Abstract

According to the Constitution and the European Convention on Human Rights, all citizens have the right to legal information and consultation, and to be accompanied by a lawyer before any authority. However, having a lawyer that meets a person’s needs is not a simple nor an effective process. There is lack of information and difficulty in finding a lawyer. In this work, we met with the stakeholders involved, namely lawyers, law firms, the Portuguese Bar Association and people, in order to identify and study the problem. We propose a solution for the problem, which involves the implementation of a web app that bridges the gap between clients and lawyers. This web app allows people to submit cases, and lawyers to answer them quickly. People receive multiple answers and are able to choose the lawyer that best suits their needs. Our goal is to make the legal services simpler and more accessible to all. At the same time, we also want to increase the volume of work, creating more opportunities for the professionals who provide legal services. Our work was developed taking into account the Bar Association’s statutes and code of conduct. This M.Sc. project covers the front-end only, the back-end being the object of a parallel work.

1 Introduction

The law industry in Portugal has shown great dynamism over the last 20 years, having grown a lot\(^1\). Quoting Manuel Fontaine, the director of the Faculty of Law of the Portuguese Catholic University, "it is necessary to find new markets in Portugal, where legal services are regarded as a last resort by the majority of the population, but should be considered as basic as health services”.

Our work was born of the intuition that the legal sector in Portugal is still little digitized. This intuition would later be confirmed, through our research, market studies, analysis of the current situation and several interviews performed with professionals in the sector, including the Bar Association.

A preliminary field study we conducted concluded that 91% of people know less than 10 Portuguese law firms, although there are 1284 law firms in Portugal\(^2\). On the other hand, 74% say they would use an online web platform to facilitate and handle the approach and communication with lawyers and law firms. These results, in addition to others, suggest that there is a window of opportunity for creating something that would make the world of advocacy more digital. A McKinsey Global Institute study reveals that lawyers in the U.S. could automate 23% of time by using currently demonstrated


\(^2\)https://portal.oa.pt/advogados/pesquisa-de-sociedades-de-advogados/, last accessed 20 Oct 2018

\(^3\)https://public.tableau.com/profile/mckinsey.analytics/#!/vizhome/AutomationandUSjobs/
technology. This is very interesting not only because of the reasonable automation potential, but also because lawyers are one of the highest paid sectors\(^3\), and that there are 32172 active lawyers in Portugal\(^4\). Some early interviews with lawyers revealed that small and medium size law firms continuously struggle to find new clients, because of insufficient manpower to do both work and clients acquisition. Also, lawyers believe that the sector is antiquated, which proves that there is room for improvement.

Looking abroad, we can easily find a substantially larger number of Legal Tech companies than in Portugal\(^5\). This represents an opportunity, but also a big challenge, and probably the biggest one for a project in this field: to disrupt the traditionally conservative legal market.

Another important fact is that the legal world in Portugal is becoming more and more specialized\(^6\). But most people are not aware of what the different specialties are, nor do they have the notion of what is the right specialty for their problem, unlike for example with doctors. In this sense, the typification of cases and clients is an increasingly important factor to take into account when developing a digital platform.

These facts were key drivers of the idea to propose a platform connecting clients to lawyers. Ac-tio is the bridge between clients and lawyers or law firms, that aims to fill the connection gap between the two. The vision is an online web platform that provides tools and a marketplace to connect clients to lawyers, that we implemented and demonstrated.

This paper summarizes the work that has been done from conceptualizing the idea to the final product. That involved a multi-disciplinary work, not only having to develop the product and software from a blank sheet, but also developing the business and managing relationships with the entities involved. The implementation of the concept required the full development of a new platform. In this work, we focus on the front-end web development. This includes a large software design component, given that the platform consists of a large set of pages and screens, but also involved a long development stage, culminating in an integration with the back-end and testing.

Finally, quoting a Forbes article, "technology is a sure win for the legal industry"\(^7\).

This work had multiple work fronts: studying the context and the problem that the platform aimed to solve; defining the product and the business strategy; defining the platform’s architecture and developing the product, which included the design and software; managing and handling relationships with stakeholders. The conceptual and business development was a continuous work since day one. In this document we focus on the software implementation itself.

## 2 Related Work

In this section we analyse the existing solutions, an important step to understand the context and develop the product from a business point of view. Then, we address the technological component necessary to implement the web application.

### 2.1 Existing solutions

#### 2.1.1 Advogadoo

Advogadoo is a Portuguese platform that started in 2014. It offers a marketplace for regular citizens and/or companies that require legal support from

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\(^3\) Technical potential for automation, last accessed 22 Oct 2018

\(^4\) https://portal.oa.pt/advogados/pesquisa-de-advogados/, last accessed 22 Oct 2018

\(^5\) https://catalyst.com/research_item/legal-tech-market-overview/, last accessed 22 Oct 2018


2bae057876f8, last accessed 28 Oct 2018
Portuguese lawyers (1). The primary use case for clients is to submit cases, and the primary use case for lawyers is to select cases and contact clients, while paying to do so. Clients submit cases by filling an extensive form, in which they are expected to explain their problem in detail. The case is then submitted to a pool of cases, to which registered lawyers have access. A case will remain in the pool until it gets contacts from 3 lawyers or after completing 15 days after the submission date8. Lawyers can view cases and contact clients that submitted cases if they are interested. This starts direct communication between client and lawyer outside the platform. The platform only allows 3 lawyers to bid for a case, in order to create a sense of urgency in them, avoiding long waits on the part of the client. As a complementary feature, the platform claims to guarantee the confidentiality of the user’s data. Lawyers register by filling an extensive form as well.

Regarding the way the platform is monetized, both the submission of the case by the client and registration on the platform by the lawyer are free. However, in order to contact the client who has submitted a particular case, the lawyer must use credits that have to be previously purchased from the platform. Advogadoo has had ”a few hundred” registered attorneys9, but this number has been decreasing. According to the company profile in the Owler database, Advogadoo has an estimated 8 employees and an estimated annual revenue of 160.6K euros10. The site hasn’t suffered any major update since February 201511.

At the time of its appearance, Advogadoo created controversy with the Bar Association. An ex-

president of the Bar Association, together with the Commission to Combat of the Illicit Prosecutor’s Office of the Regional Council of Évora of the Bar Association, publicly stated that "the registration of any lawyer in this platform alone constitutes a violation of the Statute of the Bar Association, of client acquisition by itself or by interposed person, and may result in disciplinary action of unlawful practice”12. Also more recently, in 2017 the Regional Council of Coimbra reiterated that the platform violates the by-laws of the Bar Association13. Despite these statements, the platform remains online and in business1415.

To fully experience the platform from the client point of view, we submitted a case in Advogadoo, and in the same day received three direct contacts from lawyers: one phone call and two emails. This proves that, despite its controversy and lack of updates, Advogadoo still has traction and active lawyers.

2.1.2 Zaask

Zaask is a portuguese online marketplace for services. It is not a platform specialized in legal services, but in all type of services, providing more than 500 types of services in total (2). However, it is possible to look for legal services, namely lawyers. Valuated at 5 million euros at the beginning of 2018, the platform is aimed at freelancers and micro companies, and is a market leader in Portugal. Like in Advogadoo, clients tell their cases, and are then contacted by professionals, who approach customers. The main differences for Advogadoo are: (1) the way the client submits the case, which is guided by an en-

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8 https://mailchi.mp/advogadoo/casos-ativos-1209055, last accessed 7 Nov 2018
9 https://advogadoo.com/advogados-locvost/, last accessed 7 Nov 2018
10 https://www.owler.com/company/advogadoo, last accessed 7 Nov 2018
11 https://www.owler.com/company/advogadoo\#website-history, last accessed 7 Nov 2018
14 https://advogadoo.com/advogados-locvost/, last accessed 8 Nov 2018
15 https://advogadoo.com/nao-se-pode-parar-o-vento-com-as-maos/, last accessed 8 Nov 2018
engine that asks questions; (2) the contacts by the professionals are done through the platform; (3) clients have access to attorney profiles; (4) clients can review and classify lawyers. Zaask has a dynamic form, consisting mainly of multiple-choice questions, instead of the client freely writing about his problem. With this mechanism that guides the client through the process, it is easier to classify the case, assign it to the appropriate professional, and be analyzed objectively by that professional. Contacts are made through the platform, never outside. The platform has a built-in chat facility, allowing clients and lawyers to exchange messages. The business model is similar to that of Advogadoo. The submission of cases by clients and registration of lawyers is free, and professionals use credits to compete for requests from clients whose services they are interested in performing. Not being a specific platform for legal support, Zaask had at least 87 lawyers registered as of November 2018. Although promoting and advertising "low cost lawyers", Zaask has no public record of controversy with the Bar Association. As we did with Advogadoo, we also tried Zaask in order to find a lawyer. We created a case and quickly got different answers for the case, through the "client area" in the platform. This area is pretty intuitive and easy to use, providing a chat room with lawyers.

2.1.3 Advogados24h

Advogados 24 Horas is an online Portuguese directory of lawyers and law firms. To be in this directory, lawyers and/or law companies must register on it. Clients do not register on this platform. The search is done through an interactive map, where users can filter the results by region and/or by category. The profile of a lawyer/society includes a set of information. The monetization of the platform is made through the payment of a subscription by lawyers who want to register in the directory. Although it is a simple directory and does not offer most of the features that other online legal marketplaces offer, it was important to study this platform, since it is the only directory dedicated exclusively to the area of advocacy with a favorable opinion from the Portuguese Bar Association\(^\text{16}\). As of November 2018 this platform had about 29 registered attorneys.

2.1.4 Comparison

Advogadoo is the oldest and main platform connecting clients and lawyers in Portugal, presenting a simple solution with few features. However, its operation has been troubled with regard to the relationship with the Bar Association, and has had few updates in recent years. Zaask is a more recent and complete solution. It has modern messaging dashboards, profiles, classifications and reviews. However, Zaask is not specifically targeted to the advocacy sector and goes against the codes of ethics of the Bar Association. Advogados24h is simply a search directory for registered attorneys, but has the particularity of being the only platform with a favorable opinion from the Bar Association.

Lawyers in Portugal are governed by the rules and doctrines of the Bar Association. The deontological code and statutes of the lawyer represented one of the greatest challenges for the definition of requirements of this project. All the platforms we analyzed have interesting features and functionalities that distinguish them. Nevertheless, many of them seem to violate the deontological code of the Bar Association, the reason for which they are persecuted by this regulating body of advocacy practice in Portugal. The various characteristics of these platforms, the relationship with the Bar Association, as well as their success and context, were very important factors in the study of the problem and had great impact when defining the requirements, designing and implementing the solution.

\(^{16}\)https://www.advogados24h.com/subscrever/, last accessed 11 Nov 2018
2.2 Front-end Responsive Frameworks

In the scope of this thesis, we were interested in web applications, client-server computer programs in which the client runs in a web browser (3). The front-end of web applications is usually based on HTML, CSS, and JavaScript. Web applications provide flexibility to developers, facilitating cross-platform development. Web applications can be used by users with any of the standard browser engines like Chrome, Safari, Firefox, and others (4), on any kind of device.

In 2018, the share of mobile phone website traffic was 52.2 percent of all website traffic worldwide 17. With the number of mobile device users still growing, it is crucial to provide a similar and rich user experience across desktop, tablet, and smartphone devices. In 2010, the term Responsive Web Design (RWD) was introduced by Ethan Marcotte (5). Its goal is to adopt a fluid and responsive design that allows web pages to adapt to the physical context of any device. RWD combines three concepts: (1) flexible images; (2) fluid grids; (3) CSS media queries. The idea is that, for a given request, a web server always sends the same HTML document, regardless of the device characteristics, and the rendering of the page is done as defined by CSS 18.

As Responsive Web Design is a must-have feature in any modern web application, we should analyze some front-end responsive frameworks. There is a wide range of frameworks, and new ones appear on a regular basis 19. We compared three different responsive web frameworks: Bootstrap, Foundation, and Semantic UI are responsive and support all major browsers and platforms.

2.2.1 Bootstrap

Bootstrap is "a powerful open source development framework for building mobile first responsive websites". It optimizes the website's presentation for mobile views first, and then adapts the design to fit other screen sizes (6)(7). Bootstrap is the most famous and popular front-end framework, having an extensive documentation and many examples across the Internet. It includes an extensive collection of prebuilt UI components, such as buttons, cards, carousels, and more. Bootstrap uses a 12 column responsive grid system. The Bootstrap grid system has four classes of devices: phones, tablets, small laptops, and laptops/desktops (8).

2.2.2 Foundation

Foundation is one of the biggest front-end responsive frameworks as well. It is considered to be more professional and complex than Bootstrap, providing personalized business support, training and consulting. Big websites that use Foundation include Mozilla, Facebook, Yahoo!, Ebay, National Geographic, and others. Also, it is one of the frameworks with the most advanced interface, and focuses more on project personalizing (9).

2.2.3 Semantic UI

Semantic UI stands out from the other frameworks for the simplicity and ease of its semantics, using "human-friendly HTML" (10). The code written in Semantic UI is very easy to read and understand. It is recommended for developers who are comfortable with JS because many features and widgets require the use of JavaScript for their configuration and customization, unlike Bootstrap. From the frameworks compared here, it is the framework that comes with most prebuilt UI elements (11). An advantage of Se-

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18 https://developers.google.com/search/mobile-sites/mobile-seo/responsive-design, last accessed 20 Nov 2018
mantic UI is that it only loads the required components, instead of loading the whole package as Bootstrap.

### 2.2.4 Framework Comparison

Bootstrap is by far the most popular front-end framework. It has a vast community and extensive documentation and examples across the Internet. It is simple and recommended for beginners, and includes a huge collection of prebuilt UI components. Foundation is one of the most advanced front-end frameworks. It is more professional and complex than Bootstrap and Semantic UI, allowing professional developers to create unique websites. Semantic UI was created to have a simple and natural syntax based on UI elements. The written code is easy to read. Moreover, it is the framework with the most elements and customization options. However, to use Semantic UI, it is recommended to have JavaScript skills, unlike Bootstrap.

## 3 Solution Overview and Implementation

Our solution is a web application that connects clients and lawyers, making access to legal services simpler and more accessible to all. Clients submit their cases with a few clicks in a simple and intuitive way. Registered lawyers can read the clients’ cases and “take” them if they wish. To do so, they simply send a message to the client. He or she will then be able to see the lawyer’s message followed by his/her contacts, and directly contact him/her outside the platform.

From the technological perspective, the web application was implemented according to a 3-tier REST architecture, with 3 layers: presentation, server and database. The choice of a RESTful architecture was based on the fact that it represents a model for how the Web should work. Moreover, it is scalable and widely used in any kind of service and business. The client communicates with the server using HTTP, and uses JSON as the data exchange format. The presentation tier (first tier) was developed in HTML, CSS and JavaScript, using the Bootstrap framework as a basis for the responsive web design and jQuery as a JavaScript library for handling communication and logic. The server (second tier) was developed in Node.js, using the Express framework. This server responds to customer requests, hosts the HTML pages, addresses all business logic as well as database management and access. The database (third tier) is in a third layer, and was developed in a document-based database model (MongoDB). Figure 1 summarizes the architecture of the system.

![Figure 1: Architecture of the system.](image)

Within the scope of this thesis, we only focused on the front-end, corresponding to the first tier. The back-end was developed in parallel by another team.

The web application structure is divided into four main areas: public area; attorney area; client area; and auxiliary pages. The web application’s public area contains the following pages: landing page; how it works; login; register. The client area includes: home; single message; list of messages; settings; help. The lawyer’s area includes: home; approached cases; complete profile; settings; help. In addition to these core pages, we implemented auxiliary pages that include: forgot password; error; maintenance. In Figure 2 we can see the landing page.
One of the most important features of this application is the submission of a case. The fact that this is the action that feeds the whole platform has required special attention from us. We tried different approaches and finally developed a dynamic modal dialogue. We believe that this is the easiest and most intuitive solution. The dialogue appears whenever a user clicks on a "submit case" button, which is found across the application. The key idea is to avoid a page redirection to submit the case, making the user experience as simple and easy as possible. This dialogue has four steps: (1) select location; (2) select legal area; (3) case title and description; (4) sign up or login. Figure 3 shows the third step of the submit case dialogue. The user interface was designed taking into account the Bar Association color schema, as well as similar elements and components.

4 Experimental evaluation

We have tested the platform’s main tasks with twenty clients and lawyers on both mobile and desktop devices. We tried to choose a diverse set of users, from people who are comfortable with electronic equipment and software, and people who are not. As mobile devices we used an iPhone 7 with iOS 12 and browser Safari, and a Nokia 7.1 with Android 9 and browser Google Chrome. As desktop devices we used an MacBook Pro with browser Google Chrome, and a Lenovo Thinkpad T480 with browser Google Chrome.

We asked each user to complete two tasks. These tasks depended on the type of user, whether he/she was a client or a lawyer. To support these tests, we created two task sheets: one for clients and another for lawyers. The clients’ tasks were: (1) submit a case and create an account; (2) login and see a message sent from a lawyer. The lawyers’ tasks were: (1) register and complete profile; (2) login and “take” a case.

We manually registered the time to complete and number of errors for each task, by direct observation of the user performance. Then, we computed the average values for these metrics. Users completed easiness and satisfaction surveys after each task and we computed the average, mode and first quartile. After finishing both tasks, users completed a System Usability Score (SUS) survey.

Clients took, in average, 4m52s to complete the first task, and 2m06s to complete the second. The average number of errors was 0.6 and 0.3, respectively. Lawyers took, in average, 9m47s to complete the first task, and 5m15s to complete the second. The average number of errors was 1.6 and 1.2, respectively.

User testing yielded very positive results. Both the average time and average number of errors for both tasks were below or very close to the reference values, in both the clients and lawyers tests. Also, the easiness and satisfaction surveys showed...
very positive results.

Overall, most tasks were easily performed. We noticed that elder users had slightly more difficult in accomplishing tasks, but we assume that this is normal due to being less comfortable with technology. We noticed a common issue that we should solve in the future, related with the Google Captcha widget position in the Lawyers’ account creation screen. Most errors were due to users not noticing this widget due to its position.

The SUS scores for clients and lawyers was 84 and 74, respectively. According to Jeff Sauro, the average SUS score is 68. Also, the author classifies a 84 score with grade A, and a 74 score with grande B (12).

Overall client results were better than lawyer results. This was expected since clients’ tasks were shorter and easier to perform. From a business perspective, this scenario is better than the other way around, as lawyers are the most interested stakeholders in the platform and their use of the platform depends almost exclusively on the existence of cases and clients. As long as there is demand, lawyers are expected to use the platform as this represents more work for them so they have an extra incentive to use the platform.

We didn’t notice major differences in using a mobile device or a desktop device to perform the tasks. This is extremely positive because it means that one of the main goals of this thesis has been met: to have a responsive design that allows the platform to be used on any device.

These tests, although not very extensive, were positive to obtain a first validation of the platform’s usability. No major problems arose, the platform performed well on all devices, and the feedback was great.

5 Conclusions and Future Work

This work was born from the simple intuition that there was a problem with the lack of information and difficulty in finding a lawyer. We have identified and studied the problem and proposed a solution for it. We conducted: a questionnaire for regular citizens; interviews with lawyers; meetings with the Bar Association, including a presentation for the General Council of the Bar, with the presence of the President of the Bar Association. In a first phase, we designed paper prototypes, prototypes with higher fidelity, we experimented tools such as Bootstrap and tried the integration with a simple back-end server to test the architecture. We then began the real implementation using HTML, CSS and JavaScript. We integrated the front-end solution with the back-end. We tested the final product with users, both clients and lawyers, and received positive feedback.

From the first meeting we had with the Bar Association, we were told that there were sensitive matters to deal with, such as the competitive advantage between lawyers, as well as the publicity and the monetization issues. But we also concluded that the market is changing and that, sooner or later this kind of platform would have to end up showing. Despite the above, the final product will only have value if it really meets the needs of people who need legal support and have scarce, traditional and old fashioned resources to find and obtain it.

From a business standpoint, this platform has some limitations. These limitations include impeding the implementation of a chat, having a business and monetization plan, lawyer reviews and budget features. Among others, these are examples of features that we could not implement due to deontological code compliance.

There might be some HTML, CSS and JavaScript code to improve. Also, as everything was done in plain HTML and JavaScript, creating dynamic content and handling navigation was more difficult.

Based on this product, various tools and services can be developed to improve existing features and create new ones. A good example of this would be to develop an AI tool that would help the client choose
the legal area of the case. On the other hand, such tools could also exist to detect and correct misclassified cases, i.e., with wrong legal areas. When taking design and implementation decisions, we always tried to take scalability in mind. For example by using a "step-by-step" approach in the case submission process, it is easy to add or remove a step, which would be a problem in a traditional form. Also, by using tags in cards it is easy to implement new metrics, or by using toast messages it is easy to insert a new message or information in any point of the application.

Regarding the front-end development, we believe that by using a single-page application framework the result would be more dynamic and immersive, providing better user experience to the user. Therefore, one interesting next step would be to rebuild the front-end using a single-page application framework such as React.

From a business point of view, we want our work to make legal aid more accessible to all, while preserving the historic statute and duty of lawyers and practitioners.

As IT students and/or professionals, we often have the tools to try to solve the problems that we find around us. We should not be afraid of trying, because sometimes a simple idea becomes a great journey. This thesis is an example of that.

References


Statement: Actio is not affiliated with the Bar Association nor any organization. Our work is a proposal to make legal aid more accessible to all, while preserving the historic statute and duty of lawyers and practitioners.