3 Four prototype examples

Let’s focus on four examples and comment shortly about concept, relevance, UX/UI design.

Example 1: “Ther’happier” (P35) – Category 5: Cost and financial issues *(screenshots below)*

Concept: An app for matching patients with therapists in partnership with health insurances.

Relevance: Tackling the financial issue; interesting user journey based on an orientation test before matching the patient with a therapist; avoiding digital dualism by considering a large range of practice modes (in-person, at home, by phone, online).

UX/UI design: A rather cold design, closer to the medical world, which needs improvements.

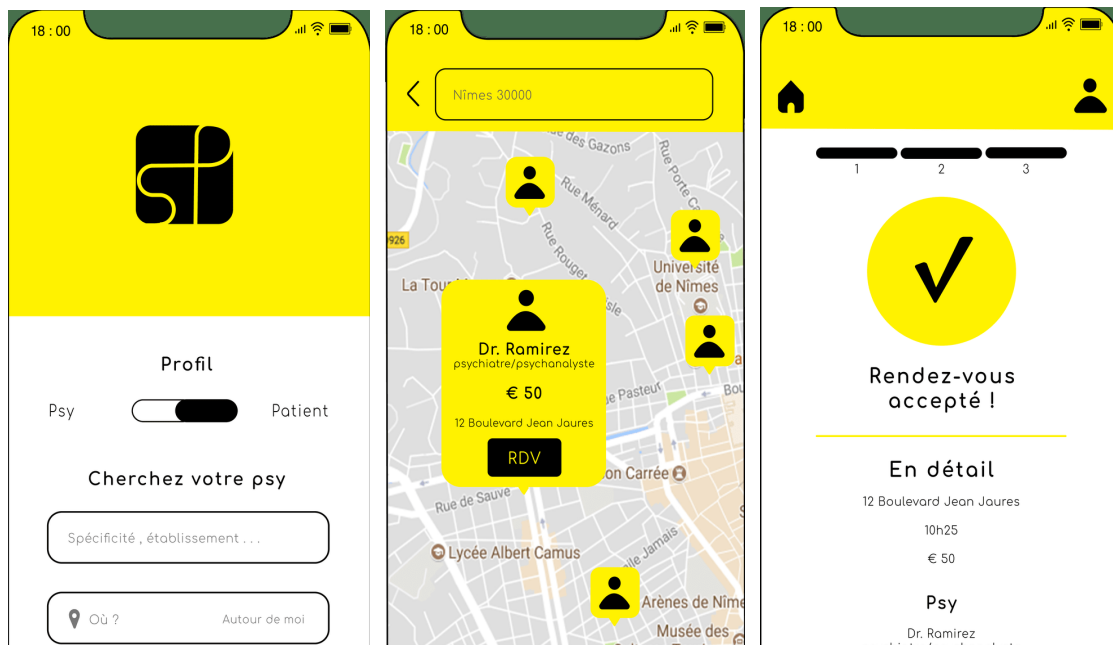


Example 2: “Sporty psy” (P27) – Category 2: Search and appointment (screenshots below)

Concept: An app for matching patients with therapists through features such as cartographic search, therapist profile, appointment management.

Relevance: Easy search and experience but no clues about why choosing this therapist.

UX/UI design: Energetic colour and clear layout, but the yellow is not so safe for accessibility.

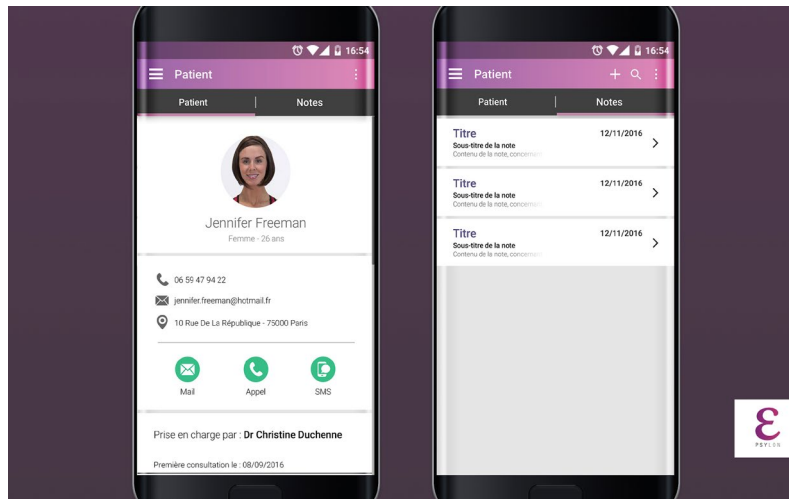


Example 3: “E-psylon” (P2) – Category 2: Search and appointment (screenshots below)

Concept: An app for matching patients with therapists with a focus on follow-up tools for therapists such as patient records and notes for therapists.

Relevance: The features focused on the therapist perspective were much appreciated by invited clinical psychologist Emmanuelle Toujas during final jury session.

UX/UI design: Clear and usable design, close to real professional quality.

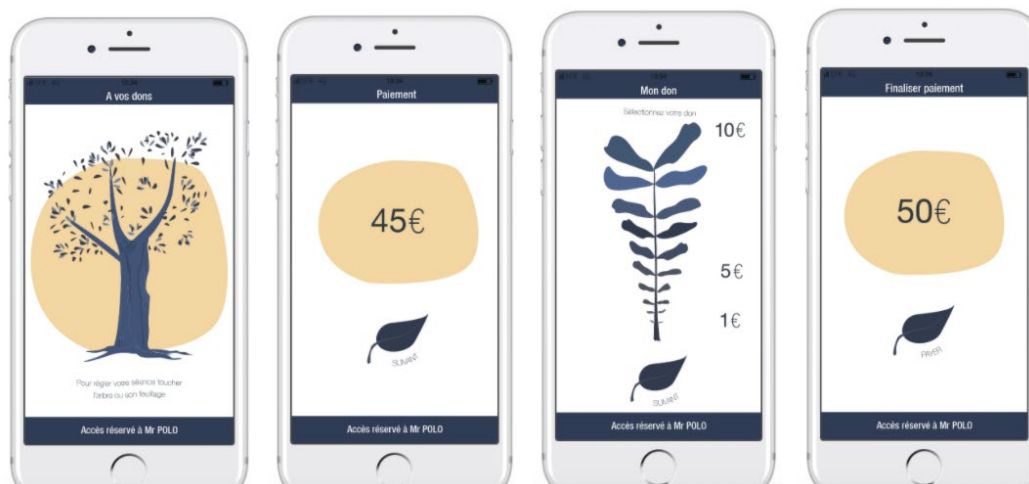


Example 4: “À vos dons” (P66) – Category 5: Cost and financial issues (screenshots below)

Concept: An app for paying your sessions and adding a tip (represented as a leaf) in order to increase a collective pot (represented as a tree) to be shared with low incomes people

Relevance: Tackling the financial issue with a very innovative and creative idea.

UX/UI design: A subtle and poetic design that gives the act of paying a sensitive dimension.



5. Discussion

This exploratory study is the first step toward a more comprehensive and in-depth research

about the question “*What design can do for psychotherapy in a digital age?*”. Conducting the five studio classes in order to address this general question, we aimed to maximize the ideation process among students to better understand both difficulties and opportunities for psychotherapy to be practiced by professionals and adopted by patients through all the possibilities that new technologies offer. In this last section, we would like to discuss a few implications of the study both from educational and research perspectives.

5.1 Educational implications

The results showed that students’ projects are structured around five main categories of ideas : 1) *Information, orientation and online help*; 2) *Search and appointment*; 3) *Supporting the therapy process*; 4) *Focusing on targeted people*; and 5) *Costs and financial issues*. From an educational perspective we explored different pedagogical *instructions and setting* that were variable from a cohort to another. *Instructions* consisted at asking students to avoid digital dualism and to focus on specific issues such as Costs or Ethics. The *setting* concern whether students work individually or in teams, and the course duration depending if sessions were either in a regular course during the semester or in a design sprint format. What we expected from these five studio classes is to discover a big range of multiple and diverse ideas addressing the eight identified issues (Section 2.3). Though, we found out that several ideas are common among different studio projects, and they only address few of the mentioned issues. We think that not all students have understood the design question they were supposed to explore, but also most of the students have answered only to a few issues. This could be one of the consequences of the difficulties students have while trying to understand psychotherapy from its different perspectives, types and practices. In fact, students approached the project being most of the time in the patient’s shoes (they naturally identified with the patient’s posture) and had difficulties to see the bigger picture. That’s why conducting more projects with codesign approach including clinicians and mental health professionals could help avoid these misleading biases and would bring more insightful data. Furthermore, students who worked in teams were more cooperating than codesigning. According to Alexiou (2010), the interactions between the participants lead to the emergence of actions and design ideas that individuals would not have in mind without this interaction. Working along with the therapist would bring students a more comprehensive knowledge about the design problems including situated knowledge from a specific field, which can only thrive in a sharing context (Goffin and Korner, 2011).

5.2 Research implications

First, the bigger challenge is to understand that addressing the question of psychotherapy in the digital age is more complex than just to design a mere digital solution (such as an online therapy service) in order to make it more accessible to all stakeholders. This is why, as mentioned above (Section 2.5), we assume that a psychotherapy is not only a treatment, it is also a user experience. Technologies always play a mediating role in human experience (Verbeek, 2015) and human perception (Vial, 2019). As such, psychotherapy is always

technology-mediated, either it happens online (with screens and interfaces) or offline (with walls and chairs). The 69 projects that raised from the 5 studio classes are a kind a proof of that, showing that from a design process' perspective it is more important to think the whole user experience before applying predefined settings ruled by conventional framing of digital uses. All students projects explicit in details how psychotherapy is deeply structured and organized by the technology that mediates the relationship between patients and psychotherapists, at all stages. For us, it is important not only to consider *but to design* the mediating role of technology instead of letting technologies dictate what psychotherapy is in a digital age and how it should be practiced. This would need deeper analysis in order to understand more exactly how this technological mediation makes a contribution to define what a psychotherapy in the digital age could be, which is our global research question.

Second, another interesting research path from this exploration is about ethical dilemmas. A lot of design situations in these 69 projects are related to ethical issues, such as the use of collected data on patients or therapists. For instance, only the Hand-up project (P40) offered to use the app without any signup. This makes questionable all the other projects that systematically require from users to register and generate a lot of personal data about their mental health. For instance, apps that offer an appointment management system will store a history of sessions, which could be a sensitive information for a insurance company or an employer. What if your employer knew that you had 60 appointments with a psychotherapist during the last 2 years? As says Rachel Metz in a recent article published in the *MIT Technology Review* about the *Mindstrong* app, "most of us wouldn't want our employers anywhere near our mental health data, no matter how well protected it may be" (Metz, 2018). Should we or should we not collect mental health data in a digital app designed for psychotherapy? What would we win and what would we lose in each case? This is an example of an ethical dilemma that was approached in this study and, of course, further research on that would be necessary.

Last but not least, this study brought us closer to our research goals, since it shed light on the success of potential paths we could take for further work. In fact, it showed that, through original projects, students were able to create mixed experiences both digital and non-digital, avoiding the traditional digital dualism that most of digital mental health services offer nowadays. This study underlines that it is totally feasible, more realistic and more relevant to design a service that join both spheres, which joins Jurgenson (2012) about the fallacy of separating the digital from the physical.

6. Conclusion

Innovation in health care requires a responsible approach involving all stakeholders. "Digital health products need to appeal not just to individual consumers but to a complicated landscape of stakeholders – from doctors and patients to regulators and insurers" (Yock, 2018). This is why most of digital health startups fail, because "they apply a strategy to healthcare that was developed and refined in the tech sector" (Yock, 2018). For the same

reasons, most of mental health startups develop online therapy services without addressing the complex and multifaceted problem of therapy nowadays. The exploratory study that we conducted with 102 students during 3 academic years has resulted in 69 projects offering many inspiring ideas for the future of psychotherapy in the digital age by avoiding the pitfalls of digital dualism. This is due to our theoretical approach, that helped avoid “preconceived ideas about what a solution should look like” (Yock, 2018). However, it was a first step and, in order to fill in the gaps of this study such as the patient-centered tendency of our students, the next step of the research will consist in a series of codesign workshops with clinicians.

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Appendix

List of the all ideas generated through the 69 projects

NB. For classes 04 and 05, prototypes are interactive and still available online (project name is clickable).

#	Projet name	Main idea	Main features in the app
Class 01 (Bachelor) - Teams			
P1	Cognitivo	improving social inclusion of children with ADHD	goals to reach, events, chat
P2	E-psylon	matching patients with therapists with a focus on follow-up tool for therapists	find a therapist, therapist profile, appointment management, notes for therapist
P3	Hopiccop	better tracking patient records and data sharing for professionals at the emergency room	single shared record with multi-users access
P4	Psychologues	patient follow-up after hospitalization that leads to start a psychotherapy	online record, find a therapist, appointment management
P5	Psyklik	matching patients with therapists with a focus on patient orientation	orientation questionnaire, find a therapist, therapist profile, appointment management, payment by app, online record
P6	RISM	making psychotherapy accessible to migrants during their journey	network of migrants, online record, map of refugee camps, appointment management
P7	TRUST	fighting against harassment at school	online chat and counselling between children & mediators, sharable child record, recommended therapist, appointment
P8	Adopte un psy	matching patients with therapists with a focus on guiding the patient	find a therapist through a questionnaire, therapist profile
P9	Mobipsy	matching patients with therapists with a focus on psychological follow-up (for agoraphobia)	find a therapist by specialty, appointment management
P10	Psygo (A)	find a psychotherapy center and go there through a dedicated taxi service	map of psychotherapy centers, appointment management, choose a car ride
P11	Helpsy	matching patients with therapists	find a therapist, appointment management, recommendations
P12	Happsy	matching patients with specialized therapists	find a therapist by specialty and therapy type through a questionnaire, manage appointments, diary, subscription

Class 02 (Master) - Individuals			
P13	Éléphant	therapy organizer in order to save and remember everything	therapy timeline including appointments, goals to reach, private notes, image sharing
P14	I=US	help people go and meet a therapist, fight against stigma	virtual psy to help define the problem, online chat, audio and video calls
P15	Pourquoi pas toi ?	breaking the taboo of therapy through a better information	digital kiosk in the street to inform people and get an appointment with a therapist
P16	MDT	helping therapists in organizing client records and clinical notes	list of difficult cases, patient profile, comments about patients from other therapist, peer sharing
P17	GoPsy	helping people forget about drugs and go see a psychotherapist	ads at physicians office, online chat before appointment, first session
P18	Speedy Psy	helping meet therapists face-to-face through psy meetups	choose therapists online, check profiles, go to meetup
P19	Amoi	toning down psychotherapy with tools	appointment management, mood diary, private notes, media sharing, exercises, chats
P20	Entre deux	communicating with therapist between two sessions	video call and chat with limited time levels (from 5 min to 25 minutes)
P21	AB	offering a therapy organizer for patients	check-up, appointments, mood diary, chat, comment sessions, find a therapist for a friend, feedback years after
Class 03 (Master) - Teams			
P22	Start my therapy	getting information and choosing the right therapist	find a therapist, types of therapies explained, therapist profile, appointment management, itinerary
P23	Feel free	follow-up after therapy is ended	progression visualization, rate your experience, sharing with relatives
Class 04 (Bachelor) - Individuals			
P24	My Psy	meeting a therapist through video	find a therapist, therapist profile, appointment management, video call
P25	Psydia	matching patients with therapists	find a therapist, appointment management, notifications
P26	Help'em all	psychotherapy service for LGBT+	specific patient profile (gender data...), find a therapist, messages, payment
P27	Sporty psy	matching patients with therapists	find a therapist, therapist profile, appointment management

P28	Thér'happy	matching patients with therapists	find a therapist, appointment management, mood diary
P29	Psycodia	matching patients with therapists and reimbursing 50% of sessions	reimbursement through insurance partnerships, mood diary, online diagnosis and related therapists recommended
P30	Hériss'	getting in touch with therapists without stress	find a therapist, therapist profile, patient's availability, request to selected therapists
P31	Test-it	online personality tests and related counselling	library of tests by categories, results and suggestions
P32	Happy & good	associate psychotherapy to wellbeing practices such as meditation	therapist profile, wellbeing care counselling, appointment management, discounts
P33	Théra'Service	fund your therapy in exchange for service in an association	localize associations, associations profile and contact, list of available services/missions
P34	Explorapie	matching patient with appropriate therapists through information about various therapy types	list of therapies, therapies presentation page with text, video, testimonials, list of therapist by therapy type
P35	Ther'happier	matching patients with therapists in partnership with mutual funds	orientation test, find a therapist, various consultation modes (in-office, video...), manage appointment, reimbursements
P36	Proksya	matching patients with therapists through a friend recommendation	symptom description, related therapists, therapist profile, chat, appointment management
P37	Psymatch	matching patients with therapists	patient profile, symptom description, find a therapist, appointment management, rate therapist, follow-up tool
P38	Psyko.more	resources on mental disorders and matching patients with therapists	articles on mental disorders, books to read, counselling, find a therapist
P39	Let's meet	patient orientation in order to match with an appropriate therapist	short personality test, access to selected talking groups for meet-ups
P40	Hand-up	chatting with psychologists without user registration	patient orientation, information on mental disorders, appointment management
P41	Théramis	invite a friend and recommend him/her a therapist	questionnaire on your friend, diagnosis hypothesis, find an appropriate therapist, therapist profile, invite your friend

P42	PsyForSport	psychotherapy counselling for professional sportspersons	patient profile, health information, specialized therapists, appointment management
P43	H Psy	matching patients with therapists	find a therapist, therapist profile, appointment management
P44	PsyForMe	matching patients with therapists through a mood test	patient profile, mood test, related therapists offered
P45	PsyYou	reduce the cost of psychotherapy by watching commercial videos	habits and hobbies form, related videos, real time nest egg, find a therapist, therapist profile, appointment management
P46	Online therapy	matching patients with therapists for online therapy in partnership with mutual funds	symptom description, find a therapist, appointment management, video calls, online payments, reimbursements
P47	Psygo (B)	matching patients with therapists	find a therapist, therapist profile
P48	VisioPsy	matching patients with therapists through a quizz	patient orientation quizz, recommended related therapists, find a therapist, appointments, video calls, PayPass payment
P49	Olimpsy	book activities and hobbies and points for funding your therapy	find hobbies and activities, pay for it, get session points, choose therapist, pay with points
P50	iTalk	inform patients and match them with similar patients for discussing	patient profile and information, patient posts, online chat
P51	Oupsy	matching patients with therapists and follow-up tools	find a therapist, therapist profile, nest egg, shared diary, meditation exercises, messages, audio files, mood test
P52	Child therapy	find the best therapist for your kid	patient profile, find a therapist, appointment management
P53	Advisor	matching patients with therapists and managing sessions	diagnosis test, online chat counselling, patient profiles, find a therapist
P54	Theraqui	matching patients with therapists through a quizz	online quizz, therapist recommendation, find a therapist, manage appointment, discount code for first session
P55	Speak'n Read	share your experience or read experiences from other people	friends groups, donate, read messages, post messages, contact therapist...
Class 05 (Master) - Individuals			
P56	Danteo	content for mental health self-management and therapy follow-up	daily goals, food and sleep resources, articles, videos, audios, therapist notes and advices, messages

P57	Help Work	support from employers to fund first therapy session	check employer support, find a psychologist, therapist profile, call, resources to read
P58	N'autre psy	Therapy management tools for therapists	shared agenda, messages from patients, appointments
P59	Si tu tends l'oreille	become a listener, get trained, listen to patients	find partner therapists to get trained, chats with patients, appointment management
P60	Adopte un psy	find the best therapist	find a therapist, messages, appointment management, first session for free in video call, rate video call
P61	Perfect Psy	matching patients with therapists through an orientation video call	immediate first meeting with a counsellor through video, related recommended and rated therapies, appointments
P62	My Psy	matching patients with therapists through an online diagnosis	quizz, diagnosis hypothesis, related recommended therapists, therapist profile, messages, online subscription
P63	Ysia	online counselling through a chatbot	chat, find a therapist, AI-enabled online conversation
P64	Feel better	matching patients with therapists	therapists list, therapist profile, therapy subscriptions, appointment management
P65	Oreilles de proximité	matching patients with therapists through a friend recommendation	invitation from a friend who offers a package of sessions, find a therapist, therapy follow-up tools (goals, co-funders...)
P66	À vos dons	add a tip to your session price and increase the collective nest egg	online payment, tips adding option, check the total of available donations, collective funding
P67	PsyCo	co-funding your therapy through monthly donations from friends	find a therapist, therapist profile, manage appointments, co-funding link, visualize amounts for next sessions
P68	PsyView	therapist profile generator and SEO tools	therapist profile generator, choosing search engines and directories
P69	Mon Cercle	understanding and improving mental disorders of relatives through online circles	find and join a circle, chat online with circle members during circle online opening times, goals to reach