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Communication organizer (Webook)

Chapter one

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Project Management

2.1 Introduction

*"Operation keeps the light on, strategy provides a light at the end of the tunnel, but **project management** is the train engine that moves the organization forward."*

Joy-Gumz

A **project** is a temporary effort, which has a defined **scope** (size, goals, requirements), **resources** (staff, equipment, material), **time** (start and end, task durations, dependencies), **money** (costs, contingencies and profit). Project management oversees the planning, organising and implementing of a project.

Project management is a powerful business tool that can deliver many advantages to businesses of all sizes. It gives you repeatable processes, guidelines and techniques to help you manage the people and the work involved in your projects. It can increase your chances of success and help you deliver projects consistently, efficiently, on time and budget.

Webook follows the scrum method which is iterative way of project management rather than the linear waterfall method.

The Waterfall model is characterized by linear progression of discrete, consecutive process steps. Basic assumptions of the Waterfall model are the following:

- Project requirements are set and fully evolved before the project starts
- No revisit phases
- Stable context

In the Waterfall model, fully stated specifications and requirements are required before the planning starts. And design, development, testing, and deployment are performed in order. Once a phase is completed, it will not be revisited unless that phase fails inspection, review, or testing. This model also assumes that the development environment does not change much before the project is completed. However, clients usually find it quite difficult to completely define all requirements at the beginning of the project. Because of limitations like this, some researchers even pointed, "the Waterfall model is dead".

Agile is a group of process models based on iterative and incremental development to develop software through collaboration between self-managing

cross-functional teams. The Scrum model is the most popular implementation of agile models. Basic assumptions of Scrum based on past literature can be summarized:

- Requirements always evolve due to the technology changes, customer's need changes, and etc.

- Iterative project development processes.

The flexible, lightweight, and iterative process enables Scrum to embrace changes and survive in an unpredictable environment. Customers don't need to worry about the disadvantages that requirement changes bring to projects. This is one of the major reasons why Scrum is gaining popularity in the rapidly changing and developing software industry.

The Scrum life-cycle model is composed of five distinct Scrum activities: the kick-off, the sprint planning meeting, the sprint, the daily Scrum, and the sprint review meeting. These five activities are briefly introduced below. Figure1 presents the Scrum life-cycle model.

- The kick-off is a meeting in which the product owner defines and introduces the high-level backlog and the major project goals to the Scrum team and Scrum Master.

- The Sprint planning meeting takes place at the beginning of each Sprint. In the first part of the meeting, the product owner presents and discusses the product backlog (a prioritized requirements list for the project) with the Scrum team (the Scrum Master is considered as a member of the Scrum team). In the second part, the Scrum team determines the sprint goal, and creates the sprint backlog.

- The sprint is an iteration cycle of two to four weeks in which the functionality of the product is further developed. The product development processes such as development, testing, and adjustment happen in the sprint phase in an unpredictable and uncontrolled way.

- The daily Scrum is a meeting, which is held by the Scrum Master every day for less than 15 minutes, aimed at tracking the progress of project, improving communications between the Scrum team members.

- The Sprint review meeting is held at the end of each sprint, in which the Scrum team demonstrates the product to the product owner.

2.2 Project Planning- wbs

There are mainly five phases for the project which is analysis, planning, design, develop and test.

As long as we are following the iterative way of project management for this project. only system requirement analysis and project planning over all are not iterative. The rest (Design, develop, test) strictly follow the iterative method.

The following wbs shows detail deliverables for the plan and analysis phase but it will show the first stage deliverables for design, develop and test phase. After the first stage delivery of the project. The team will collect all the comments and will proceed to the next stage

	Level 1	Level 2	Level 3	Level 4
Weboo k		**Resource plan**	Human resource plan	• List down all employees with their role and responsibilitie s
			Material equipment plan	• List down all material equipment's needed for the project
		Financial planning	Hrs financial plan	• List financial budget for all employees
			Material equipment financial plan	• List all equipment financial budget
			Project budget	• List and sum of all project plan
		Team organization	• Organize and contact all team people • interview team people • Hire people suitable for the project	
	Planning	**Process model**	• Context data flow diagram • Data flow diagram • Description of each data elements of the diagram	

		Risk Management plan	Swot analysis	- Strength analysis - Weakness analysis - Opportunity analysis - Threat analysis - General swot analysis
			Risk management table	- identify risk - determine probability - evaluate projects
			Risk management	-planning response. -communicate risk.
	Analysis	**Interview**	- Make interview question - Order the questions based on employees to be interviewed - Make the interview	
		document	-Document analysis and organizing.	
		Tools and methodologies	-select best client-side interface tool -select best server-side technology -select suitable databases	
		Requirement	**Functional and non-functional requirement**	- list the functional requirement - list non-functional requirement
			Requirement determination	- draw use case diagram

				- use case documentation. - Design ui prototype - Design flow diagram
		Supplementary specifications		- Design business rules - Design constraints and change case
		System analysis model		- System analysis use case diagram - System analysis use case documentation
		- draw sequence diagram - draw activity diagram		
	Design	**Design Goals**	-specify design goal of the project	
		Subsystem Decomposition	-Decompose system to subsystems	
		Subsystem-one Phase models	-draw class models -draw persistent models -Map Class Diagram to Relation	
		Subsystem-one Database design	-database design -Normalization	
		Client-side design	- User Interface Design	
		Server-side design	-server-side design	
		Scrum board making	-Making stories -classify stories based on on-	

			progress, review ,completed
	Implementation	Team Meeting	-consecutive scrum meetings with gap of 15 days
	Test	System tester	-System tester will test the first subsystem
		customers	-customers test the first subsystem -accepting comment and feedbacks

2.3 Resource planning

2.3.1 Human resource planning

Human resource planning is an important part of the Company's human resource management system that includes policies related to acquisition, utilization, improvement and retainment of human resources. The primary objective of the human resource planning process is to optimally utilize the existing human resources by employing the right personnel for the right work. Therefore, listed below are the roles and responsibility for system project team.

- o **Graphics Designer**

Graphic design is the process of creating visual and textual content in order to communicate messages to a target group. It involves the application of typography, photography, and illustration, in combination with visual hierarchy and page layout techniques.

Key skills for graphic designers:

- Excellent IT skills, especially with design and photo-editing software
- Exceptional creativity and innovation
- Excellent time management and organizational skills
- Html and css skill

Responsibility:

- Create multiple design options for clients.
- Create and design advertising circular page layouts.

- Assist and support software engineers in executing projects successfully and on time.
- Coordinate and discuss creative aspects with other team members working on the project.
  - **Project Manager**:

A Project manager is someone who manages everything about a project. He or she manages the operations within a project — time, budget, delegation of tasks, scope creep, identification of risks and more. All in all, he or she is responsible for the successful delivery of the project within the decided budget and deadline.

Key responsibilities

- Communication
- Risk and issue management
- Planning and resource scheduling
- Scope management
- Leading
  - **Full Stack Programmer**

Is an individual who has a good understanding of technologies used to implement different layers and components in the solution. Some of the skill required are: -

- know at least one server-side programming languages like Mern stack technology (Mongo dB, express, react and node.js)
- Knowledge of various Non-SQL database technology.
- Knowledge of web services or API.
- knowing the principle of basic prototype design and UI /UX design.

  - **Front-End Developer**

The front end of a website is the part that users interact with. Everything that you see when you're navigating around the Internet, from fonts and colors to dropdown menus and sliders, is a combo of HTML, CSS, and JavaScript being controlled by your computer's browser.

SKILLS AND TOOLS

Front end developers responsible for a website's user-facing code and the architecture of its immersive user experiences. In order to execute those objectives, front-end devs must be adept at three main languages: HTML, CSS, and JavaScript programming.

o **Back-End Developer**

The back end of a website consists of a server, an application, and a database. A back-end developer builds and maintains the technology that powers those components which, together, enable the user-facing side of the website to even exist in the first place.

SKILLS AND TOOLS

In order to make the server, application, and database communicate with each other, back-end devs use server-side languages like Node.js t to build an application, and tools like Mongo Db Server to find, save, or change data and serve it back to the user in front-end code.

o **Tester: responsibilities of a performance tester:**
- Conduct system performance testing to ensure system reliability, capacity and scalability.
- Work with testing team to develop performance test plans and cases.
- Analyse test results and coordinate with development teams for bug fixes.
- Generate test summary reports for management review.
- Analyse root causes of performance issues and provide corrective actions.
- Suggest new tools and techniques to improve testing efficiency.
- Assist in project planning, scheduling, budgeting and tracking activities.
- Provide support in project design, development and deployment activities.
- Develop automated test scenarios and environments for performance testing.
- Review and recommend improvements to existing test procedures.
o **Project analyst:**

The primary role of a Business Analyst is to help the organization meet it's objective, provide business solutions, ensure complete requirement engineering for success of the project.

Responsibility:

- Maintaining project timeframes, objectives and communications.
- Verifying data and information and analyse it to suit the direction of a project.
- Preparing presentations and regular status reports.

Skill required:

- understanding in project management and data analysis
- Proficient in computer technology and Microsoft Office applications
- Excellent verbal and written communication skills

- Strong analytical and problem-solving abilitie

- **System architect**

System Architects design, configure, operate and perform maintenance on networking and computer systems including hardware, software, web portals, internet and intranet connections, firewalls, servers, and security that allow company infrastructures to function.

Responsibility:

- Designing and implementing short and long-term strategic goals for managing and maintaining systems and software.
- System Architects design, create and monitor the implementation of end-to-end integrated systems.
- Lead architecture vision, design and documentation.
- Lead on system design, architecture and integration.
- Realize target architecture advancing business and information technology strategies.

System Architect Skills:

- Working knowledge of Non-SQL databases, JavaScript frame works like react
- Solid understanding of Object-Oriented Programming, coding for large scale web or client-server applications and design and development of application service layers

  o **Node.js developers**: deploy and maintain network applications.

Responsibilities:

- Developing and maintaining all server-side network components.
- Designing customer-facing UI and back-end services for various business processes.
- Implementing effective security protocols, data protection measures, and storage solutions.

Skill required:

- Knowledge of server side Node.js frameworks like Express, socket.io, mongoose.

- Extensive knowledge of JavaScript, web stacks, libraries, and frameworks.
- Great organizational and time management skills.

  o **JavaScript Developer:**

JavaScript Developer is responsible for the programming and development of applications and software using the popular programming language

Responsibilities:

- Develop and enhance our main front end platform - website
- Develop new user-facing features
- Design and develop new front end applications for various platforms

  Skill required:
  - React.js framework knowledge
  - JavaScript Dom knowledge
  - Virtual Dom Knowledge
  - Extensive HTML/CSS
  - Full stack web development experience

Specification	Employee amount
Project manager	1
Project Analyst	1
Front end developer	3
Back end developer	3
Full-stack developer	3
Graphics designer	2
Tester	1
System architect	1
Node.js developer	1
JavaScript developer	1

2.3.2 Material /equipment planning

Software equipment

- Visual basics note editor
- Node.js
- npm packages
- React.js
- Express.js
- Bootrrap.css
- Html and CSS
- Atlas Mongo database
- Chrome browser

Hardware equipment

- Laptop
    Above 50 GB hard disk
    Above 2 GHZ processor speed
    8 GB RAM
- Modem
- White board
- Papers, pencil, Markers, pen
- Boards
- Chair and table
- Router
- Internet connection

Hardware	Specification	Number of required
Computer	50GB hard disk, 8GB RAM, 2GHZ processor speed	20
Internet requirement	Router, modem	4
Internet connection	80 Mb/s	
White Boards	2m*1.5m	4
Boards	2m*1.5m	4
Chairs	Comfortable for typing	30
Table	Comfortable for typing	20

2.4 financial planning

The main goals and objectives will be effective use of financial resource in a given day and it provides a road map for our financial future.

The project time frame is estimated to be between 110 to 120 days. So the estimated finance is based on the time frame, human resource and material resource and backup for any accidental and emergency case during in the development process.

Our payment and cost analysis are based on current country average cost. System is based on accomplishment of a certain task. It is a contract payment system for each task done by each team member. Our total project estimated budget is a total of 1,200,000 birr.

2.4.1 Human Resource Financial Plan

Specification	Payment in Birr per month	Employee amount	Gross of (Pay*emp) in birr per month
Project manager	20000	1	20000
Project Analyst	9000	1	9000
Front end developer	7000	3	21000
Back end developer	7000	3	21000
Full-stack developer	10000	3	30000
Graphics designer	10000	2	20000
Tester	8500	1	17000
System architect	25000	1	25000
Node.js developer	9500	1	9500
JavaScript developer	12000	1	12000
Total per month	118000	17	184500

2.4.2 Material/Equipment Financial Plan

Material resource	Price in Birr	Amount of materials	Gross in birr
Computer	9000	20 with reserve 3	18000
Internet connection	24000 per month		24000 per month
Router	4000	2	8000
Modem	1300	3	3900
Chair	200	20 with reserve	4000
Table	200	20 with reserve	4000
Domain For Website	5000	1	5000
Office Rent	25000	1	25000
White Board	400	4	1600
Board	500	4	2000
Total	69600		273700

2.4.3 Project budget

Totally **1,083,700birr** is efficient for our system development. But the rest additional **116700 birr** of is reserved for sec of surprise.

Generally we budgeted **1,200,000 birr.**

2.5 Team organization

Applicants apply their cv, certificate and work experience using our email weebook123@gmail.com and potential applicants will be interviewed through face-to-face communication.

Team organization is done after hiring the people required with the specified skill. For the best group performance there will a repository on GitHub (Repository website). A New repository will be created and all the developers and analysis will be committed.

2.6 Process Model

Software Processes is a coherent set of activities for specifying, designing, implementing and testing software systems. A **software process model** is an abstract representation of a process that presents a description of a process from some particular perspective. There are many different software processes but all involve:

- Specification – defining what the system should do;
- Design and implementation – defining the organization of the system and implementing the system;
- Validation – checking that it does what the customer wants;
- Evolution – changing the system in response to changing customer needs

As long as we following the iterative way of system development .it does not attempt to start with a full specification of requirements by first focusing on an initial, simplified set user feature, which then progressively gains more complexity and a broader set of features until the targeted system is complete. When adopting the iterative approach, the philosophy of incremental development will also often be used liberally and interchangeably.

For better iterative way of approach after the decomposition to subsystem the team will deliver the first subsystem then the customer will give comment on the subsystem and obviously will done some improvement based on the given comment. As the subsystem is being supervised, the next subsystem will be started. The cycle will continue until it reaches to the final subsystem. After the final subsystem is delivered the system will be a system which interprets and hold all the system that are decomposed.
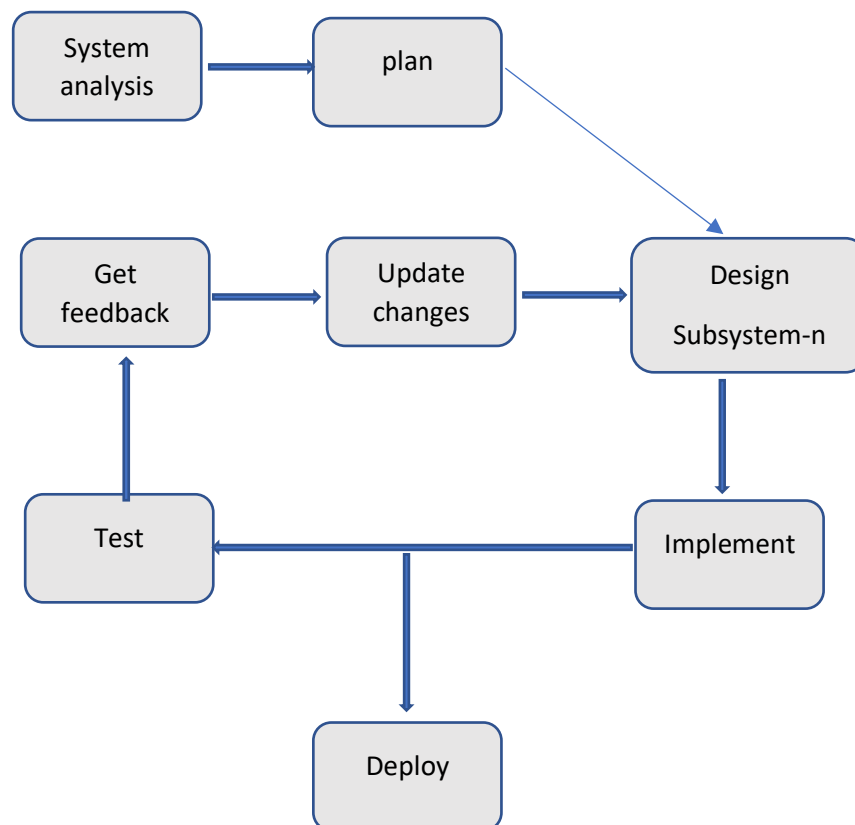
System analysis → plan → Design Subsystem-n

Get feedback → Update changes → Design Subsystem-n

Test, Implement, Deploy

Fig 1:- process model

2.7 Risk MMM plan

Customers and key stakeholders place a lot of trust in the reliability of our web application. They trust that their data is secure from unwanted access on the servers, while still seamlessly allowing wanted access while they're using it.

Many things can happen to compromise data-safety and application reliability. Some of these are common and some are rare, but it's a fact that they're inevitable. we *cannot* avoid malicious users from trying to exploit the holes in our application's armor. Our Database-driven services(**mango.Db**) is more prone to *SQL Injection* attacks, where an unwanted user gains privileges in your database. It's enough to have the most basic database privileges to be able to extract enough information to cause havoc, depending on how sensitive the data is.

These attacks are possible with even the slightest oversight in the design and architecture of the application and the lack of query checks in the back-end.

That being said, Focusing on risk management is an essential part of ensuring our customer safety and satisfaction. It's up to us and our team to identify which attacks our application will be prone to, and which protection measures will be implemented.

Here is how we are going to use *Risk MMM Plan to* increase the reliability of our web app.

We start with risk assessment :- The first step we are going to take for effective risk management is to create a list of the risks that our web application(**webook**) faces.

our application transfers sensitive information between clients and servers so we expect a MitM(man in the middle) attack.

our application sends a lot of massage with attachments so we expect a Phishing attack.

SQL injection

users not being able to understand our web application

Next, we will need to *quantify* the risks that our application faces. Quantification makes it easy for us to compare risks, identify the most impactful ones, and pick suitable risk control measures. This being said, For the purpose of illustration, we provide Risk MMM Table includes four of the attributes given above. It is sorted according to the probability of occurrence, and the total risk exposure is a sum of all the individual risk exposures.
To quantify a possible risk, we simply used this equation **:- R= P*RE**

Where: *R* = Risk of an attack, *RE* = risk exposure and *P* =average the likelihood of possible risk occurring. the risk is calculated as:

R=100%*10 ; the highest risk that our project can be exposed to is (*10*). So from this we calculate risk of an attack and demonstrate our Risk MMM Table.

Description(Risk of an attack)	Probability of Occurrence	Risk Exposure (Days)
MitM(man in the middle) attack	35%	3.5
Phishing attack.	20%	3.0
SQL injection	20%	3.0
users not being able to understand our web application	5%	0.5
	Average of probability= 20% **Total risk exposure= 10.0** **Risk of an attack = 10.0*20%= 2/10**	

Now that we have demonstrated our Risk mmm table, we work on solution that we are going face.

. A Man-in-the-Middle (MITM) attack happens when a hacker inserts themselves between a user and a website. This kind of attack comes in several forms. For example, a fake website may be used to capture our website login information. The fake site is "in the middle" between the user and the actual website.

Types of Man-in-the Middle Attacks

Wi-Fi Eavesdropping

If you've ever used a laptop in a coffee shop, you may have noticed a pop-up that says "This network is not secure." Public wi-fi is usually provided "as-is," with no guarantees over the quality of service.

However, unencrypted wi-fi connections are easy to eavesdrop. It's much like having a conversation in a public restaurant – anyone can listen in. You can limit your exposure by setting your network to "public," which disables Network Discovery. This prevents other users on the network from accessing your system.

Another Wi-Fi Eavesdropping attack happens when a hacker creates its own wi-fi hotspot, called an "Evil Twin." They make the connection look just like the authentic one, down to the network ID and passwords. Users may accidentally (or automatically) connect to the "evil twin," allowing the hacker to snoop on their activity.

Man in the Middle Attack Prevention

By letting our uses Use a Virtual Private Network (VPN) to encrypt your web traffic. An encrypted VPN severely limits a hacker's ability to read or modify web traffic.

Network Security, Secure our network with an intrusion detection system. Our Network administrators will be using good network hygiene to mitigate a man-in-the-middle attack. Also Analyze traffic patterns to identify unusual behavior.

By Use third-party software and HTTPS encryption to help detect and block spoofing attempts. Install active virus and malware protection that includes a scanner that runs on your system at boot. MITM attacks often rely on malware. Running updated anti-virus software is imperative.

. Phishing attack :- is a type of social engineering attack often used to steal user data, including login credentials. It occurs when an attacker, masquerading as a trusted entity, dupes a victim into opening instant message, or text message. The recipient is then tricked into

clicking a malicious link, which can lead to the installation of malware, the freezing of the system or the revealing of sensitive information.

The most common phising attack technique that could happen to our weebok or website:

- Email phishing scams is a numbers game. An attacker sending out thousands of fraudulent messages can net significant information and sums of money, even if only a small percentage of recipients fall for the scam.

-Spear phishing targets a specific person or enterprise, as opposed to random application users. It's a more in-depth version of phishing that requires special knowledge about an organization, including its power structure.

An attack might play out as follows:

1. A perpetrator researches names of employees within the organization's and gains access to the latest project invoices.
2. Posing as the marketing director, the attacker emails a departmental project manager (PM) using a subject line that reads, Updated invoice for Q3 campaigns. The text, style, and included logo duplicate the organization's standard email template.
3. A link in the massage redirects to a password-protected internal document, which is in actuality a spoofed version of a stolen invoice.
4. The PM is requested to log in to view the document. The attacker steals his credentials, gaining full access to sensitive areas within the organization's network.

Here is how we prevent phishing attack

Phishing attack protection requires steps be taken by users and organization.

For users, vigilance is key. A spoofed message often contains subtle mistakes that expose its true identity. These can include spelling mistakes or changes to domain names.

For enterprises, a number of steps can be taken to mitigate both phishing and spear phishing attacks:

. Two-factor authentication (2FA) is the most effective method for countering phishing attacks, as it adds an extra verification layer when logging in to sensitive applications. 2FA relies on users having two things: something they know, such as a password and user name, and something they have, such as their smartphones. Even when employees are compromised, 2FA prevents the use of their compromised credentials, since these alone are insufficient to gain entry.

-In addition to using 2FA, organizations should enforce strict password management policies. For example, employees should be required to frequently change their passwords and to not be allowed to reuse a password for multiple applications. -Educational campaigns can also help diminish the threat of phishing attacks by enforcing secure practices, such as not clicking on external email links.

. SQL injection :- consists of insertion or "injection" of a SQL query via the input data from the client to the application. SQL Injection has become a common issue with database-driven web sites. The flaw is easily detected, and easily exploited, and as such, any site or software package with even a minimal user base is likely to be subject to an attempted attack of this kind.

Essentially, the attack is accomplished by placing a meta character into data input to then place SQL commands in the control plane, which did not exist there before. This flaw depends on the fact that SQL makes no real distinction between the control and data planes.

SQL injection prevention techniques
With user input channels being the main vector for such attacks, the best approach is controlling and vetting user input to watch for attack patterns. we can also avoid vulnerabilities by applying the following main prevention methods.

-Input validation
The validation process is aimed at verifying whether or not the type of input submitted by a user is allowed. Input validation makes sure it is the accepted type, length, format, and so on. Only the value which passes the validation can be processed. It helps counteract any commands inserted in the input string. In a way, it is similar to looking to see who is knocking before opening the door.

- Parametrized queries
Parameterized queries are a means of pre-compiling an SQL statement so that you can then supply the parameters in order for the statement to be executed. This method makes it possible for the database to recognize the code and distinguish it from input data.

The user input is automatically quoted and the supplied input will not cause the change of the intent, so this coding style helps mitigate an SQL injection attack.

-Stored procedures

Stored procedures (SP) require us to group one or more SQL statements into a logical unit to create an execution plan. Subsequent executions allow statements to be automatically parameterized. Simply put, it is a type of code that can be stored for later and used many times.

So, whenever you need to execute the query, instead of writing it over and over, you can just call the stored procedure.

. users not being able to understand our web application:- even though this problem happens rarely. The fact is, usability is becoming an essential aspect of web application development. User expectations have changed. Modern end users expect to pick up a web app and understand how it works. Confusing interfaces will only frustrate users and drive them away.

We are going to achieve clear and usable design through

Simplicity – we focus on what's important. If we don't distract our users they will be more likely to do what you want them to do.
Familiarity – Stick to what people already know. So as users can easily understand our website
Consistency – by creating a consistent experience across our entire website to keep our users mind at ease.

Guidance – Take our users by the hand. We Don't expect our users to explore our site all on their own. Instead, guide them through our site and show them what we offer.
Direct feedback – Feedback is essential to any interaction. The moment people interact with our site, we make sure to offer an indication of success or failure of their actions.
Good information architecture – Understand our users mental models and how they would expect us to structure the content on our site.