

Software Construction and Decision Making

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Class Notes

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who knows what will be here

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1. Socioformadores

1.1. Mareé

Mauricio Hernández Siles (442 443 5874), Joel, María. @mareecrepe

Crepería. Experiencia completa.

Proyecto en fortalecer la relación con su comunidad. Incrementar la lealtad que tienen.

- Sistema de royalty para clientes. Mobile. Tarjeta digital.
- Menú digital, personalizado. Horarios y disponibilidad. Futuro, pedir comida en la aplicación.
- Portal administrativo.
- Notificaciones whatsapp, programar mensajes.
- Adaptable y disponible en los teléfonos.

Quieren una solución integral personal. Evitar limitantes.

Apoyo con el diseño.

1.2. Necesidad

El objetivo principal es fortalecer la relación con su comunidad, e incrementar la lealtad de los consumidores. La experiencia del cliente es muy importante.

1.3. Módulos

1.3.1. Menú

Debe de ser muy customizable, dependiendo de lo que quiero y que le quiero poner el menú cambia. Yo puedo armar mi propia crepa. Incluso manejar toppings o ingredientes de temporada. Debe de haber dos modelos de menú de crepas

- Arma tu crepa
- Crepas predefinidas que pueden ser modificadas

Proveen café, crepas, y waffles.

1.3.2. Administración

Poder modificar precios, ingredientes, usuarios, de temporada, horarios de atención,

1.3.3. Experiencia

Primero era un modelo *to go*, pero no funcionaba tan bien. Ahora funciona como un restaurante, llegan, menus, comandan.

Si le gustaría poder educar a su cliente a poder ordenar por medio de una aplicación.

Son mayormente mujeres, y si son hombres son es porque vienen con su pareja. Es en un casona histórica de Mazatlán.

No quiere cambiar su tipo de venta. Hay un prepa cerca y muchos van, por lo que estaría bien que los chavos puedan utilizarlo. No se quiere alejar del cliente, se quiere acercar por medio de la aplicación.

Saber del cliente, saber su nombre, si se fue de viaje, tener ese acercamiento con el cliente y la aplicación debe poder complementar eso.

Pedidos caen a un sistema que hace un sonidito especial, y manualmente se ingresa a la comanda. Tener una ipad a full volumen para reconocer que es del sistema. Sería bien tener un pedido que sepa quien estaba recibiendo esas comandas para saber si hubo algún error.

1.3.4. Diseño

Girly, enfocado a la mujer. Pero, fácil de usar y amigable a los hombres.

1.3.5. Lealtad

Tienen una tarjetita que va puntuando. Llevar el control de saber que consume, invitarlo a volverlo a consumir. Se tiene que tener información para poder dar recomendaciones y mensajes estratégicos. Tiene que ser personalizado, por ejemplo descuentos en cumpleaños. En consumo de x cantidad puedes participar en rifas, etc.

1.3.6. Métricas

Poque no se mueven algunas crepas. De dinero no se necesita mucho. Se enfoca más en la visita del cliente, si se la pasó bien, etc.

1.4. Preguntas

- No me queda muy claro a que se refieren con un portal administrativo.
- Que tipo de recompensa quieren ofrecer, puntos, descuentos, productos gratis
- La idea es que hayan membresias
- El menu cambia segun horario

1.5. Notas

Va a haber muchas oportunides para conectar con terceros. Apple pay, google wallet, what-sapp.

2. Project Management

2.1. An Introduction

The course seeks to teach techniques and knowledge for the efficient project management. It is mainly based on the Project Management Institute (PMI) and its research.

First it is important to realize that few are the projects that are successful. Only about 17% of all projects can be considered successful. Even optimistic estimates only reach about 20 to 30%.

There are some points of suspicion, points which can give us insight into why projects fail so often. These are but some of them:

- Incomplete or changing specifications and requirements
- Lack of user involvement
- Not enough technical knowledge
- Inadequate use of methods and tools
- Unrealistic expectations

We can conclude the main reason is **weak project management**.

2.1.1. Projects and Project Management

But first let us define what a project even is. A project is a temporal effort in order to bring a product, service or result to life. This definition implicates three things: effort, which is the use of organized resources; time constrainss, for it must be completed at some point; and the product itself, which must be alive, functioning.

Knowing this we might be able to answer, what is project management then?

Project management is the exercise of knowledge, abilities, tools and techniques in the activities that comprise a project in order to meet the project requirements.

2.1.2. PMBOK

Now PMI, a non lucrative association, is the author and proprietary of the **PMBOK**, the most complete manual on project management. It establishes standards, it homogenizes training programs and even certificates individuals. And PMBOK is its Project Management Body of Knowledge, which, among other things, describes the environment wherein the projects will be developed, describes and organizes the project characteristics, describes the necessary knowledge to manage a project (divided into 9 areas), and establishes a shared vocabulary.

The PMBOK manages mainly 9 areas, namely:

- Project Integration Management
- Project Communication Management
- Project Scope Management
- Project Schedule Management

- Project Cost Management
- Project Quality Management
- Project Risk Management
- Project Resource Management
- Project Procurement Management

2.1.2.1. Project Integration Management

Includes the necessary processes to guarantee that the distinct elements of the project are well coordinated. It includes the development of the project plan, the execution of said plan, a control for the changes made. This is a recursive process. A plan is made, then executed and revised by the control. With the feedback from the control the plan is altered, then executed and so on. Once the control gives a green light the process is terminated.

2.1.2.2. Project Communication Management

It deals with how to generate, collect, distribute, store, recover and delete the projects information.

2.1.2.3. Project Scope Management

How to determine if the project contains and only contains the necessary work to execute the project. How to control the use of resources and execution of activities so that the project may have the exact desired characteristics and functionalities.

2.1.2.4. Project Schedule and Cost Management

How to determine the order and sequence of activities to deliver in time. How to assign resources so that the project stays within budget. How to use the resources, time and money.

2.1.2.5. Project Quality and Risk Management

Quality deals with how to satisfy the project necessities by the continued improvement of processes. Risk deals with how to identify events that are out of the project control, and how to act accordingly.

2.1.2.6. Project Resource and Procurement Management

Resource means how to organize and administrate the team for the project, balancing participation, decision taking and commitment. Procurement means how to acquire the goods and services required by the project, as well as knowing how to select from providers.

2.2. A Review on Objectives

Any project must be divided in objectives. But first it is important to identify the necessity or problem, the **pain points** of the client. Only afterwards can the objectives be identified and detailed.

- Objective (usually in text)
- Functional (usecases diagrams)
- Non functional (quality attributes)
- Information (catalogues, fields, relations)
- Business rules

- Interface
 - User GUI
 - Communication (between other systems)

Extensible is a system that is able to grow by implementing more. Scalable is that the system grows just by inputting more computer power.

Question: How relevant is it nowadays the PMBOK and are big companies actually using it?

2.3. Scope

It is composed of all, and only those, necessary activities, works and processes that guarantee a successful project. It includes:

- Initiation
- Scope planning
- Scope definition
- Scope verification
- Scope change control

The scope is the aggregate of the *products* and *services* that need to be delivered, and defines what should be included but also what should not be included. These objectives are written in a SMART format.

But before diving into this subject, let's differentiate between *product scope* and *project scope*.

Product scope deals with the characteristics and functionalities that should be included in a given product or system. The success of it is verified with the requirements (functional, nonfunctional, business, etc.).

On the other hand, project scope deals with the work and tasks that need to be done in order to deliver the product with said characteristics and functionalities. Its success is verified with the project plan.

2.3.1. Initiation

Is the formal authorization of a new project or phase. It guarantees organizational support for the project. Among other things it defines the high level objectives, secures the necessary resources and approvals, confirms the alignment of the project with the strategic objectives, and assigns a project boss.

Since there may be many project ideas, only the best one should be considered. Therefore a method of prioritization is necessary. The available methods include: focusing on general necessities, categorizing the projects, financial analysis, and punctuation methods.

Once the project has been selected it must be formalized so that everyone involved in the project is on the same page. This formalization must contain:

- Objectives
- Success criteria
- Restrictions
- Assumptions

- Roles and responsibilities

Is this formalization the same as the project charter or a separate document?

There must be a project charter that recognizes the project and informs about the necessities of the project and the description of the product. This charter must have authority, and therefore must be signed by a high ranking official (xd).

2.3.2. Scope Planning

The development of a written scope statement that will serve as the foundation for future decisions regarding the project. It also establishes an agreement between the project and client in order to identify both the objectives as well as the things that will be delivered.

This statement must include (a) a project justification, (b) the project product, (c) the things to be delivered, and (d) the project objectives (written in a SMART method).

The scope management plan must describe how the project will be managed and how scope changes may be integrated. It is part of the global project plan. It must include the stability expectations and a clear description as to how scope changes will be identified and classified.

2.4. Scope Definition

Now the work must be divided into several more manageable pieces. Here we seek to

- Improve the precision of estimates for time, cost, and resources.
- Define the baseline by which the project will be compared and controlled.
- Help clearly define the responsibilities of each task.

A deliverable is every product, result or measurable element, tangible and verifiable that will be delivered.

2.5. Work Breakdown Structures

no idea what this is

It is the process of dividing the deliverables and work in smaller and more manageable products. It is a hierarchical decomposition delivery oriented.

A work package is the lowest level. We now our division has gotten there when we can (a) state when it begins and ends, (b) estimate costs and efforts, and (c) monitor and control it.

The detail level must be enough.

2.6. Context Diagram

It helps us identifying the scope of the project, the people interested and how data flows through the system.

2.7. Project Charter

Must include a description of the project, the people responsible, budget and time, what should be in the project and what not.

There must also be milestones that help divide the project and get tangible results, as well as knowing exactly how bad you are developing.

2.8. Addendum

- The people **interested** in the project are those who benefit and are affected by it.
- **Project agreement** is the document that formalises what the goals, scope and overall things that will be done in the project, which includes the time. It must also outline what the project will contain and what it will not.

3. Information Systems

3.1. An Introduction

An information system is defined as a set of interrelated components that compile, process, store and distribute information with the goal of decision taking and control over organization.

3.1.1. Definitions

- **Data:** Is the symbolic representation of an attribute or characteristic of an entity. It does not have semantic meaning but may be conveniently processed into a more valuable thing.
- **Information:** Is an organized set of data that has been processed and thus has semantic meaning.
- **Input:** Is the information (data?) produced by the user. An input also can be produced by networks, etc.
- **Processing:** Are the actions that take an entry and generate useful information for the user.
- **Output:** Is the information that the computer will show to the user.
- **Feedback:** Is the added value that allows users to take actions.

3.1.2. Architecture

It is divided in mainly five levels (types), each one with a specific user in mind.

1. **Transaction Processing System (TPS):** Help in the daily activities of a enterprise. They are the heart of the information system. It comprises the data collection, data manipulation, storage, and report production.

Its goal is to process data, be exact and correct, maintain data integrity, produce opportune reports and documents, and overall improve laboral efficiency. It, thus, has a big volume I/O, needs high storage capabilities, and impacts a high number of user (specially when there is an error and everyone is stroke).

A transaction means sort of CRUD, create, recover, update and delete information. There are three processing types:

- In line: In the moment as it arrives, though it does not matter if it lags behind (register user).
- In batch: Waits a bit to gather up and then processes.
- Realtime: Processes instantly as it arrives, where the time is critical (air traffic).

2. **Office Automation Systems (OAS):** Provide help for daily activities to increase employee efficiency of those who work with the information (e.g. word processors, email, schedules, etc.).

Knowledge Work Systems (KWS): Provide help for specialized employees in the creation and integration of new knowledge for the institution, for instance software that aids architects in blueprint design.

3. **Management Information Systems (MIS):** A collection of people, procedures, databases, and devices needed to display information to the managers and decision takers so that they may achieve the objectives. They seek to show a general vision of how things look and how and which operations take place.

These systems produce reports, which may be scheduled, demanded or exceptional (when a critical situation creates the need).

Decision Support Systems: It is similar to a MIS, but its purpose is to take decisions regarding specific problems, semi-structured problems or non-structured ones. It also gathers information from many places, but it must also be able to perform complex and sophisticated analysis using statistical packages. It must also be visual. A DSS serves as a *what if* visualizer, allowing the user to see the impact of hypothetical cases.

4. **Group Decision Support Systems (GDSS):** This system aids group decision taking. Its design is special, as it must encourage creative thinking and effective communication. It must also be easy to learn and use, while also being flexible enough to accommodate for the different kinds of people. It should also have some degree of anonymity in order for to avoid source bias.

Expert Systems (ES): A system that acts as a human expert in certain field or area. It helps identifying issues, predicting future events and aiding in the design of new products.

5. **Executive Information Systems (EIS):** Encompasses all critical information that influences decision taking. It aids non structured decision taking with KPIs graphicly. It uses quality information, reduced use of the keyboard, secure access, fast response time, remote access and perfect fitted design.

3.2. DB & DBMS

Se puede pensar en una base de datos como una colección de archivos interrelacionados lógicamente, cuyos datos han sido cuidadosamente diseñados para que estos archivos contengan la menor repetición de datos y hechos.

El uso de una base de datos es muy conveniente ya que nos permite trabajar con una mayor cantidad de datos, además de que se le puede dar una estructura bien diseñada para facilitar su uso.

3.2.1. DBMS

Un sistema de gestión de base de datos consiste en una colección de datos y un conjunto de programas para controlar esos datos. A la colección de datos interrelacionados se le denomina como la base de datos, y al conjunto de programas como el DBMS, que crea un entorno conveniente y eficiente para extraer y almacenar información de la base de datos.

3.2.2. Objetivos

- Eliminar la redundancia y la inconsistencia de los datos. El hecho de tener redundancia solo aumenta los costos de almacenamiento y acceso. Además, puede llevar a una inconsistencia de datos donde los diferentes registros contienen diferente información y no concuerden entre sí.
- Elimina la dificultad de acceso a la información. Las bases de datos proporcionan un sistema conveniente y eficiente para recuperar información, pero que a la vez es lo suficientemente generales para poder ser utilizado en varios lugares.
- Los datos están naturalmente relacionados.
- Seguridad al acceder de manera concurrente.
- Seguridad para evitar que cualquiera pueda acceder a la información.
- Integridad de los datos. Se pueden añadir restricciones a los datos dentro de la base de datos para asegurar que ciertas reglas se cumplan.
- Crear copias y backups de la base de datos.: