Development of the Alexa skill ”Inteligencia sintética” to attract young users to artificial intelligence

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***Abstract*—Nowadays artificial intelligence has become something very important in our lives, but not much people now how important artificial intelligence has become, that's why we decided to create an amazon Alexa skill that tells you curious facts about artificial intelligence to attract people to the artificial intelligence wonders. This article presents the different developing stages and activities for the amazon Alexa skill “Inteligencia sintetica”, it also includes a brief description of these and**

***Index Terms*—artificial intelligence, curious facts, educational, amazon skill**

I. Introduction

NOWADAYS artificial intelligence has become very important, many systems use artificial intelligence to work properly and also there are many new technologies that depend on artificial intelligence.

Even though artificial intelligence is so important in social network, banks, stocks, self driving cars, etc; not much people know the importance of it, most of the general public think that artificial intelligence is a thing of movies science fiction and something of the future but they don´t realize that artificial intelligence is something of the present.

That is why we decided to do something to make people aware of the importance and presence in our daily basis of artificial intelligence. We passed through many different ideas on how to make people aware, but at last we concluded that the best way to make people aware was by an Amazon Alexa skill

II. Objective

Our objective is to do an interactive Amazon Alexa skill for children between 9 and 14 years old that helps the users to learn about artificial intelligence through curious facts and frequent asked questions presented in a non-boring and interactive way. The skill should also have simple answers and simple curious facts so that the users can understand

III. Justification

Artificial intelligence is part of our daily life. Artificial intelligence in education offers numerous possibilities to add more value to students, but without changes in it, it will not be possible to equip a population to innovate in the technology of tomorrow. Artificial Intelligence is the technology of the future, and students are the architects of that future.

Hence the idea of creating a skill for current generations, in this way we can awaken the interest of users towards artificial intelligence, through a bot called ”inteligencia sintética”. While it is not enough to teach children all about the Artificial Intelligence, if you create a desire to learn more, that will lead them to investigate and even to question their teachers.

We would have loved for someone to give us this knowledge at an earlier age, so that´s why we focus the project on this type of user.

IV. Product characteristics

The final product will be easy to use for users, it will have different interactive sections since it is the function of the skill in Alexa, easy interaction, it will provide clear answers, a striking way to make known the Artificial intelligence

V. methodology

A. Requirements

After 3 phases of refinement, our definitive requirements are:

1) user requirements:

- The skill can be easily found and downloaded to Alexa.
- The user can interact with the skill by asking simple questions about Artificial Intelligence (It is considered that because of their age, users will not ask very elaborate questions about artificial intelligence).
- The skill will provide simple explanations that users can understand.
- The user will be able to open the skill through voice commands.
- The skill will provide daily curious data about Artificial Intelligence.

2) system requirements:

- Functional
  - RF001 voice recognition service
    - The bot will work through Alexa to use the Alexa recognition algorithm
  - RF002 Accessibility
    - The bot will be accessible on cell phones, computers, tablets, smart speakers and any device that uses Alexa

  - RF003 Interactive experience
    * The skill will give simple explanations and understandable answers for users. The skill will have 3 options to interact: 1. You will be able to ask curiosities about Artificial Intelligence 2. You will be able to ask frequent questions about AI 3. It will tell you a new curiosity every day
  - RF004 Correct answer
    * The skill will have correct and simple answers to the frequently asked questions from users
  - RF005 Introduction
    * The skill will give you an explanation of how it works, the first time you open it it will give you an introduction explaining how to interact with the skill
  - RF006 Fun facts
    * The skill will have more than 50 fun facts
  - RF007 Daily fun fact
    * The skill will tell you a curious fact a day apart from the ones you ask so that every day you learn something new and interesting about AI
- Non-functional
  - RNF001 Compatibly
    * The skill will be compatible with any device that supports Alexa
  - RNF002 Accessibly
    * The user can´t access the skill without internet
  - RNF003 Alexa acceptation
    * The skill must have the 3 main intents (cancel, help, stop) to be accepted in the Alexa store
  - RNF004 Language
    * The skill will only be available in Spanish
  - RNF005 Server
    * The skill will only allow 1 million requests to the lambda server per month and 5GB of storage on Amazon's servers

B. Design

once we finished the requirements phase, we started the designing phase In which we made the use cases, the use cases diagram, the skill logo, the logic of the skill, and the user experience

1) Use cases: To make the user cases we started by doing the user histories which are:

- HU01- As: User I want to: ask curiosities to the bot To: know data or curiosities about AI
- HU02- As: User I want: the bot to give me daily curiosities about AI, To: be informed of the latest news about AI.
- HU03- As: Father I want: the bot to provide simple explanations, To: help my child learn and understand the information.
- HU04- As: user I want: the bot to use Alexa, For: that the information can be easily accessed through voice commands.
- HU05- As: User I want: the bot to answer my frequent questions about AI, To: complement my learning about artificial intelligence.
- HU06- As: User I want to: access the bot using the words "Alexa, abre inteligencia sistetica" To: make it easier to access it.
- HU07- As: User I want: the bot to give us an introduction the first time, To: to explain to me how it works.

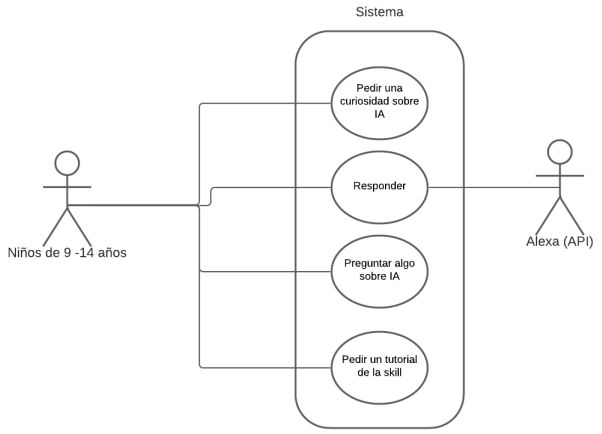
Then after we had the user histories we made the use cases based on the user histories Our user cases are:

CU01 Summon the bot	
Precondition	None
Description	The user requires starting the bot and launches the voice command to access it.
Sequence	• User summons Alexa • User tells Alexa "Abre inteligencia sintetica" • Alexa searches the skill "Inteligencia sintetica" • Alexa opens the skill "Inteligencia sintetica"
alternate outputs	If the system does not find a match, then it launches the possible suggestions according to what it is trying to find.

CU02 First interaction	
Precondition	It has to be the first time the user opens the skill.
Description	Alexa provides a brief introduction, so that the user knows how the bot works.
Sequence	• User tells Alexa "Abre inteligencia sintetica" • Alexa verifies that this is the first time the skill was started. • Alexa displays an introductory message about how the skill works. • Alexa asks what do you want to do"
alternate outputs	If it's not the first time it's used, then Alexa displays a different, simpler greeting.

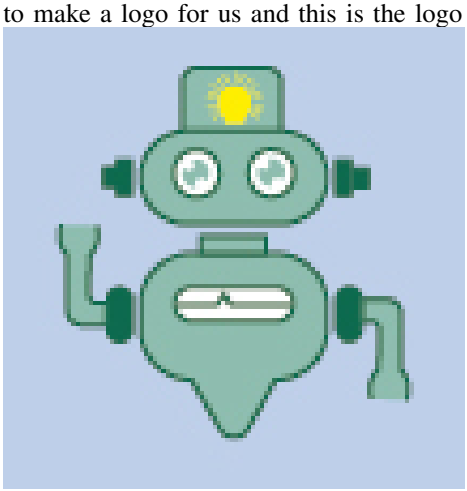
CU03 Alexa answers frequent ask questions	
Precondition	It only answers the basic frequently asked questions that are stored in the system.
Description	The user wants to know the answer to a ”Basic” question related to AI, and asks skill to answer his question.
Sequence	• User tells Alexa ”Alexa pregúntale a inteligencia sintética ¿pregunta?” • Alexa discusses the intention of the user and verifies that there is a possible answer to your question. • Alexa responds with a preloaded response.
alternate outputs	Alexa responds ”Vaya, creo que no encontré una respuesta a tu pregunta, pregúntame otra cosa.”

2) Use cases diagram: This is our use cases diagram:



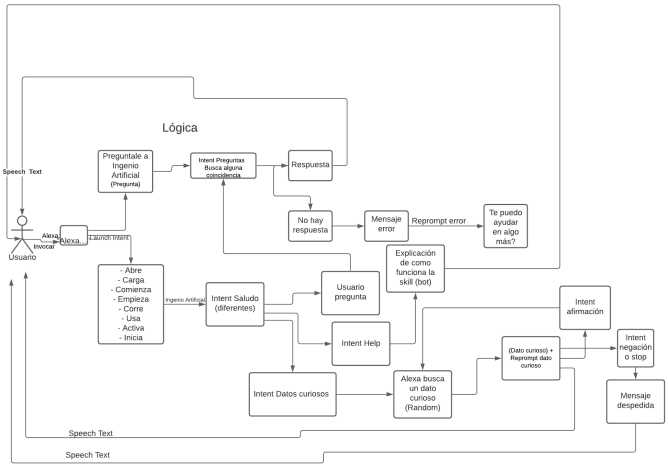
To see the use cases diagram with more detail you can visit our GitHub repository HERE

3) Skill logo: We paid a friend of one of the team members to make a logo for us and this is the logo he made:



we necessarily needed a logo to be able to upload our skill to the Amazon Alexa skill store

4) Skill Logic and UX: This is our skill logic diagram and UX flow diagram:



As well as with the use cases diagram you can visit our GitHub repository HERE to see it with more detail

C. Construction

This was the most extensive part of all the previous sprints, each developer was working on a characteristic of the skill. At the beginning, we started with a base code offered by ASK (Alexa Skill Kit), which gave us a clearer idea of the possible interactions that the skill can have with the user and that some of them are already defined. All the code part was organized by GitHub, we had a base code in a main branch and from there everyone created a sub-branch to work with.

In the first versions of the project, we had some problems organizing all the code in the file “index.js”, due to the new features that were being added. So we had to look for a quick solution and that’s when a team member recommended using the ”Composite” design pattern.
From what little we can understand, it consists of separating your application into different parts. What allowed us to have a simple and concise Code.

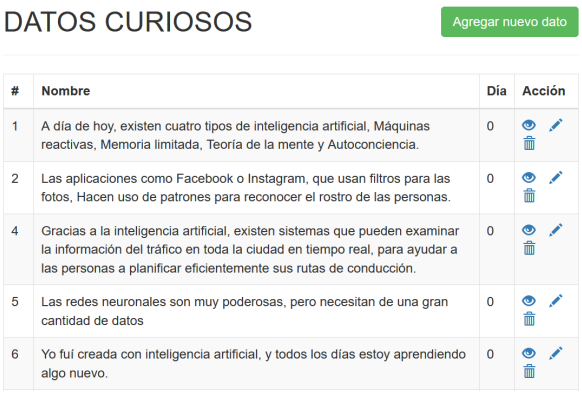
Doing a bit of research, we found that it was possible to do it in Nodejs with ”module. exports”, which allowed us to divide the intents into different files and in our ”Index.js” only those modules were imported referring to the name of the class that contains and the file path.

Our code, organized in modules:

index.js × languageStrings.js × questions.js × getDatoCuriosoIntentHandler.js ×

```
// Se separaron todos los intents, para que sea mas facil la edicion.
let { LaunchRequestHandler } = require('./intents/launchRequestHandler');
let { HelpIntentHandler } = require('./intents/helpIntentHandler');
let { GetDatoCuriosoIntentHandler } = require('./intents/getDatoCuriosoIntentHandler');
let { GetDatoDiarioIntentHandler } = require ('./intents/getDatoDiarioIntentHandler');
let { CancelAndStopIntentHandler } = require ('./intents/cancelAndStopIntentHandler');
let { ResetHandler } = require ('./intents/resetHandler');
let { FallbackHandler } = require('./intents/fallbackHandler');
let { SessionEndedRequestHandler } = require('./intents/sessionEndedRequestHandler');
let { ErrorHandler } = require('./errors/errorHandler');

// Inicia interceptors
let { LocalizationInterceptor } = require('./interceptors/localizationInterceptor');
let { LoadAttributesRequestInterceptor } = require('./interceptors/loadAttributesRequestInterceptor');
let { SaveAttributesResponseInterceptor } = require('./interceptors/saveAttributesResponseInterceptor');
// Termina interceptors



// Inicia intents Preguntas
let { doubtIntenthandler} = require('./intents/doubtIntenthandler');

let { QuestiononeIntentHandler } = require('./intents/questions');
let { QuestiontwoIntentHandler } = require('./intents/questions');
let { QuestionthreeIntentHandler } = require('./intents/questions');
let { QuestionfourIntentHandler } = require('./intents/questions');
let { QuestionfiveIntentHandler } = require('./intents/questions');
let { QuestionsisIntentHandler } = require('./intents/questions');
let { QuestionsevenIntentHandler } = require('./intents/questions');
```

- The first feature to be implemented was the ”LaunchIntent”. Where the user made the invocation of the skill by means of the name that was assigned to him and this responded with a curious random data, which were obtained from a JS file.
- As a second feature, the basic intents that are necessary for a skill were enabled. Help, Stop, Denial, Affirmation and in our case the ”GetDatoCuriosoIntent” which was the one that gave the curious data.
- The third feature was the Next Intent, which allowed to generate another Random curiosity if the user wanted it.
- The fourth feature was to add all the possible utterances that the user could say when requesting a Fun Fact.
- The fifth feature was to modify the ”LaunchIntent” in order to provide an introduction or instruction the first time the user used the skill.
- The sixth feature was adding the ability to answer ”Frequently Asked Questions about Artificial Intelligence”. The user must ask for the list of questions and then say the question to get an answer from the skill.
- The seventh feature was to add an intent that gave the curious fact of the day. They were obtained in the same way as the curiosity data, but it was saved in the user's session, to repeat the same data when the user invokes the intent for the second time.
- The eighth feature was to make an API that is connected to the skill so that we can easily update the curious facts and the curious fact of the day.
- The ninth feature is not related to the code of the skill, but we had to adapt a CRUD with PHP and Mysql to add, modify, delete new curious data and assign the curious data of the day, in an easier way for our team.



#	Nombre	Día	Acción
1	A día de hoy, existen cuatro tipos de inteligencia artificial, Máquinas reactivas, Memoria limitada, Teoría de la mente y Autoconciencia.	0	
2	Las aplicaciones como Facebook o Instagram, que usan filtros para las fotos, Hacen uso de patrones para reconocer el rostro de las personas.	0	
4	Gracias a la inteligencia artificial, existen sistemas que pueden examinar la información del tráfico en toda la ciudad en tiempo real, para ayudar a las personas a planificar eficientemente sus rutas de conducción.	0	
5	Las redes neuronales son muy poderosas, pero necesitan de una gran cantidad de datos	0	
6	Yo fuí creada con inteligencia artificial, y todos los días estoy aprendiendo algo nuevo.	0	

- As a last modification in the skill, we had to change the name of the skill from ”Ingenio Artificial” to ”Inteligencia Sintética”, as well as validate the ”Frequently Asked Questions” slots, as it was necessary for its correct approval in the Amazon Store.

In short, our project is a bot that responds to the user's voice commands and we already have a prototype of the Skill ready that provides curiosities, answers frequent Artificial Intelligence questions every time it is invoked.

D. Tests

The first test we did was when we were checking the feasibility of the project, we tested Alexa and Amazon services, in the end we checked if it was feasible to do the project with these services. Throughout the project we did 3 different tests: Alpha tests, Unit tests, Integration tests.

For the tests, each team member installed the voice assistant (Alexa) to test skill, the codes were implemented from the Alexa skill kit console, alpha tests were carried out, which consist of carrying out tests while the system is under development and to verify that what is being developed is correct and useful for the client.

Unit tests were carried out on the intents of the skill, the intentLaunch was tested, to verify that the skill starts when pronouncing the phrase ”Alexa, abre inteligencia sintética”, and they were tested with all intents (negation, affirmation, next, help, stop, etc.), just as integration tests were implemented to verify that the system works properly, and this led us to implement the subsystem test, which verifies that all the content is correct.

Once we finished coding the skill, system and user tests were made to assure the skill is working correctly, all the skill was tested, we tested all the intents to assure it gave the correct answers and to also test the API

E. Maintenance

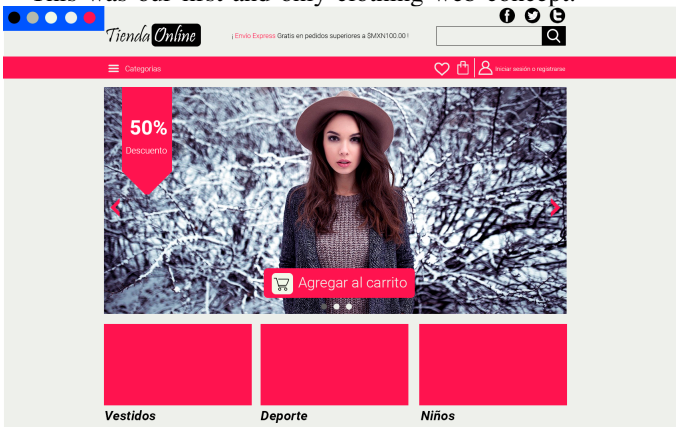
We haven´t done any maintenance yet because we just uploaded the skill to the Amazon Alexa store and to the day we are making this report no bugs have appear

VI. Project monitoring

A. developing process

First we started by holding a meeting to get to know each other and provide ideas about the project that we should carry out.
We understood that communication was a bit difficult, since we had never talked each other. During that meeting, the idea of creating a web page for a clothing store came up, so the idea of making the design in Photoshop came up and we did that.

This was our first and only clothing web concept:



The team seemed to like it and it was decided to present the idea to the teacher. That's when we had a reality check and our hopes of making a website were lost, but despite this, we felt motivated to develop another product, better than the previous one.

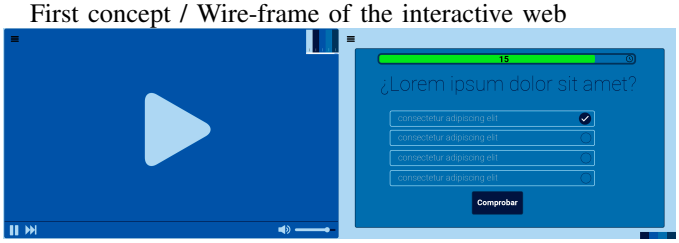
Then a team member suggested that we do an investigation about Artificial intelligence so we began doing the investigation.

From there, each member of the team chose various subtopics to investigate and we began to add information in a file that was on the GitHub platform and that allowed us to work on the same document, but in different sections.
The main topics were: Creation of AI, products and ethical debate, it is important to mention that all the content that had been added to the repository was referenced in the document.

Before carrying out the first delivery of the project, we had a conversation with the professors, to make sure that our product was correct and was at the level of university students.
Then we received some comments about the project, in them it could be perceived, discontent on the part of the teachers, because our research was very complex, and it would be difficult to carry out, because we had very little time and the topic of artificial intelligence is very extensive.

Then we refined more what we were going to do. We were going to do an interactive page about Artificial Intelligence, so, we started with all the preparations, to define the requirements and objectives of the new project, a person was also appointed to make a Wire-frame of the interactive site on artificial intelligence.

First concept / Wire-frame of the interactive web



The idea seemed simple, a website with interactive videos in the style "Black Mirror" on Netflix, but we had not contemplated the complexity of making a large number of videos, and on the team there were only two people with the knowledge to edit a video and adapt it to our needs.
So there we already had a problem, but we were still convinced that it was possible to finish the project on time.

We made the first delivery and we were sure that our project was the only one that didn't convince the teachers, it still seemed a little developed idea and talking with the team, it was decided to schedule another meeting with the teacher to give ups support to define our project. And then the teacher had a very interesting talk with us, that's where he recommended us to do an Alexa Skill of Artificial intelligence.

After hearing that great idea, the team scheduled a sprint to do some research on the complexity of perming Skills with Alexa and the tools needed to carry it out.

The process was complicated, as none of the developers on the team had worked with NodeJs and Alexa Skills, but we were motivated to continue with the project. Starting in January, the team was ready to start developing our Skill. The first thing we did was a meeting to define the project documentation and the characteristics or functionalities of the skill.

After that, another sprint was started and all the tasks to carry it out were organized. Some of those tasks included conducting fun facts research, in which each team member had to search 10-15 fun facts from the internet and include their reference in the documentation.

Once all the functionality of the skill was in place, the development team designed a diagram where it specified, all the user interaction at the time of using the skill, which served as a basis to start coding.

It could be said that the developers learned by watching YouTube videos and doing some tests with other skills, to later start with the development of "Inteligencia Sintética"

After several days of development, we already had the first prototype of the skill with limited characteristics, which provided curious data every time it was invoked.

This prototype was improving over time, modifying and adding new features that allowed better interaction with the user. To be exact, the entire coding process began between January 7-8, ending on January 26. It could be said that it lasted approximately 20 days and was a complicated process at first, but after several unsuccessful attempts, the user version was finished.

Obviously, having a "final" version, the corresponding tests were carried out by the team members to find possible errors. After completing the functional tests, the team was in charge of sending the skill to be published in the Amazon store. Unfortunately, there were still some problems with the skill, so some changes were made and it had to be sent back for review. This process was repeated 2 times, but on January 31, we received an email indicating that the Skill was now

available to all Alexa users in Mexico.

Amazon Alexa email, to indicate that the skill was accepted:

Your Alexa skill Inteligencia Sintética is now live!

no-reply-skilldev@amazon.com
para mí

inglés > español Traducir mensaje

amazon alexa

Dear Omar,

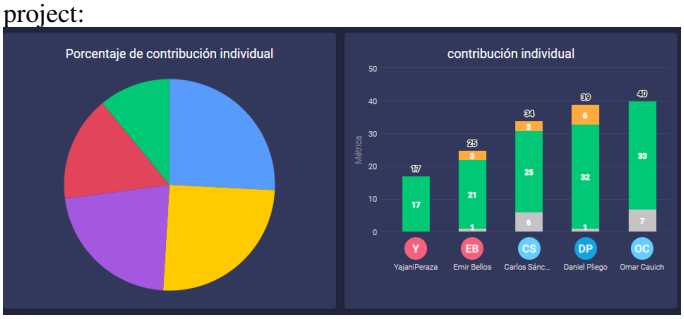
Thank you for the recent submission of your skill, 'Inteligencia Sintética'.

B. Monitoring

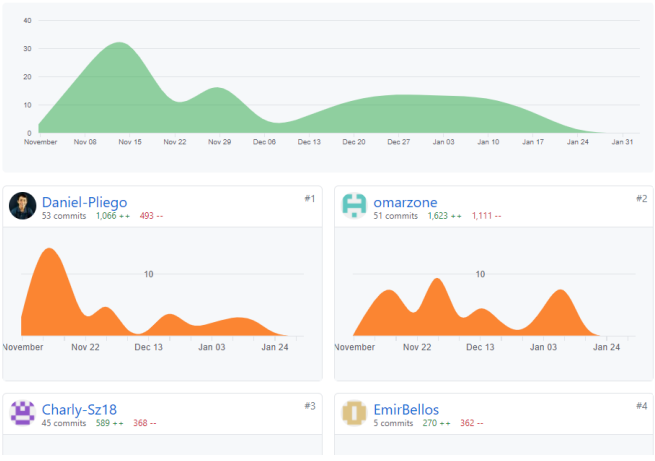
To monitor our process we used Monday.com which is an online tool to keep track of the project tasks Monday is a very useful tool because is easy to use, is free and you can easily generate graphics and statistics

We kept track on Monday of not only the task, we also used it to keep track of the individual metrics

This is an example of the graphics and metrics of our project:



We also used GitHub to keep track of our advancements by using the commits charts GitHub has and also checking the progress that the team have uploaded. GitHub is were the project repository is located and there is where we upload the advancements



C. Individual contribution

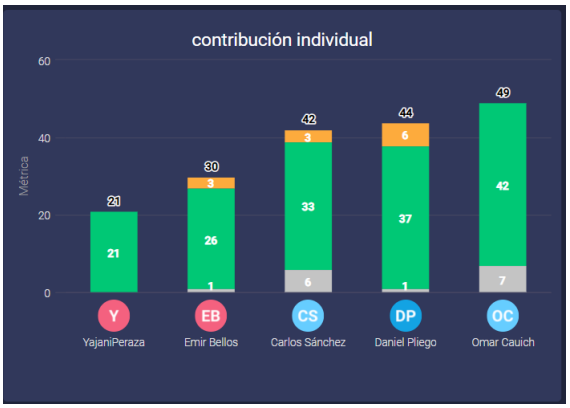
To measure the individual contribution we made the next metric:

To obtain the metric first we calculate the estimated time it will take us to do the task, then we calculate the difficulty The estimated time is measured in hours and the difficulty has 3 possible values

- Easy: 0.5
- Normal: 1
- Hard: 1.5

In case the task took much longer or was more difficult than estimated, the scrum master will see if it´s appropriate to change the metric values of the task

The individual contribution of all the team members is:



- Omar Cauich: 49 pts
- Daniel Pliego: 44 pts
- Carlos Sánchez: 42 pts
- Emir Bellos: 30 pts
- Yajani Peraza: 21 pts

VII. Learned Lessons

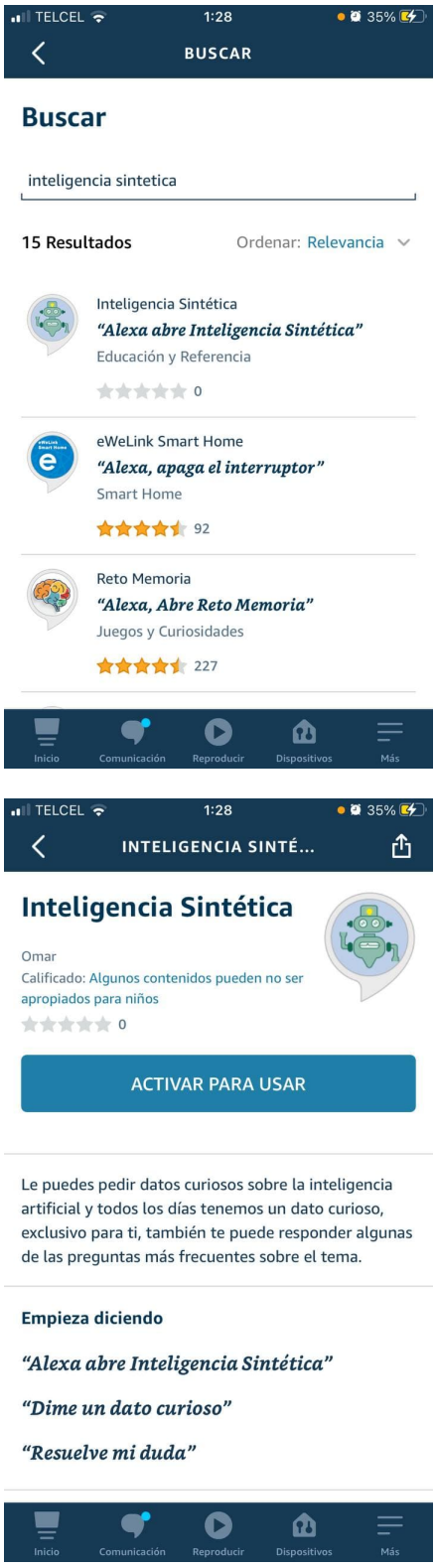
Throughout the project we have learned various lessons and new skill. Some of the lessons we learned are:

- Responsibility and punctuality are very important to be able to ac hive your goals
- Keeping everything in order is very important
- We can do more than we imagine
- We have much potential
- Doing a project with a methodology is easier than doing it without one
- agile methodologies are very useful
- The most important lesson is that having a supportive team is very important for the project to succeed

VIII. Evidence of Skill Acquisition

The evidence of our skills acquisition is our project Our project talks by itself, we passed from not having a very clear idea of what is artificial intelligence to making an Amazon Alexa skill and uploading it to the Amazon store

If we hadn't acquired all the skills we had acquired, we couldn't have finished the skill and less uploaded to the Amazon Alexa store



IX. Conclusions

We developed the project 95 % compared to what was planned, we were able to satisfactorily meet most of the goals established in the different stages of our project, the remaining 5 % is due to some minor characteristics that in the end were no longer implemented due to lack of time, but these features do not affect the functionality of the skill and were minor features

Self-evaluating our project, we consider that we are delivering a very good final result, we met the goals on time, we managed to perform all the requirements on time and we even managed to get our skills accepted in the Amazon store. We are satisfied with the final product of the project but what we would do differently next time would be to define our final product well from the beginning, we would improve the communication of the team and we would optimize the performance of tasks

We learned many things in the subject which helped us a lot in carrying out our project, some examples are:

- Having learned about the different software development methodologies or frameworks helped us to choose the methodology that best suited our needs to carry out the project
- Having learned the design phases helped us to be able to carry out the project in an efficient and organized manner
- Learning about the requirements helped us plan our final product from the beginning
- All the softskills talks helped us to have better team communication

References

1) https://github.com/Daniel-Pliego/Proyecto-FIS/blob/main/Documentacion/1.
2) https://github.com/Daniel-Pliego/Proyecto-FIS
3) https://www.amazon.com.mx/dp/B08VJG1R9T/?ref-suffix=ss_copy
4) https://www.youtube.com/watch?v=mqIk4-Ry-cg
5) https://developer.amazon.com/es-ES/alexa/alexa-skills-kit