Lead: An iOS Application to Help in the Construction of New Habits

André Wescley Oliveira de Aguiar, Jagni Dasa Horta Bezerra, João Alexandre Lobo Marques, and Auzuir Ripardo de Alexandria

***Abstract*—In recent years, the use of mobile applications is pervasive in different societies and cultures, not only for professional and leisure, but also as supporting tools for personal development. This article presents "Lead", a mobile application modeled to help people organize their time to perform daily tasks and develop new habits for reaching their goals. The main functionalities of the application are presented and analyzed, showing its effectiveness for the proposed objectives. It has already reached the mark of 26,000 active users in different countries such as Brazil, China, United States, United Kingdom and Canada. These users have registered more than 90,000 habits divided into 12 categories. The Lead application may be a relevant tool for helping its users to reach their goals.**

***Index Terms*—Habit management, mobile app, iOS.**

I. Introduction

Technical assistance through mobile applications is increasingly being used to solve problems and even automate tasks [1]. Based on this need, Lead emerges as an application for iOS devices, with the idea of helping people organize their time so they can accomplish their tasks and thus help them achieve their goals.

Research shows that Brazil is the second country in the world in terms of stress, falling behind only to Japan. This is mainly due to the work routine of these country's population. Specialists point out that this fact can be improved by changing habits, which include goals such as rest, good nutrition and frequent physical exercise practices, among others [2]. Besides, high levels of stress are found in both western and eastern societies, presenting this as a global concern.

Habits are behaviors that are related to the lifestyle of each individual. As each individual performs their actions over several days, these become common behavior and then a habit [3]. A great number of goals achieved are results of habits. For example, the habit of performing regular exercises is related to the goal of having a healthier life, or the habit of reading books to pursue the goal of increasing personal knowledge.

Habits are behaviors and actions that the individual performs. Therefore, an action may be beneficial to achieve the desired goal or it may not contribute and even hinders the achievement of that goal [3]. From this, it is possible to follow a classification of good and bad habits, and this work will follow this assumption.

To adapt the routine to these new habits and to stop carrying out bad habits, the individuals can search for specialized professionals from different areas, or they can decide to change their habits by themselves.

From this context, this work introduces the LEAD app, developed for iOS devices, with the aim to help people in their habits management. The specific objectives of this article are: to present features that stimulate and help users during the process of acquiring new habits, maintaining a habit and avoiding a bad habit; analyze the main application module for habits management; present the requirements for the system development and publication; discuss tests, corrections and schedule improvements to reach users in at least three different countries.

The explanation of these ideas in the present work is divided into three sections: the first one defines the theoretical foundation used for development, the second one will demonstrate the related works and the third one comes with the tests, application publication and information on the development.

II. Justification and Theoretical Foundation

The development of the Lead application started from a challenge-based study, where the general topic would be the management of habits, while the implicit challenge would be the creation of an application that could assist users in managing their good and bad habits [4].

For the research modeling, a literature review from books and technical papers was performed, focusing on habits management. To support the process, in a second moment, two professionals specialized in habits management were interviewed with the objective of collecting data about their practical experience, identifying the actions taken to help people create new habits or eliminate bad habits. The intention was to turn these actions into tools that could be used through the application. Finally, Similar applications available in the Apple Store were also tested and evaluated.

To define the requirements, the CBL (Challenge Based Learning) method was used. This method came in 2008 from Apple's initiatives to improve learning in the 21st century. The method starts from a broad theme, seeking the debate on essential issues, directed questions, activities and reflections [5]. Each question raised must relate to a challenge that can be converted into practical action by the students.

A list of targeted questions, as well as their answers and search sources is listed below in Table 1. The list is known as Guide Question under the CBL Guide [6].

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TABLE I: GUIDE QUESTION, RESOURCES AND ACTIVITIES AND BENEFITS TO THE PROJECT

Guide Question	Resources and Activities	What we learned
How does a coach influence the construction of a habit?	Interviews with coaches Rondineli and Gabriela, conducted on 08/19/2015 and 08/20/2015	By helping people visualize their desired goals and rewards. After that, the necessary actions to make them concrete can be planned.
Is it useful to share habits? In what ways?	Interviews with coaches Rondineli and Gabriela "The Power of Habit" [3]	Sharing habits in a cooperative way can stimulate people to maintain them. Sharing habits in a competitive way can distract people from their real goals.
Would graphs about the fulfillment of habits be useful for coaches? And for a client?	Interviews with coaches Rondineli and Gabriela	It would be undoubtedly useful for a coach to monitor and analyze their clients. The coaches did not agree with each other, arguing it could be a severe distraction or a great stimulation if accessible by clients.
Which services are available to help construct habits?	Search on App Store Interviews with coaches Rondineli and Gabriela	Habit Tracker and Way of Life were found by searching the App Store. The coaches did not know any similar app, only a coach session management utility.

For the server-side platform, PHP programming language was considered. For the development of screens and interactions of the application, the Swift programming language was used along with the XCode IDE [7]. The database server was MySQL and the relational entity model (REM) implemented in the database is presented in Fig. 1.

III. RELATED WORKS

To develop Lead, first it was necessary to discover and understand how the main applications dealt with the theme habit management. Among them, Easy Habit, Way of Life, and Habit Tracker stand out.

A. App Evaluation: Easy Habits

An app that proposes the creation of habits and the abandonment of addictions. It tracks the evolution of the user from graphs that relate to the desired habit and allows the user to choose a custom icon with colors for each habit.

Available functions:

- Record habits or addictions;
- Notifications to remind the goals of each day;
- A graph about the history of a habit;
- Customize the habits with colors.

B. App Evaluation: Way of Life

This is a second available application designed to build new habits, allowing the users to record what they do during the day as well as the duration of that event. The users are allowed to inform on which days of the week they will need to be reminded. The tool provides graphs of the day summarizing whether actions were taken or not. The way that this application presents the results of a user's week is similar to matrices.

C. Habit Tracker

An app that helps changing habits and lifestyle. In this tool it is presented to the user if he is becoming a better person according to reports that are generated. It accompanies trends in habits ranging from 3 months to 1 year. The free version offers the registration of three habits.

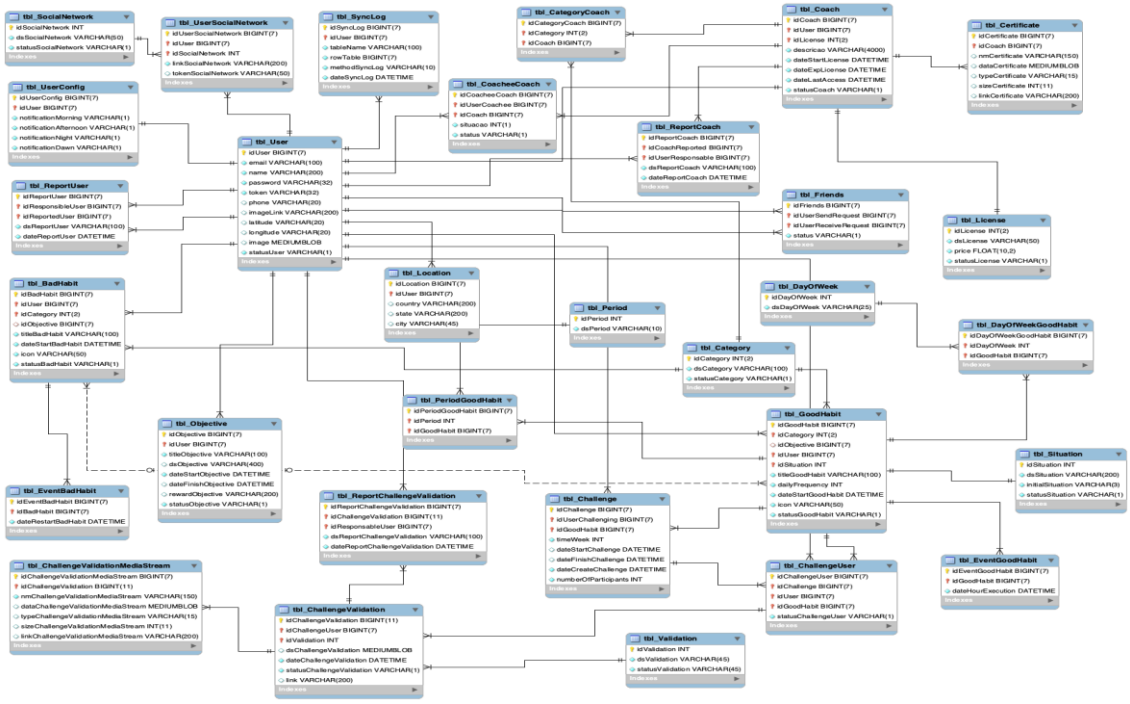

Fig. 1. Relational entity model for the lead application.

IV. Proposed Solution: Lead

An important requirement was to understand that people can be encouraged to maintain their habits by doing them in a cooperative way and by sharing their routine. The application will have the functionality of group habits to achieve this goal. In the research with the professionals, it was also clear that rivalry should not be incited since the focus could be diverted from the main objective and by that harm the process.

Another relevant functionality mapped by professionals was to develop a graphic interface to track the user progress. However, there was disagreement about the period that should be presented in the application. For the final requirement, it was defined that the charts would show the period of one week.

It was defined through the requirements that the addictions and bad habits should be separated from the good habits on the interface. It was also debated that showing a streak with the number of days the bad habit was not performed would be a good reinforcement.

Lead was formatted based on the Business Model Canvas [8] presented in Fig. 2.

For a better user experience, a tutorial explaining screens and functionalities to ease the application's learning curve was implemented. The user has the possibility to visualize the habits, goals, bad habits and notifications screens.

For Lead navigation, a menu with 4 options was implemented: Today; Habits; Social; and Profile. This menu is available in all screens of the application, thus making it easy to transition between features.

For the “Today” option, the user has the freedom to navigate through 3 screens, as shown in Fig. 3: one that shows habits divided by shifts; more details about a specific shift; and a screen with the percentage of habits performed.

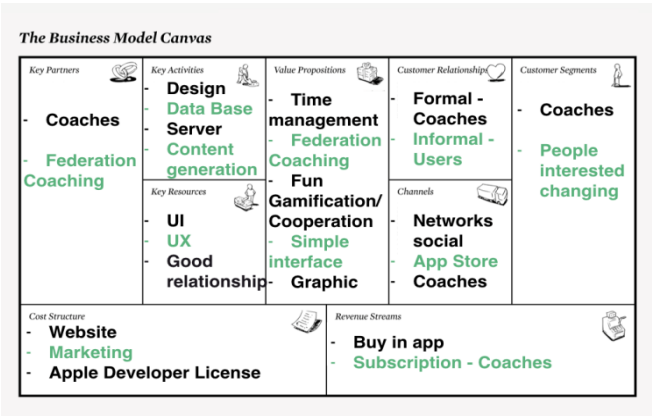

Fig. 2. Business model canvas.

Fig. 3. Lead application: screenshots from the “today” option.

The aforementioned screens present options for the user to visualize their progress with the accomplishment of the proposed habits, interacting with scroll and tap gestures to select a habit that has just been performed. A message will be displayed asking if the user confirms that they have performed the action related to the habit.

An icon in the upper left bar of the application directs the user between good and bad habit screens. For a bad habit, the user will see all the bad habits registered and the number of days that the user is fulfilling his goal of not performing a bad habit. Fig. 4 shows the screens available in the application to interact in the bad habits of each user.

For the "Habits" option on the menu, the user can choose to register new habits and/or new goals. When this option is selected by the user, the list of habits becomes visible, giving the option to edit an existing habit or register a new habit. In addition to the habits, the users can navigate to the option of the objective menu and in this option, they will have the possibility to edit a goal or register a new one. Fig. 5 shows how to access the tools and functions contained in the "Habits" tab.

One of the features from the requirements worksheet was the possibility to perform habits together with other people, Lead presents this option through the Social icon contained in the menu.

Fig. 4. Lead application: Screenshots from the "Habits" option - bad habits.

For the "Social" option, the user is offered a list of habits created by other users that seek to carry out activities together. As soon as the habit is given the minimum number of participants, it will start and their routine will be shared. For habits performed in a shared way, users have the opportunity to post their actions on the habit news feed and other users can view the action done and consequently be encouraged to do the same. Fig. 6 shows the list of shared habits available in My Challenges, where we have actively shared habits and the habit of "writing my monograph" is in standby mode.

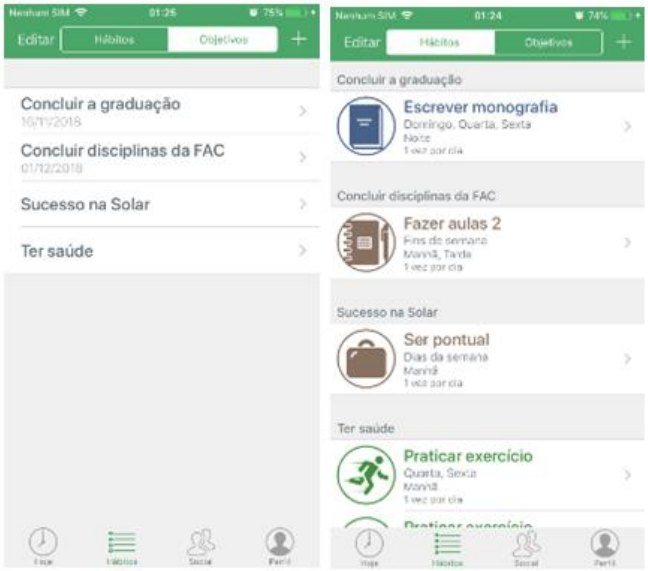

Fig. 5. Lead application: Screenshots from the "Habits" option - Habit management.

Fig. 6. Lead application: Screenshots from the "Social" option.

It is worth noting that a filter is available for the consultation of shared habits, based on two filters: Location and Habit Categories, so the user can find Challenges related to his interests. In Fig. 7 the options available in the filter are presented.

Finally, Lead provides users with a screen, shown in Fig. 8, containing: user configurations; access to the tutorial; possibility to add friends; and visualization of graphs containing the performance in the last week.

For the publication in the Apple Store, it was necessary to acquire an Apple developer license to allow the developer the right to publish applications. After the license, the delivery is made to the store through the XCode tool and Apple analyzes if the application can be available to users downloads, as well as whether something needs to be adjusted before the final publication.

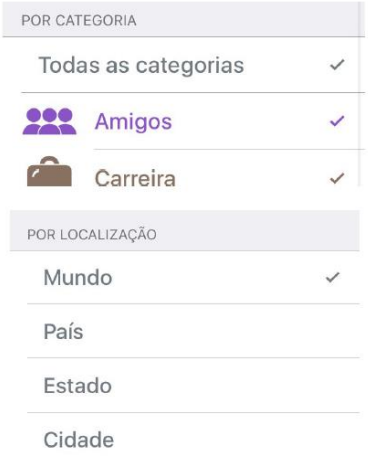

Fig. 7. Lead application: social habits filters.

Fig. 8. Lead application: User profile.

V. Results

Currently, Lead has around 26,000 active users, with a total of 34,000 units of the application properly installed. The facilities are distributed in 5 different countries, they are: Brazil, China, U.S., U.K. and Canada.

The distribution of app units in the world territory is presented in Fig. 9 [9].

To achieve visibility, it was necessary to publish the application not only in the Brazilian Apple store, but also in the North American one. It is noteworthy that all comments received by users through the Apple Store were properly attended, as a key strategy to retain users fidelity.

Lead today counts in its database a total of 92,742 registered habits. It is possible to analyze the categories that have the largest quantity of records, in Table II the categories and their respective quantities are presented. The Health category is the one with the highest number of registered

habits, followed by the Friends and Career respectively.

Fig. 9. Number of lead app users around the world from ITunes analytics.

TABLE II: NUMBER OF HABITS BY CATEGORY.

Category	Quantity
Health	27839
Friends	21193
Carreer	12392
Intelectual	9294
Espiritual	5307
Home	3939
Leisure	3874
Emotional	2745
Family	2199
Affective Life	1649
Finances	1642
Charity	669

VI. CONCLUSION

With Lead, it became possible to present functionalities that stimulate and help users during the process of acquiring new habits. It is possible to highlight within this context the functionality of social habits, acting directly in the construction of new habits; Functionalities for maintaining a habit and avoiding a bad habit have been developed; App developed based on the CBL methodology, also presented in this work.

It is worth stressing the importance of developing the Business Model Canvas before any development starts, with Canvas the idea becomes more palpable and identified with its target audience, in addition to being developed with a look at its value proposal defined for delivery the developed product.

As a future work, the development group will analyze the frequency of habits accomplishment and alert users about habits that are being neglected, making their goal easier to reach.

Another work is the development of functionalities that could connect professional related to each Lead's habit category with users. This functionality will provide greater user loyalty as well as the possibility of monetizing the app.

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REFERENCES

[1] S. Mesquita. (2018). Aprendizagem de língua inglesa mediada por tecnologia: Aplicativos para dispositivos móveis. Doctoral dissertation. [Online]. Available: https://repositorio.pgsskroton.com.br/bitstream/123456789/12728/1/SANDRA%20disserta%C3%A7%C3%A3o.pdf

[2] M. Grinberg. (2018). Brasileiro é o 2º mais estressado do mundo. [Online]. Available: https://www.qualicorp.com.br/qualicorp/ecp/comunidade.do?app=portalbemestar&idNoticia=53169&view=interna

[3] C. Duhigg, "O poder do hábito: Porque fazemos o que fazemos na vida e nos negócios," Rio de Janeiro: Objetiva, 2012.

[4] A. Santos, A. Sale, P. Fernandes, and M. Nichols, Combining challenge based learning and scrum framework for mobile application development. [Online]. Available: http://cbl.digitalpromise.org/wp-content/uploads/sites/7/2016/08/cblagile.pdf

[5] R. Braga. (2017). Aprendizagem baseada em desafios é chave para um ensino ativo. [Online]. Available: https://desafiosdaeducacao.com.br/aprendizagem-baseada-em-desafios/

[6] CBL DOCS. (2011). Challenge based learning: A classroom guide. [Online]. Available: https://images.apple.com/education/docs/CBL_Classroom_Guide_Jan_2011.pdf

[7] Apple Inc. (2018). SWIFT. Uma linguagem aberta e poderosa para todo mundo criar apps incríveis. [Online]. Available: https://www.apple.com/br/swift/

[8] A. Osterwalder and Y. Pigneur, *Business Model Generation- Inovação em Modelos de Negócio: Um Manual Para Visionários, Inovadores e Revolucionários*, Rio de Janeiro: Alta Books, 2011.

[9] Apple Store. (2018). [Online]. Available: https://www.apple.com/br/ios/app-store/

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