

WIRELESS MOBILE CHARGER USING MAGNETIC INDUCTION

PROJECT REPORT

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In partial fulfillment of the requirement for the award of
BACHELOR'S DEGREE OF SCIENCE IN PHYSICS



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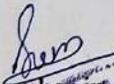
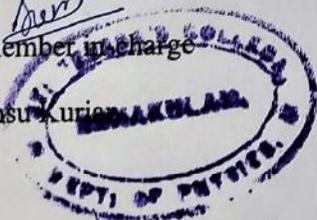
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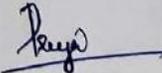


**B.Sc. PHYSICS PROJECT
REPORT**

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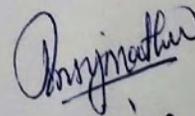

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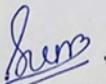

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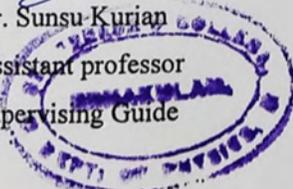
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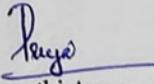


CERTIFICATE

This is to certify that the project report entitled “**WIRELESS MOBILE CHARGER USING MAGNETIC INDUCTION**” is a bonafide work by N SORNAMUHI, St.Teresa’s College Ernakulam, under my supervision at the Department of Physics, St.Teresa's College, Ernakulam for the partial fulfillment of the award of Degree Of Bachelor of Science in Physics during the academic year 2021-'22 .The work presented in this dissertation has not been submitted for any other degree in this or any other university.


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ACKNOWLEDGMENT

DECLARATION

I, **N SORNAMUHI (Register Number: AB19PHY019)**, final year B.Sc. Physics student, Department of Physics, St. Teresa's College, Ernakulam do hereby declare that the project work entitled "**WIRELESS MOBILE CHARGER USING MAGNETIC INDUCTION**" has been originally carried out under the guidance and supervision of Dr. Sunsu Kurian, Assistant Professor, Department of Physics, St. Teresa's College (Autonomous), Ernakulam in partial fulfillment for the award of the Degree of Bachelor of Physics. I further declare that this project is not partially or wholly submitted for any other purpose and the data included in the project is collected from various sources and are true to the best of my knowledge.



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I would like to express my gratitude and appreciation to all those who gave us the possibility to complete this report. I feel obliged to acknowledge the support and guidance that came from various quarters during the course of competition of this project. I would like to express our sincere gratitude to Dr. Sunsu Kurian, the project in charge, for guiding us throughout the entire duration of the project work, whose help, stimulating suggestions and encouragement helped us in all time of fabrication process and in writing this report.

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ABSTRACT

The main objective of this project is to demonstrate the concept of wireless mobile charging system using the principle of inductive coupling. The system allows users to wirelessly charge their mobile phones without plugging in the mobile adapter. It is demonstrated using a charging pad where users just need to place their adapter circuit to charge their mobile phone. The system is based on a coupling magnetic field, thus designed and constructed as two parts: the transmitter part and receiver part. An oscillation circuit converts DC energy to AC energy to transmit magnetic field by passing frequency and then induce the receiver coil. The Ampere's law, Biot Savart's law and Faraday law are used to calculate the inductive coupling between the transmitter coil and the receiver coil. We have constructed a wireless mobile charger using magnetic induction and the efficiency of the system is calculated by varying the distance between the coils.

CHAPTER 1

INTRODUCTION

In this modern era, Wireless and Telecommunication have become an integral part of each other to provide wireless communication to the common man that helps people located in any part of the world communicate easily. This technology transmits information over the air using electromagnetic waves like infrared, radiofrequency, satellite, etc. For example, GPS, Wi-Fi, satellite television, wireless computer parts, wireless phones that include 3G and 4G networks, and Bluetooth. Wireless charging technology enables wireless power transfer from a power source such as a charger to a load such as a mobile device conveniently across an air gap by eliminating the bunch of wires. The development of this technology started in the late 19th and early 20th centuries, when a number of important innovations in electromagnetic research were made. These advancements established the basic principles that served as the foundation for modern electrical power transport.

Wireless technology makes our life more convenient and easier. Imagine sitting on a sofa and reading the newspaper, and automatically charging your mobile phone by placing it on a table without the need of getting a wired charger and plugging it to a supply. You can simply grab your mobile phone at any time and charge it wherever you are- home, the office, the library, the local coffee shop. It has numerous applications like for pacemakers, MP3 players, toothbrushes, iPod, digital cameras, laptops, etc.

There are a number of methods for transmitting power wirelessly. The most popular and effective of which are inductive coupling, resonant inductive coupling, capacitive coupling, radio frequency and microwave power transmission, and laser power beaming. One of the oldest techniques of transferring energy wirelessly is inductive coupling. An inductor is a wire formed into a coil where an induced current produces a magnetic field which is based on the principle of electromagnetic induction. Electromagnetic or magnetic induction is the production of an electromotive force across an electrical conductor in a changing magnetic field. Michael Faraday is generally credited with the discovery of induction in 1831, and James Clerk Maxwell mathematically described it as Faraday's law of induction.

The project demonstrates the concept of wireless mobile charging system. The efficiency of the system is calculated by varying the distance between the coils. Graphs between the efficiency and distance are plotted for its performance analysis. The system allows users to wirelessly charge their mobile phones without plugging in the mobile adapter. The system is demonstrated using a charging pad where users just need to place their adapter circuit to charge the mobile phone.

CHAPTER 2

PROBLEM STATEMENT

Wireless Charging is one technology that looks very promising in today's tech world. Most, if not all high-end Smartphones these days come with the Wireless Charging feature and for those smartphones that don't come with the feature, you can always buy a Wireless Charging Case. This will enable you to charge your smartphone wirelessly simply by placing the smartphone on the charging pad.

The biggest disadvantage of wired technology is that it lacks the mobility that wireless technology provides. You are physically limited to the reach of the cable, whereas wireless technology allows users to move great distances freely and without hassle. Moving equipment that is even within the range of the cable may be difficult if you choose to mount the cables rather than have them dangling. Another physical constraint of wired technology is that wires can be easily damaged, which is not as large of a concern with wireless technology. Exposed cables are susceptible to everyday abuse from things such as cleaning. Wires that are exposed and not properly laid may also pose a tripping risk, not only damaging the cable but also potentially sending someone to the emergency room. Damaged wires may have to be completely replaced.

Using a wireless charger gives your USB Port more free time and subsequently increases the lifespan. There is no doubt that using wired chargers leads to the USB Port getting more action which can damage the port. Using a wireless charger leaves the USB Port for only when you need to connect to another device like computers, hard drives, TV etc which if we are to be honest happens less frequently than charging. Wireless networks are cheaper to install and maintain. The data is transmitted faster and at a high speed.

The study is therefore aimed at eliminating the problems of wired technology and demonstrating the easiness of wireless communication systems promoting greater convenience and ubiquity for charging everyday devices. By designing and constructing a method by circuit to transmit electrical power wirelessly from source to device, we will eliminate the use of cables in the charging process, thus making it simpler and easier to charge a low power device. It would also ensure the safety of the device since it would eliminate the risk of short circuit.

CHAPTER 3

PRINCIPLE OF WORKING

3.1. ELECTROMAGNETIC INDUCTION

Ørsted was able to demonstrate that electric currents can produce magnetic fields by setting up a compass through a wire carrying an electric current. The English physicist Michael Faraday, a brilliant experimentalist, was the first to demonstrate the converse effect that magnetic fields can be used to induce electric currents. Faraday wrapped a thick iron ring with two coils of insulated wire, one on each side of the ring. One coil was connected to a battery, and the other to a galvanometer. When the battery circuit was closed, Faraday saw a momentary deflection on the galvanometer. A similar momentary deflection but in the opposite direction was seen when the battery circuit was opened.

This observation led to the discovery that a change in a magnetic field produces an electromotive force and current in a nearby circuit. This phenomenon, called electromagnetic induction, was later mathematically modeled by James Clerk Maxwell and came to be known as Faraday's Law. The foundation laid by Faraday helped Maxwell further investigate electromagnetic field theory, and the latter's contribution then significantly influenced 20th century physics. Faraday's law of induction describes how an electric current produces a magnetic field and, conversely, how a changing magnetic field generates an electric current in a conductor. The American physicist Joseph Henry independently made the same discovery at about the same time, according to the University of Texas at Austin.

Faraday explained electromagnetic induction using a concept he called lines of force. Coils of wire in the base station (the charging plate) create a magnetic field as the current passes through. This field can induce an electrical current in an adjacent coil of wire without actually touching it. Inductive charging uses an electromagnetic field to transfer energy between two objects. This is usually done with a charging station. Energy is sent through an inductive coupling to an electrical device, which can then use that energy to charge batteries or run the device.

Faraday's Law states that the amount of voltage induced in a coil is directly proportional to the rate of change of the magnetic flux with respect to the coil, $d\phi/dt$ and to the number of turns of wire in the coil (N). The formula that represents Faraday's Law is the following:

$$V = N \frac{d\phi}{dt} \dots\dots\dots(1)$$

where V= the induced voltage

N = number of turns of wire in the coil

$\frac{d\phi}{dt}$ = the rate of change of the magnetic flux

In an AC circuit, the induced voltage is directly dependent on frequency. As frequency increases so does the rate of change of the current. The formula of inductance is as follows:

$$L = \frac{N\mu A}{l} \dots\dots\dots(2)$$

$$\mu = \mu_r \mu_0$$

where L = inductance of coil in Henrys

N = Number of turns in wire of coil

μ = Permeability of core material

μ_r = Relative permeability (1 for air)

μ_0 = Permeability of free space ($4\pi \times 10^{-7} \mu/m$)

A = Area of coil in square meters

l = Average length of coil in meters

3.2. Inductive Coupling

Two conductors are said to be inductively coupled or magnetically coupled when they are configured in a way such that change in current through one wire induces a voltage across the ends of the other wire through electromagnetic induction. A changing current through the first wire creates a changing magnetic field around it by Ampere's circuital law. The changing magnetic field induces an electromotive force (EMF or voltage) in the second wire by Faraday's law of induction. The amount of inductive coupling between two conductors is measured by their mutual inductance. The coupling between two wires can be increased by winding them into coils and placing them close together on a common axis, so the magnetic field of one coil passes through the other coil. Coupling can also be increased by a magnetic core of a ferromagnetic material like iron or ferrite in the coils, which increases the magnetic flux. The two coils may be physically contained in a single unit, as in the primary and secondary windings of a transformer, or may be separated.

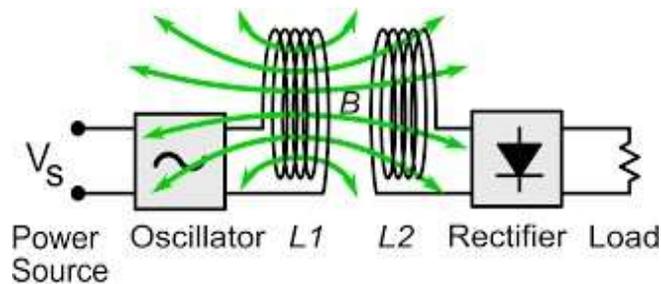


Fig 1. Simplified Circuit Illustrating Inductive Coupling

Consider a coil through which a current is passed. This creates a changing magnetic field around it. When a second coil is introduced to a changing magnetic field of the primary coil, it will cause an induced voltage in the second coil, thereby magnetically coupling the coils. The voltage induced in the second coil is a function of mutual inductance, calculated by the following formula:

$$L_M = k\sqrt{L_1 L_2}$$

Where L_M = Mutual inductance

$$k = \frac{\phi_1}{\phi_2}, \text{ coefficient coupling between the two coils}$$

$$L_1 = \text{Inductance of coil 1}$$

$$L_2 = \text{Inductance of coil 2}$$

The formulas above describe the principles of induction and how voltage is induced in a second coil.

In the circuit, the transmitter has an AC source which is connected to a resistor (R_p) and an inductor (L_1), where the resistor represents power loss due to heat. As inductor 1 (L_1) receives the fluctuating current from the AC source it creates a magnetic field and induces voltage in L_2 . The receiver circuit which has L_2 , R_s , and R_L is powered by the changing magnetic field of the transmitter. Again, R_s represents the power loss of the inductor and R_L is the load.

Power transfer efficiency of inductive coupling can be increased by increasing the number of turns in the coil, the strength of the current, the area of cross-section of the coil and the strength of the radial magnetic field. Magnetic fields decay quickly, making inductive coupling effective at a very short range. There have been some attempts to reduce transfer loss in inductive coupling. Methods such as implementing ultra-thin coils, higher frequencies, and enhancing drive electronics are possible solutions. When implementing higher frequency induction to deliver high power the efficiency reaches 86%, the other two methods are still being investigated for any improvements.

CHAPTER – 4

OVERVIEW OF COMPONENTS

The hardware components required to design the proposed system of wireless mobile charger are :-

- 1) Copper wire (25 gauge)
- 2) IRFZ44N MOSFET
- 3) 9 volt Battery
- 4) IC4007 diode
- 5) 1000 μ F capacitor
- 6) LM7805
- 7) 1 K Ω resistor
- 8) LED
- 9) Switch
- 10) Breadboard
- 11) Charging pin
- 12) Battery cap

4.1. HARDWARE SPECIFICATIONS:-

1. Copper wire

A copper wire is a single electrical conductor made of copper. Copper has the lowest resistance to the flow of electricity of all non-precious metals. It is highly conductive as in a copper atom, the outermost 4s energy zone, or conduction band, is only half filled, so many electrons are able to carry electric current. When an electric field is applied to a copper wire, the conduction of electrons accelerates towards the electropositive end, thereby creating a current. These electrons encounter resistance to their passage by colliding with impurity atoms, vacancies, lattice ions, and imperfections. It has high tensile strength thus resists stretching, neck-down, creep, nicks and breaks, and thereby also prevents failures and service interruptions. Copper has a higher ductility than alternate metal conductors with the exception of gold and silver hence it is easy to draw down

to diameters with very close tolerances. Copper has excellent creep characteristics that minimizes loosening at connections. It resists corrosion from moisture, humidity, industrial pollution, and other atmospheric influences. However, any corrosion oxides, chlorides, and sulfides that do form on copper are somewhat conductive. It has a low coefficient of thermal expansion thus can be readily soldered to make durable connections when necessary. The strength, hardness, and flexibility of copper make it very easy to work with.



Fig 2. Copper wire of 25 gauge

The copper wire used in the proposed system is of 25 gauge.

Copper wires are the most widely used conductor in many kinds of electrical wiring. Copper wire and cables are used in power generation, power transmission, power distribution, telecommunications, electronics circuitry, and countless types of electrical equipment.

2. Battery

An electric battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy.

Batteries convert chemical energy directly to electrical energy. It consists of some number of voltaic cells. Each cell consists of two half-cells connected in series by a conductive electrolyte containing metal cations. One half-cell includes electrolyte and the negative electrode, the electrode to which anions (negatively charged ions) migrate; the other half-cell includes electrolyte and the positive

electrode, to which cations (positively charged ions) migrate. Cations are reduced (electrons are added) at the cathode, while metal atoms are oxidized (electrons are removed) at the anode. Some cells use different electrolytes for each half-cell; then a separator is used to prevent mixing of the electrolytes while allowing ions to flow between half-cells to complete the electrical circuit.

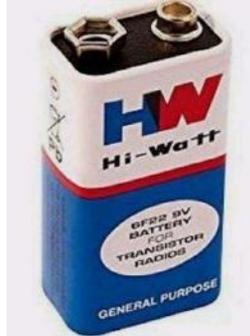


Fig 3. Battery (9v)

The power source used in the proposed system is a 9v battery.

3. IRFZ44N MOSFET

MOSFET is an abbreviation for metal-oxide semiconductor field-effect transistors. It has a source, gate, and drain. The gate of a MOSFET is insulated from the channel. Because of this MOSFET is known as an IGFET which stands for insulated-gate field effect transistor. Unlike transistors, MOSFETs are voltage controlled devices i.e. they can be turned on or turned off by supplying the required Gate threshold voltage (V_{GS}).

There are two basic types of MOSFETs :-

- i) Depletion type MOSFET (D-type MOSFET)
- ii) Enhancement type MOSFET (E-type MOSFET)

The primary difference between the two types of MOSFETs is the difference between the constructions.

The IRFZ44N is a N-channel enhancement type MOSFET with a high drain current of 49A and low R_{ds} value of 17.5 m Ω which help in increasing the efficiency of switching circuits. It also has a low threshold voltage of 4V at which the MOSFET will start conducting. Hence it is commonly used with microcontrollers to drive with 5V. The pulsed drain current (I_{D-peak}) is 160A, minimum gate

threshold voltage (V_{GS-th}) is 2V, maximum gate threshold voltage (V_{GS-th}) is 4V, gate-source voltage is (V_{GS}) is $\pm 20V$ (max), maximum drain-source voltage (V_{DS}) is 55V.

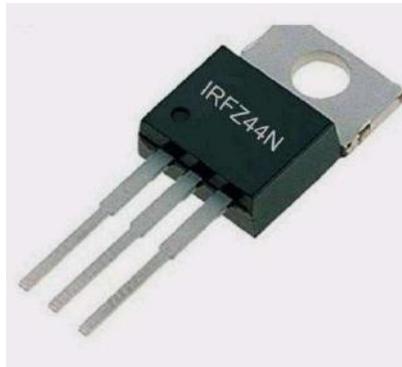


Fig 4. IRFZ44N MOSFET

IRFZ44N Pinout Configuration

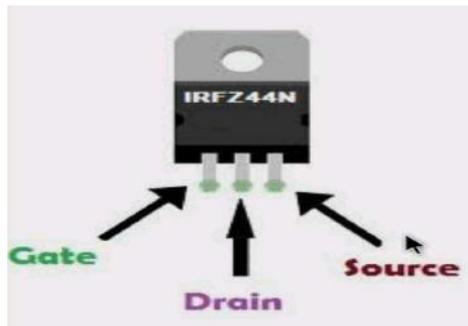


Fig 5. Pinout configuration of IRFZ44N MOSFET

Pin name and corresponding functions

Pin Number	Pin Name	Description
1	Gate	Controls the biasing of the MOSFET
2	Drain	Current flows in through Drain
3	Source	Current flows out through Source

Table 1

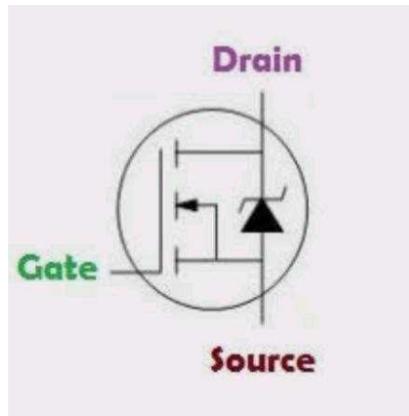


Fig 6. Symbol of IRFZ44N MOSFET

IRFZ44N is an N-channel MOSFET, so the Drain and Source pins will be left open when there is no voltage applied to the gate pin. When a gate voltage is applied these pins get closed. If it is required to be switched with Arduino, then a simple drive circuit using a transistor will work to provide the required gate voltage to trigger the MOSFET to open fully. For other switching and amplifying applications, a dedicated MOSFET Driver IC is required.

Its applications are in switching high power devices, to control the speed of motors, in LED dimmers or flashers, in high speed switching applications, converters or inverter circuits. By using MOSFET in wireless power transmission it creates the output with high frequency improves the efficiency of power transfer between the coils. Here, it also functions as DC to AC inverter.

4. IN4007 diode

A diode is a device which allows current flow through only one direction. That is the current should always flow from the anode to cathode. The cathode terminal can be identified by using a grey bar. The maximum current carrying capacity is 1A it withstand peaks up to 30A. Hence we can use this in circuits that are designed for less than 1A. The reverse current is 5 μ A which is negligible. The power dissipation of this diode is 3W. Its peak repetitive reverse voltage is 1000V.



Fig 7. 1N4007 Diode

Pin Configuration



Fig 8. 1N4007 Diode pin configuration

Pin and corresponding functions

	Pin Name	Description
1	Anode	Current always Enters through Anode
2	Cathode	Current always Exits through Cathode

Table 2

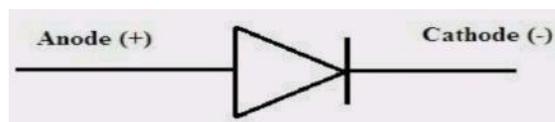


Fig 9. Symbol of diode

The IN4007 diode can be used to prevent reverse polarity problems. They are used in half wave and full wave rectifiers .And also used as protection devices and current flow regulators.

5. Capacitor

Capacitors an electrical or electronic component that stores electric charges. Basically, a capacitor consists of 2 parallel plates made up of conducting materials, and a dielectric material (air, mica, paper, plastic, etc.) placed between them.

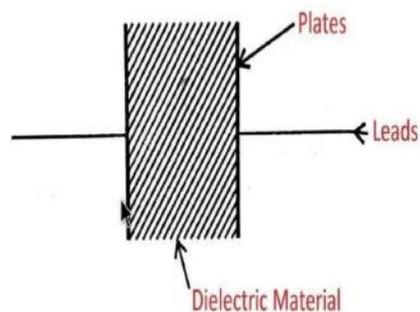


Fig 10. Capacitor

Different types of capacitors are :- Fixed Capacitors, Mica Capacitors, Ceramic Capacitors, Paper Capacitors, Plastic Capacitors, Electrolytic Capacitors, Film capacitor, Adjustable Capacitors, Variable Capacitors.

Electrolytic Capacitors



Fig 11. Electrolytic capacitor (1000 μ F)

Electrolytic capacitors are polarized capacitors so these are used where energy with required polarity is necessary. Here oxide film obtained by a chemical reaction acts as a dielectric material.

Electrolytic capacitors are further classified into: -

- i) Wet Type Electrolytic Capacitor
- ii) Dry Type Electrolytic Capacitor

Wet Type Electrolytic Capacitor

It consists of an aluminum rod placed in a base electrolyte placed in an aluminum container. Now D.C. current is passed through the container, with the help of the D.C. source connected between rod and container. A thin film of oxide is deposited on the rod, which is connected to a positive terminal of the source. Thus the rod acts as a positive terminal of the capacitor. The source is switched off when the rod is covered by oxide film completely. Thus rod acts as (+)ve terminal, container as (-)ve terminal with oxide film as a dielectric material.

Dry Type Electrolytic Capacitor

It contains two aluminum sheets separated by a layer of gauze separator saturated with a liquid chemical of boric acid. Copper lead wires are soldered to the aluminum foils for external connection. D.C. voltage is applied to the copper leads, which deposited aluminum oxide film on the foil that is connected to a positive terminal of the supply. so that foil acts as (+)ve terminal and other foil acts as (-)ve terminal. Now the foils are rolled into a cylindrical shape and enclosed in an aluminum or plastic tube.

An electrolytic capacitor of 1000 μ F.

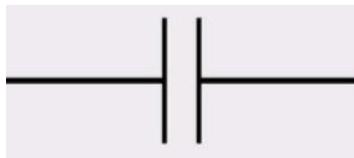


Fig 12. Symbol of capacitor

Capacitors are used as filters in rectifier circuits, as bypass capacitors in amplifier circuits. They are also used in T.V. and radio receivers for tuning purposes.

6. LM7805

The 7805 Voltage Regulator IC is a commonly used voltage regulator that finds its application in most of the electronics projects. It provides a constant +5V output voltage for a variable input voltage supply. 7805 IC is an iconic regulator IC that finds its application in most of the projects. The name 7805 signifies two meanings, “78” means that it is a positive voltage regulator and “05” means that it provides 5V as output. Hence 7805 will provide a +5V output voltage.

The output current of this IC can go up to 1.5A. But, it suffers from heavy heat loss. Hence, usually a heat sink is recommended for projects that consume more current.

Its minimum input voltage is 7V and maximum input voltage is 25V. The operating current is 5 mA. Internal thermal overload and short circuit current limiting protection is available in this. Maximum junction temperature is 125 degree celsius.



Fig 13. LM7805

LM7805 Pinout Configuration

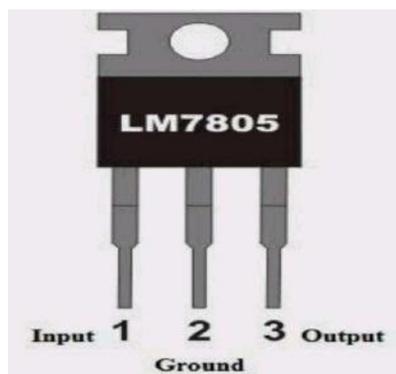


Fig 14. LM7805 pin configuration

Pin and corresponding functions

Pin Number	Pin Name	Description
1	Input (V+)	Unregulated Input Voltage
2	Ground (Gnd)	Connected to Ground
3	Output (Vo)	Outputs Regulated +5V

Table 2

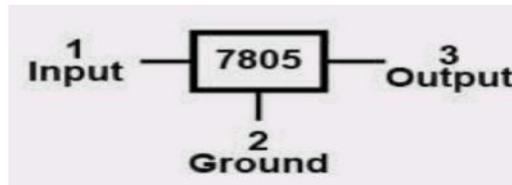


Fig 15. Symbol of LM7805

Voltage regulators are very common in electronic circuits. It is used as a constant 5V output regulator to power microcontrollers and sensors. They are also used as current limiters for certain applications. Also used as an output polarity reversal protection circuit.

7. Resistors

A resistor is a passive electronic component and senses to prevent or limit the flow of electrons. It is a two terminal device that works on the principle of ohm's law which prevents overflow of voltage. Resistance can be derived from ohm's law i.e. $V=IR$, which indicates that voltage is directly proportional to the current flowing through the conductor. Each resistor comes with two wires called leads. Between these two leads there lies a ceramic part which actually resists the flow of current. Resistor consists of 3 colored strips that indicate the value of resistance.



Fig 16. Resistor

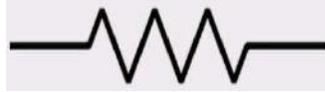


Fig 17. Symbol of Resistor

The resistor used in the proposed system is 1 K Ω resistor

8. LED (Light emitting diode)

LED is a PN junction diode which emits light when forward biased, is known as a light emitting diode. The LED has two legs, one is shorter and the other is longer. The longer leg is known as anode and the shorter leg is cathode. The LED is available in different colours like white, red, blue etc., which depends upon the semiconducting material used for LED fabrication and its band gap energy.



Fig 18. LED

When the LED is forward biased, the electrons and holes move towards the junction and recombination takes place. This effect is called electro-illumination. After the recombination, the electrons, lying in the conduction band of the N region, fall into the holes lying in the valence band of the P region. The difference of energy between the conduction band and valence band is radiated in the form of light energy. The amount of light output is directly proportional to the forward current. Thus, the higher the forward current the higher is the light output.

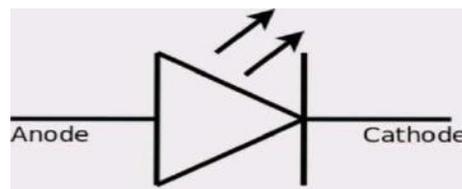


Fig 19. Symbol of LED

Usually, Indium gallium nitride and Aluminum gallium indium phosphide are used for LED fabrication.

9. Switch

A switch is an electrical component that can disconnect or connect the conducting path in an electrical circuit, interrupting the electric current or diverting it from one conductor to another. The most common type of switch is an electromechanical device consisting of one or more sets of movable electrical contacts connected to external circuits. When a pair of contacts is touching current can pass between them, while when the contacts are separated no current can flow.

The switch that we use in this circuit is the Rocket switch. They are used for operations that can be pressed on either end like a seesaw to connect or disconnect an electrical circuit. They are often used as ON/OFF switches on the main power supplies for electronic devices. The name “rocker switch” comes from the rocking motion that the switch makes when the button is pressed. It is also sometimes called a seesaw switch.



Fig 20. Rocket switch

It has a small size and high switching capacity. The operation button itself clearly indicates the ON/OFF status, allowing for a visual confirmation to prevent incorrect operation.



Fig 21. Symbol of Switch

An ideal switch would have no voltage drop when closed, and would have no limits on voltage or current rating. It would have zero rise time and fall time during state changes, and would change state without bouncing between on and off positions.

10. Breadboard

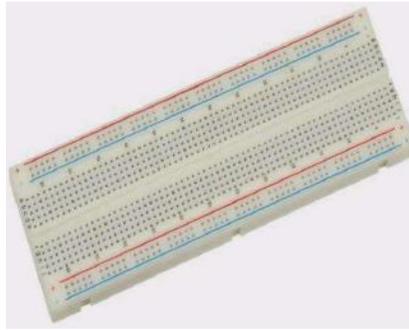


Fig 22. Breadboard

A Breadboard, also known as a protoboard, is a construction base for prototyping of electronics. The word referred to a literal breadboard, a polished piece of wood used for slicing bread. Later, solderless breadboards became available as it does not require soldering, and is used for creating temporary prototypes and experimenting with circuit design which means it is reusable and because of this reason it is popular among students for many projects. The bread board consists of clips which are called tie or contact points, the clips will be maintaining a gap of 2.54mm between each one of them. They are connected from pin to other pins using metal strips.

CHAPTER - 5

METHODOLOGY

Wireless charging technology enables wireless power transfer from a power source such as charger to a load such as a mobile device conveniently across an air gap by eliminating the bunch of wire. Wireless power transmission involves the exchange of power without the need for physical connections.

5.1. CIRCUIT DIAGRAM:

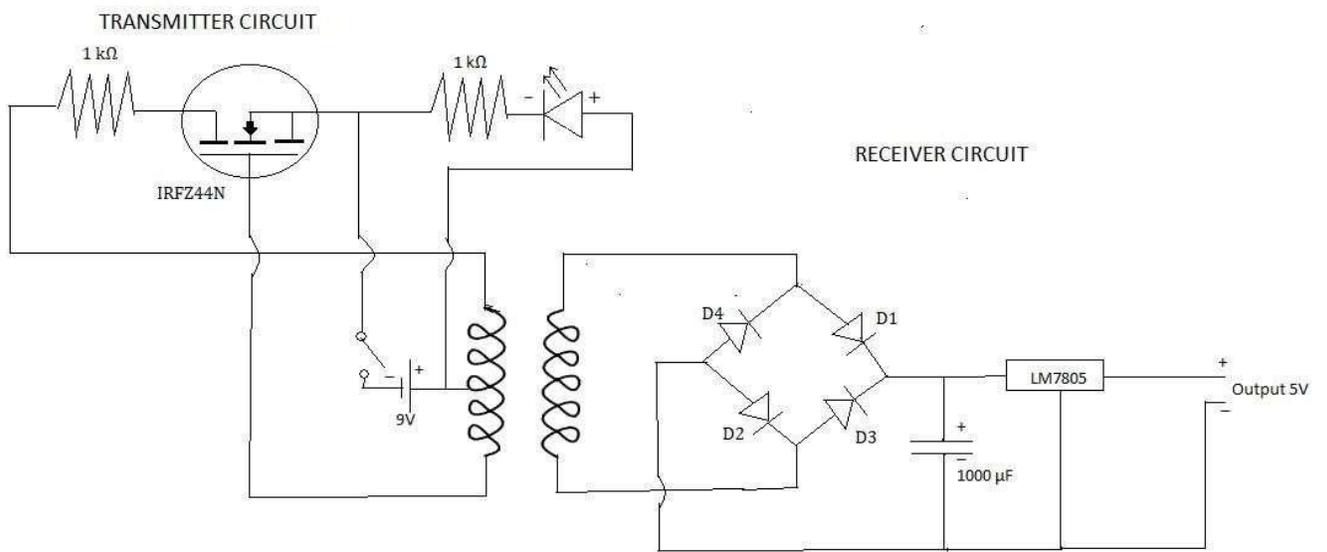


Fig 23. Circuit diagram

5.2. WORKING OF THE SYSTEM :

The circuit for wireless power transfer consists of a 9V Battery, rectifier, LC oscillator circuit, transmitter, receiver and current amplifier, voltage regulator.

Current amplifier:

Here we use MOSFET Z44 to invert the DC current to AC. It also works as a current amplifier, so that it increases the efficiency of the coil.

Transmitter coil:

Power supply is given to the transmitter. Copper coil is wound into several turns. When power supply is given to the coil, a magnetic field is produced. Hence the power gets transferred.

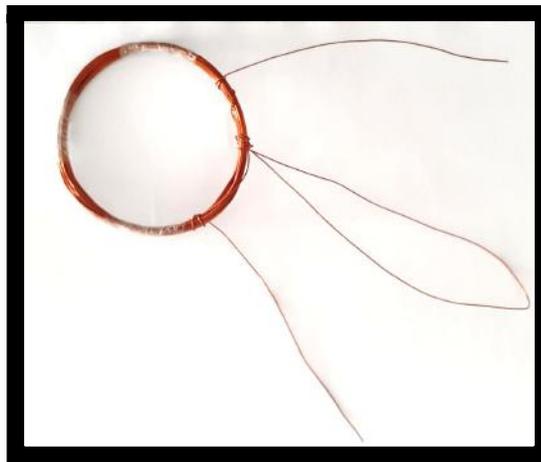


Fig 24. Transmitter coil

Receiver coil:

The receiver coil is the secondary coil and has the same design as the primary coil. Running the secondary at the same resonant frequency as the primary ensures that the secondary has low impedance at the transmitter's frequency and that the energy is optimally absorbed. To remove energy from the secondary coil, different methods can be used, the AC can be directly rectified and a regulator circuit can be used to generate DC voltage.

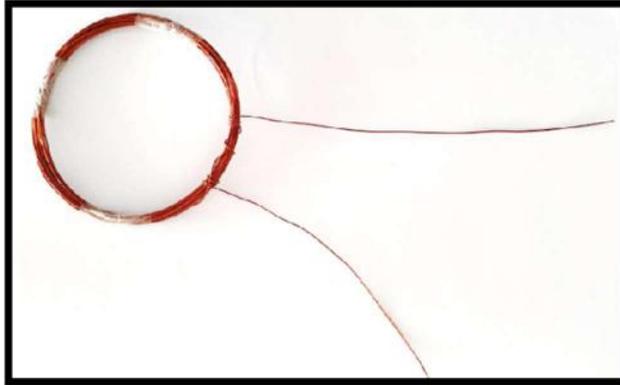


Fig 25. Receiver coil

Rectifier:

The output from the secondary coil is rectified by the use of a rectifier using four diodes connected with each other. The rectifier is used to convert AC to DC. We use a full wave rectifier in this case. The full wave rectifier produces a smooth DC with less ripples. In the positive half of the AC cycle, D1 and D2 conduct because they're forward biased. Positive voltage is on the anode of D1 and negative voltage is on the cathode of D2. Thus, these two diodes work together to pass the first half of the signal through. In the negative half of the AC cycle, D3 and D4 conduct because they're forward biased: Positive voltage is on the anode of D3 and negative voltage is on the cathode of D4. The net effect of the bridge rectifier is that both halves of the AC sine wave are allowed to pass through, but the negative half of the wave is inverted so that it becomes positive to produce pure DC.

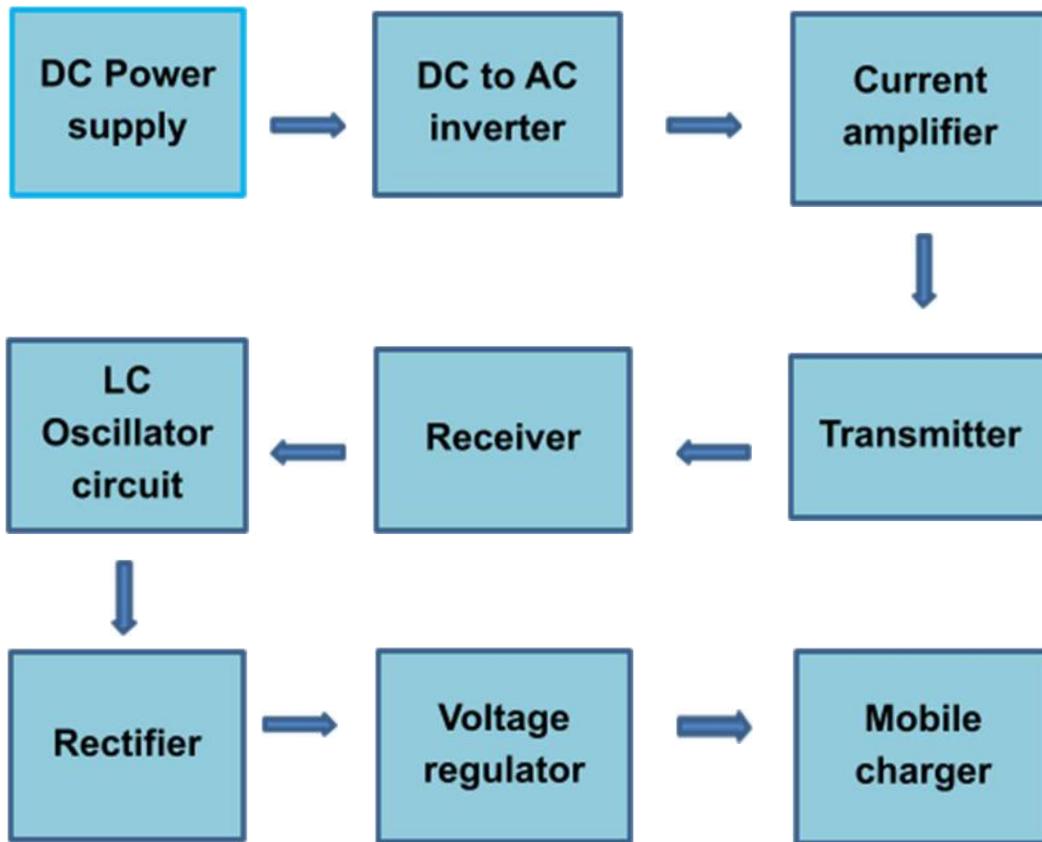
LC oscillator circuit:

The electric current and the charge on the capacitor in the circuit undergo electrical LC oscillations when a charged capacitor is connected to an inductor. The LC circuit is used to select or generate a specific frequency signal. The process continues at a definite frequency and if no resistance is present in the LC circuit, then the LC Oscillations will continue indefinitely.

Voltage regulator:

Voltage regulator is used to obtain a constant DC source. We use IC 7805 for this purpose. The number 78 signifies that it is a positive voltage regulator and 05 signifies that it gives 5V output.

A flow chart of the working:-



In brief, in our Wireless charging system there are two circuits, a transmitter circuit and a receiver circuit. The transmitter circuit consists of an Z44 MOSFET which converts the DC power supply to AC. Then, with the help of a transmitting coil the wireless power gets transmitted to the receiver circuit. The receiver circuit receives the power through the receiving coil and passes through the rectifier circuit (consisting of diode and capacitor). The AC current received by the receiver coil is converted into DC current with the help of a bridge rectifier. After that a 1000 μF capacitor is used to filter the ripples and pure DC is supplied. The pure DC is then passed through the voltage regulator to get a regulated 5V DC and it is then given to the cable from which the mobile charging is achieved.

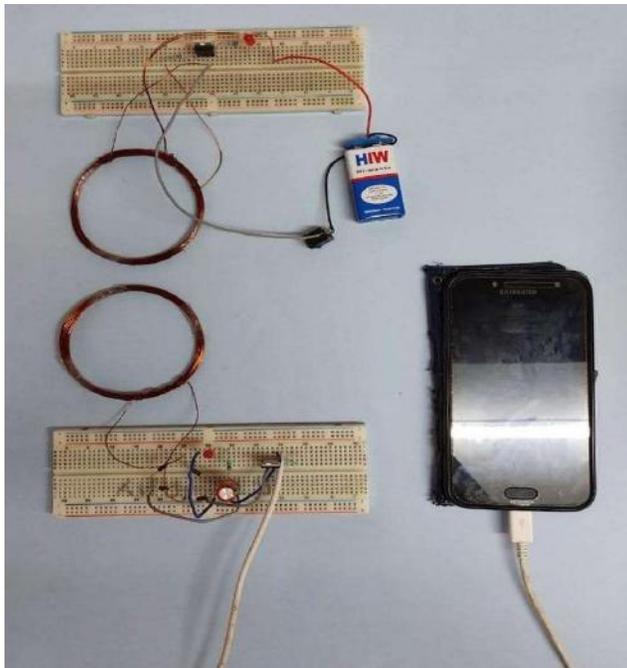


Fig 26. An image of the wireless mobile charger circuit

5.3. DESIGN CALCULATION :

Details of Transmitting Coil:

Radius of the transmitting coil (r) = 3.742 cm
Radius of the cross-section (a) = 0.02483 cm
Number of transmitting coil Turns (N) = 30 turns
Coil wire size = 25 gauge
Diameter= 7.484 cm
Width of the winding= 0.343 cm

Details of Receiving Coil:

Radius of the receiving coil (r) = 3.742 cm
Radius of the cross-section (a) = 0.02483 cm
Number of receiving coil Turns (N) = 30 turns
Coil wire size = 25 gauge
Diameter= 7.484 cm

Width of the winding= 0.343 cm

Theoretical Calculation

Inductance of the Winding:

$$\begin{aligned} \text{Inductance of transmitter coil} &= N^2 \mu_0 r (\ln (8r/a) - 1.75) \dots\dots\dots(3) \\ &= 30^2 \times 4\pi \times 10^{-7} \times 3.742 \left(\ln \ln \left(\frac{(8 \times 3.742)}{0.0248} \right) - 1.75 \right) \\ &= 0.0226 \text{ H} = 22.6 \text{ mH} \end{aligned}$$

$$\begin{aligned} \text{Inductance of receiver coil} &= N^2 \mu_0 r (\ln (8r/a) - 1.75) \\ &= 30^2 \times 4\pi \times 10^{-7} \times 3.742 \left(\ln \ln \left(\frac{(8 \times 3.742)}{0.0248} \right) - 1.75 \right) \\ &= 0.0226 \text{ H} = 22.6 \text{ mH} \end{aligned}$$

Resistance of the winding:

$$\text{Resistance of the Winding (R)} = \rho l/A \dots\dots\dots(4)$$

$$\begin{aligned} \text{Length of transmitter coil (l)} &= \text{Circumference of coil} \times N \\ &= 2\pi \times D \times N \\ &= 2 \times 3.14 \times 7.484 \times 30 \text{ cm} \\ &= 1409.9856 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Length of receiver coil (l)} &= \text{Circumference of coil} \times N \\ &= 2\pi \times D \times N \\ &= 2 \times 3.14 \times 7.484 \times 30 \text{ cm} \\ &= 1409.9856 \text{ cm} \end{aligned}$$

$$A = 2\pi r(r+h) \dots\dots\dots(5)$$

where h = width of the winding

$$= 2 \times 3.14 \times 3.742(3.742 + 0.343) = 95.996 \text{ cm}^2$$

P = Resistivity of Copper = 1.796×10^{-8}

$$\text{Resistance of transmitter coil} = 2.637 \times 10^{-7} \Omega$$

$$\text{Resistance of receiver coil} = 2.637 \times 10^{-7} \Omega$$

Resonant Frequency of the receiver coil:

$$f = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2 \times 3.14 \times \sqrt{22.6 \times 10^{-3} \times 1000 \times 10^{-6}}} = 33.49 \text{ Hz}$$

$$L = 22.6 \text{ mH}$$

$$C = 1000 \text{ } \mu\text{F (Capacitor Used)}$$

$$f = 33.49 \text{ Hz}$$

Resonance Condition satisfied by the receiver coil:

For Resonance to occur, $X_L = X_C$

X_L = Inductive reactance (Reactance of Coil)

$$= 2\pi \times f \times L = 2 \times 3.14 \times 33.49 \times 22.6 \times 10^{-3} = 4.753 \text{ K}\Omega$$

X_C = Capacitive Reactance

$$= 1/2\pi \times f \times C = 1 \div (2 \times 3.14 \times 33.49 \times 1000 \times 10^{-6}) = 4.753 \text{ K}\Omega$$

Thus, $X_L = X_C$ and so Resonance occurs resulting in transfer of power wirelessly.

5.4. OBSERVATIONS:

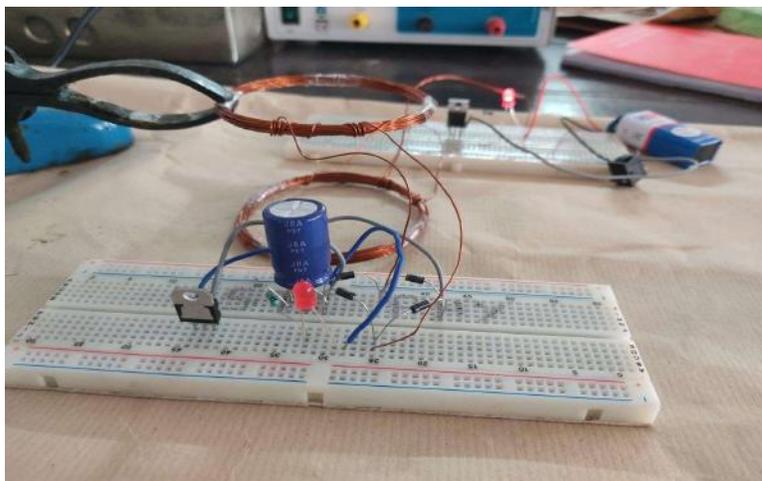


Fig 27. An image of taking observation

1) CASE 1:

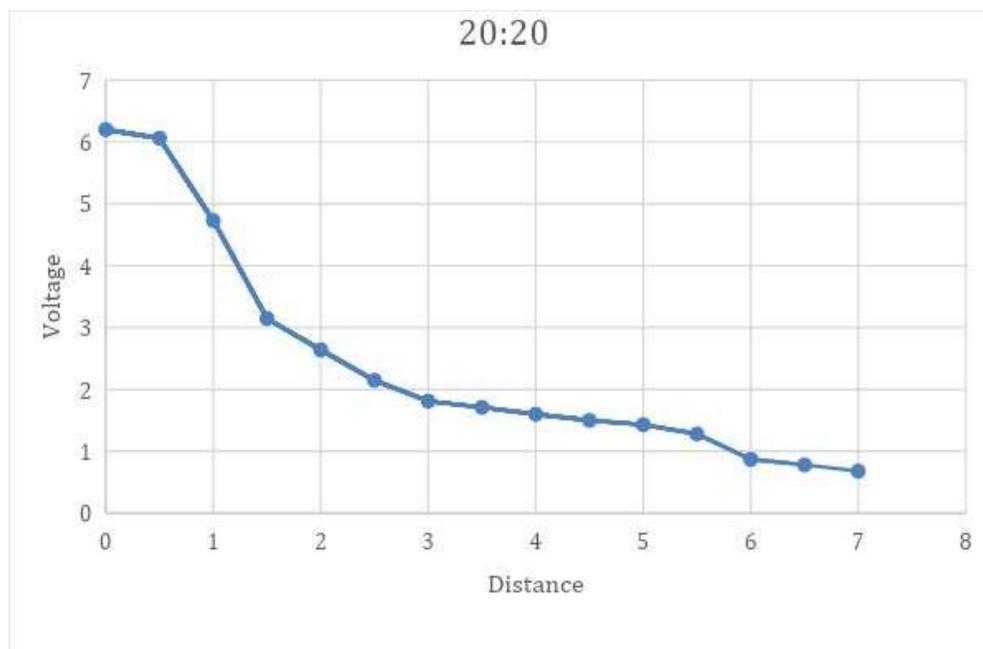
No. of turns in primary coil: 20

No. of turns in the secondary coil: 20

Input voltage: 9V

DISTANCE (cm)	OUTPUT VOLTAGE(V)	EFFICIENCY
0	6.2	0.68
0.5	6.06	0.67
1	4.73	0.52
1.5	3.147	0.349
2	2.64	0.293
2.5	2.147	0.238
3	1.81	0.201
3.5	1.71	0.19
4	1.60	0.17
4.5	1.5	0.16
5	1.43	0.15
5.5	1.28	0.14
6	0.87	0.096
6.5	0.78	0.086
7	0.68	0.075

Table 3



Graph 1. Voltage vs Distance graph (for 20 turns)

2) CASE 2:

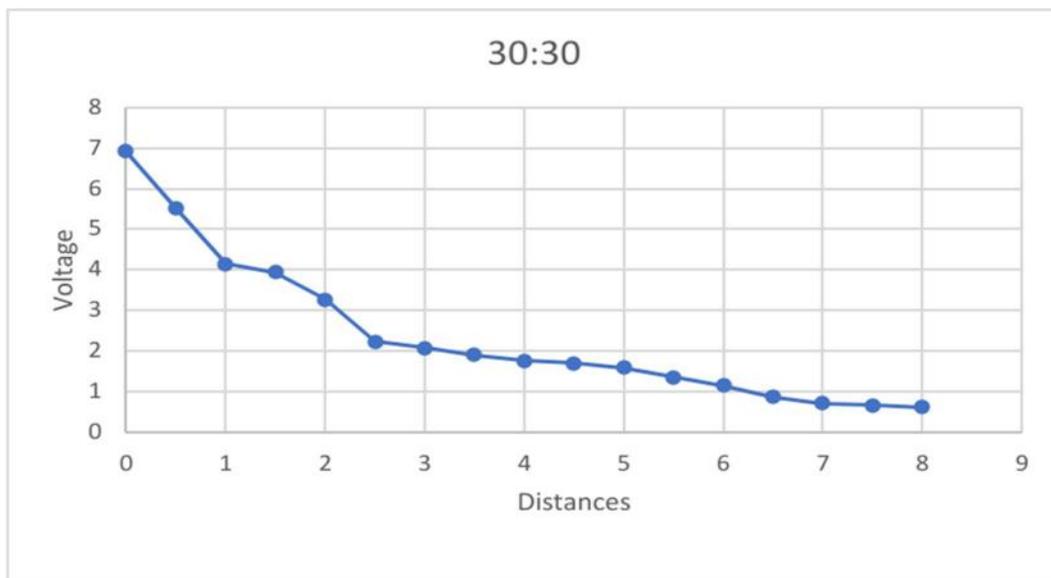
No. of turns in primary coil: 30

No. of turns in the secondary coil: 30

Input voltage: 9V

DISTANCE (cm)	OUTPUT VOLTAGE(V)	EFFICIENCY
0	6.92	0.768
0.5	5.52	0.6
1	4.15	0.457
1.5	3.94	0.437
2	3.27	0.363
2.5	2.23	0.247
3	2.09	0.229
3.5	1.9	0.211
4	1.75	0.194
4.5	1.691	0.187
5	1.58	0.175
5.5	1.35	0.15
6	1.15	0.127
6.5	0.861	0.095
7	0.702	0.078
7.5	0.65	0.072
8	0.612	0.068

Table 4



Graph 2. Voltage vs Distance graph (for 30 turns)

CHAPTER - 6

CONCLUSION

Wireless charging is a much convenient and easier system to use for charging various devices. We constructed a wireless mobile charging system using transmitter and receiver coils. The distance between the coils were varied to study the change in output voltage and hence the efficiency. We observed that the efficiency,

(i) decreases with increase in the distance between the coils

(ii) increases with the increase in no of turns.

Thus the predicted theoretical condition matches with the experimental results.

Even though wireless charging is still pretty much in its early stages, the technology is anticipated to evolve dramatically over the next few years.

CHAPTER - 7

MERITS, CHALLENGES AND FUTURE SCOPE OF WIRELESS CHARGING

Wireless charging can be sized to deliver 5W or 10W of energy to the battery. It can also charge a battery at a fast rate depending on the size of the battery pack.

The benefit of having wireless charging is that there won't be any need to deal with cords again. It leaves the need of messy cords and makes it much simpler by just letting you drop your phone at the charging station. With wireless chargers, we are able to charge all your phones simultaneously. One of the best advantages of certain wireless chargers is that it can integrate with almost all cell phones, no matter the shape or size of its charging socket. And also, there are certain devices other than smartphones which can be charged using the wireless charger. When the device is fully charged, the wireless charging pad shuts down automatically. This means that less energy is wasted, safer charging, and there won't be any overheating in the process.

The main disadvantages of inductive charging are its lower efficiency and increased resistive heating in comparison to direct contact. Implementations using lower frequencies or older drive technologies charge more slowly and generate heat for most portable electronics. Inductive Charging also requires drive electronics and coils that increase manufacturing complexity and cost. Newer approaches diminish the transfer losses with ultra-thin coils, higher frequencies and optimized drive electronics, thus providing chargers and receivers that are compact, more efficient and can be integrated into mobile devices or batteries with minimal change. These technologies provide charging time that is the same as wired approaches and are rapidly finding their way into mobile devices.

Wireless charging is a dependable, convenient, and a secure method of powering and charging electrical equipment. It is gaining momentum in healthcare, automotive, aerospace and consumer goods production industries.

Some of them are:

- Solar power satellite
- Wirelessly powered home appliances
- Wirelessly charging of electric vehicles on the way
- Wireless power used in medical devices.
- Wirelessly powered train.

REFERENCES

1. Muhammad Ahsan Javaid, Dr. Kamran Liaqat Bhatti, Engr. Zeeshan Raza, Engr. Umer Ilyas, Shan ul Haq. “Wireless Power Transmission “A Potential Idea for Future”“ International Journal of Scientific & Engineering Research ISSN: 2229-5518, Volume 6, Issue 3, Page: 933-937, March-2015.
2. Murugesan R. “Electricity & Magnetism”, Ninth revised edition, reprint 2013, Publications - S Chand & Company PVT-LTD, Ram Nagar, New Delhi – 110055, Chapter13, Sections 13, 14, 30 and18.
3. Omkar Singh. “Wireless mobile charger” International Journal of Electronics, Electrical and Computational System (IJEECS) ISSN: 2348-117X, Volume 5, Issue 6, Page: 97-105, June 2016.
4. Otchere Peter Kweku. “Wireless mobile charger using inductive coupling” International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-7, Issue-1, Page:84-99, October 2017.
5. Puranam Revanth Kumar “Wireless mobile charger using inductive coupling” Journal of Emerging Technologies and Innovative Research (JETIR) Page: 40-44, October 2018.
6. Sedha R.S, A TextBook of Applied Electronics, revised edition, Publications - S Chand & Company PVT-LTD, Ram Nagar, New Delhi – 110055, Chapter 16, Section 14, 15, 16. 17, 20, 21, 24 and 26.
7. Sumi FH, Dutta L, Sarker F (2018) “Future with Wireless Power Transfer Technology” J Electr Electron Syst 7: 279 ISSN: 2332-0796, Volume 7, Issue 4, Page: 1-7.

ST. TERESA'S COLLEGE(AUTONOMOUS)
ERNAKULAM
AFFILIATED TO MAHATMA GANDHI UNIVERSITY



SearchQ

PROJECT REPORT

In partial fulfilment of the requirements for the award
of the degree of

BACHELOR OF SCIENCE IN
COMPUTER APPLICATIONS [TRIPLE MAIN]

Submitted by

NAFRIN IQBAL

III B.Sc. Computer Applications [Triple main]

Register No: SB19CA019

Under the guidance of

Smt. ARYA ASOK

DEPARTMENT OF COMPUTER APPLICATIONS

2019-2022

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An ISO 9001:2015 Certified Company



APRIL 5, 2022

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **NAFRIN IQBAL**, 6th semester **BSc COMPUTER APPLICATION (Triple Main)** student of **ST. TERESA'S COLLEGE, ERNAKULAM** has successfully completed a project titled "**SEARCH Q**" from our organization.

The duration of the project was for 3 months. The Project was incorporated in **ANDROID, JAVA** and was implemented successfully.

Thanking you,

For **LCC Computer Education**

A handwritten signature in black ink, appearing to read "T.S. Ramaswamy".

T.S. Ramaswamy
Director



ST. TERESA'S COLLEGE(AUTONOMOUS)
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AFFILIATED TO MAHATMA GANDHI UNIVERSITY

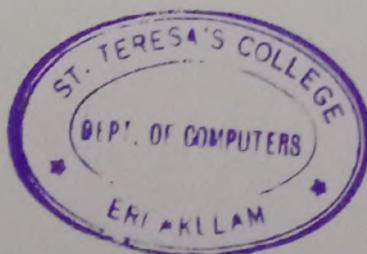


CERTIFICATE

This is to certify that the project report entitled "SearchQ", a bona fide record of the work done by NAFRIN IQBAL during the year 2021-22 and submitted in partial fulfilment of the requirements for the degree of Bachelor of Science in Computer Applications (Triple main) under Mahatma Gandhi University.

Head of the Department

Internal Examiner



External Examiner

Date: 06/04/2022

DECLARATION

I, **Nafrin Iqbal**, B.Sc. Computer Application [TRIPLE MAIN] final year student of St. Teresa's college (autonomous)Ernakulam, register no:SB19CA019, hereby declare that the dissertation submitted for Bachelor's Degree in Computer Application is my original work. I further declare that the said work has not previously been submitted to any other university or academic body

DATE:

PLACE:

NAFRIN IQBAL

ACKNOWLEDGEMENT

First and foremost, I thank God Almighty for his blessings. I take this opportunity to express my gratitude to all those who helped me in completing this project successfully. I wish to express my sincere gratitude to the **Manager Rev. Dr. Sr. Vinitha CSST, Director Rev. Sr Emeline CSST** and **Principal Dr. Lizzy Mathew** for providing all the facilities.

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My deepest appreciation goes to all my friends and relatives for their support. I convey my hearty thanks to my parents who encouraged me and provided all the opportunities for the completion of this project.

SYNOPSIS

SearchQ is a maths-based search app which used to understand basic mathematic requirements for students. As there are difficulties to find certain equation or base of a theorem through the internet. This app helps to find further explanation of certain derivative function. The aim of this project is to provide one stop solution to maths problems and related information.

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1. INTRODUCTION

This project SearchQ is used as a helper guide to students and competitive examiners, SearchQ will be a one stop solution to maths problems and related information. This app displayed as a helper guide to students and competitive exams. The app also helps to find further explanation of a certain derivative function and more which is a useful content for competitive exams.

1.1 ABOUT ORGANIZATION

LCC founded in Cochin back in the year 1992, LCC started its journey as a premier computer coaching centre and later advanced into one of the most reputed branches for computer learning throughout India. LCC has surpassed victory in finding and refining those hidden talents in our pupils, to deliver thousands of IT prosto the evergreen IT industry every year.

1.2 OBJECTIVES OF THE PROJECT AND THE ORGANIZATION

The main objective of the project is to introduce a concept to find a suitable app for finding exact information for the problems that is difficult for students and a useful content for competitive examiners.

2. SYSTEM ANALYSIS

2.1 INTRODUCTION

The first step in the system study includes analysis of the system. System analysis involves studying the way an organization currently receives and process data to produce information with the goal of determining how to make it work better. The app SearchQ displayed as a helper guide to students and competitive examiners. Since this app helps to find the explanation of a certain application of mathematics, it can be a useful guide for any kind of users.

2.2 EXISTING SYSTEM

The existing system is a general wide area search platform which makes difficulties to find certain equation or base of a theorem through internet. Starting with competitive exams, some are already graduated ones they find it as a problem to find certain equation in internet since the information is a lot.

2.3 PROPOSED SYSTEM

Proposed system can overcome all the limitation of the existing system. The system provides appropriate information regarding the user's request. The app SearchQ displayed as a helper guide to students and competitive examiners. Since this app helps to find the explanation of a certain application of mathematics, it can be a useful guide for any kind of users. This app is not only a solution for math but, also solution for other subjects which mathematics are involved.

2.4 SYSTEM SPECIFICATION

A software requirement specification (SRS), a requirements specification for a software system, is a complete description of the behavior of a system to be developed and may include a set of use cases that describe interactions the users will have with the software. In addition, it also contains non-functional requirements. Non-functional requirements impose constraints on the

design or implementation (such as performance engineering requirements, quality standards, or design constraints) The software requirements specification document enlists all necessary requirements that are required for the project development. To derive the requirements, we need to have clear and thorough understanding of the products to be developed. This is prepared after detailed communications with the project team and customer.

2.4.1 SOFTWARE SPECIFICATION

The selection of hardware is very important in the existence and proper working of any software. When selecting hardware, the size and capacity requirements are also important. Below are some of the hardware that is required by the system.

Main Processor	Intel core i3 or above
RAM	8 GB or Above
Keyboard	Standard 108 keys
Mouse	3D Optical mouse
Monitor	15" Standard
Hard disk	10 GB of available disk space minimum or Above

2.4.2 HARDWARE SPECIFICATION

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware. A hardware requirements list is often accompanied by a hardware compatibility list (HCL), especially in case of operating systems. An HCL lists tested, compatible, and sometimes incompatible hardware devices for a particular operating system or application.

We require much different software to make the application which is in making to work efficiently. It is very important to select the appropriate software so that the software works properly.

Operating System	64-bit Microsoft® Windows® 8/10/11
Programming Language	Java, Android

RDBMS	MYSQL
Web Server	Apache Tomcat & Glassfish Server
Scripting language	JSP

2.5 LANGUAGES OR SOFTWARE PACKAGES

The software development of the proposed system is as follows. The software for the development has been selected based on several factors such as:-

- Support
- Cost effectiveness
- Development Speed
- Ability to runout application in the least time.
- Stability

Operating System : Windows 10
 Front End : Android, Java
 Back End : SQLyog

- **JAVA**

Java is a general-purpose computer-programming language that is concurrent, class- based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA),

meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of computer architecture. As of 2016, Java is one of the most popular programming languages in use, particularly for client-server web applications, with a reported 9 million developers. Java was originally developed by James Gosling, a Canadian, at Sun Microsystems (which has since been acquired by Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform. The language derives much of its original features from Smalltalk, with a syntax similar to C and C++, but it has fewer low-level facilities than either of them.

The original and reference implementation Java compilers, virtual machines, and class libraries were originally released by Sun under proprietary licenses. As of May 2007, in compliance with the specifications of the Java Community Process, Sun relicensed most of its Java technologies under the GNU General Public License. Others have also developed alternative implementations of these Sun technologies, such as the GNU Compiler for Java (bytecode compiler), GNU Class path (standard libraries), and Iced Tea-Web (browser plugin for applets).

The latest version is Java 11, released on September 25, 2018. Java 11 is a currently supported long-term support (LTS) version ("Oracle Customers will receive Oracle Premier Support"); Oracle released for the "legacy" Java 8 LTS the last "public update", which is free for commercial use, in January 2019. Oracle will still support Java 8 with public updates for personal use up to at least December 2020. Oracle (and others) "highly recommend that you uninstall older versions of Java", because of serious risks due to unresolved security issues. Since Java 9 is no longer supported, Oracle advises its users to "immediately transition" to Java 11. Oracle extended support for Java 6 ended in December 2018.

- **GOOGLE API**

Google APIs can be downloaded from Google Code, Google's site for developer tools, APIs and technical resources. The Google Data API] allow programmers to create applications that read and write data from Google services. Currently, these include APIs.

For Google Apps, Google Analytics, Blogger, Google Base, Google Book Search, Google Calendar, Google Code Search, Google Earth, Google Spreadsheets, Google Notebook, and Picasa Web Albums.

- **MySQL**

MySQL is a relational database management system (RDBMS) which is more than 11 million institutions. The program runs as a server providing multi-user access to a number of databases. MySQL is owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now a subsidiary of Sun Microsystems, which holds the copyright to most of the code base. The project's source code is available under terms of the GNU General Public License, as well as under a variety of proprietary agreements.

- **OPERATING SYSTEM**

Windows10 an Overview:

Windows 10 includes improved network, application and Web services. It provides increased reliability and scalability, lowers your cost of computing with powerful, flexible management services, and provides the best foundation for running business application.

Network Data Security:

Network data can be protected on the wire or at the network interface. Securing data at the network requires a firewall to proxy services and mediate connections between the internal network, (LAN) and external network (Internet). This is the purpose of Proxy Server.

Internet Protocol Security:

Internet Protocol Security (IPsec) is a framework of open standards for ensuring secure private communications over Internet Protocol networks, using cryptographic security services.

- **INTERNET EXPLORER WEB BROWSER**

INTERNET EXPLORER(IE) makes it easier to get the most from the world wide web, whether we are searching for new information or browsing your favorite website. and built-in intelligence technology can save us time completing web tasks, such as automatically completing web addresses and form for, and automatically detecting your network and connection status.

Advantages of IE:

When we start typing a frequently used web address in the address bar, a list of similar appears that you can choose from. And if a web page address is wrong, IE can search for similar addresses to try to find a match. Search for websites by clicking the search button on the toolbar. In the search bar type a word or phrase that describes what you are looking for. Go to other web pages similar to the one you are viewing without even doing a search. Just use the show related sites feature. Browse through the list of web pages you recently visited by clicking the history button on the tool bar.

- **ANDROID**

Android is a Linux-based operating system designed primarily for touch screen mobile devices such as Smartphone and tablet computers. Initially developed by Android, Inc., which Google backed financially and later bought in 2005. Android is open source and Google releases the code under the Apache License. This open-source code and permissive licensing allows the software to be freely modified and distributed by device manufacturers, Wireless carriers and enthusiast developers. Additionally, Android has a large community of developers writing applications ("apps") that extend the functionality of devices, written primarily in a customized version of the Java programming language.

Android Studio is Android's official IDE. It is purpose-built for Android to accelerate your development and help you build the highest-quality apps for every Android device. Android Studio's Instant Run feature pushes code and resource changes to your running app. It intelligently understands the changes and often delivers them without restarting your app or rebuilding your APK, so you can see the effects immediately. The code editor helps you write better code, work faster, and be more productive by offering advanced code completion, refactoring, and code analysis. As you type, Android Studio provides suggestions in a dropdown list. Simply press Tab to insert the code

The Android Emulator installs and starts your apps faster than a real device and allows you to prototype and tests your app on various Android device configurations: phones, tablets, Android Wear, and Android TV devices. You can also simulate a variety of hardware features such as GPS location, network latency, motion sensors, and multi- touch input.

Android Studio includes project and code templates that make it easy to add well- established patterns such as a navigation drawer and view pager. You can start with a code template or even right-click an API in the editor and select Find Sample Code to search for examples. Moreover, you can import fully functional apps from GitHub, right from the Create Project screen.

Android software development is the process by which new applications are created for the Android operating system. Applications are usually developed in the Java programming language using the Android Software Development Kit. ADT (Android Development Tools) is the software used to develop android apps. It basically encases Eclipse IDE, which is a multi-language Integrated development environment (IDE) comprising a base workspace and an

extensible plug-in system for customizing the environment... The latest version comes with ADT plug-in preinstalled and bundled to the IDE. Application programming interface (API) specifies how some software components should interact with each other. In practice in most of the cases an API is a library that usually includes specification for routines, data structures, object classes, and variables. SDK (Software Development Kit or "devkit") is typically a set of software development tools that allows for the creation of applications for a certain software package software framework, hardware platform, computer system, video game console, operating system, or similar development platform. It may be something as simple as an application programming interface (API) in the form of some files to interface to a particular programming language or include sophisticated hardware to communicate with certain embedded system. Common tools include debugging aids and other utilities often presented in an integrated development environment (IDE). In the latest version of ADT, the android SDK adds on to the IDE automatically as soon as you unzip and load the IDE.

Android Virtual Device (AVD) manager enables us to launch virtual android devices/ emulators in our PC and run the app in the emulator, and at the same time we can track and debug each app activity from the Logcat in our IDE.

The major advantages of Android Studio are:

- o Faster Deployment of Fresh Builds.
- o More Accurate Programming.
- o the newly introduced emulator is 3 as faster in CPU, RAM, & I/O in comparison to its predecessor.
- o Promoting is an important component of the app marketing, and Android Studio 2.0 takes it to a new high.

3. SYSTEM DESIGN

3.1 INTRODUCTION

System design is an interactive process through which requirements are transmitted to a “blue print” for constructing the software initial; the blue print depicts a holistic view of software that is design is represented at a high-level abstraction a level that can be directly traced to specific data, functional and behavioral requirements. System design is the solution to the creation of a new system. This is the important aspect made up of several steps. System design is the process of developing specifications for a candidate system that meet the criteria established in the system analysis. Major step in system design is the preparation of the input forms and output reports in a form applicable to the users.

The main objective of system design is to use the package easily by a computer operator. System design is the creative act of invention, developing new inputs, a database, off-line files, methods, procedures and output for processing business to meet an organization objective. System design-built information gathered during the system analysis. As design interaction occurs subset-quant refinement leads to design representation at much lower level of abstraction. System design is a creative art of inventing and developing input, data bases, off line files, methods and procedures, for processing data to get meaningful output that satisfy the organization objectives. Through the design phase consideration to the human factor, that is inputs to the users will have on the system. Some of the main factors that have to be noted using the design of the system are:

- **Practicability**
System must be capable of being operated over a long period of time and must have ease of use.
- **Efficiency**
Make better use of available resources. Efficiency involves accuracy, timeliness and compare- pensiveness of system output.
- **Cost**
Aim of minimum cost and better results.
- **Security**

Ensure physical security of data.

3.2 INPUT DESIGN

Input design is the process of converting user-oriented input to a based format. Inaccurate input data are the most common cause of errors in data processing. Errors entered by data entry operators can be controlled by input design. The goal of designing input data is to make data entry as easy, logical and free from errors. When we approach input data design; we design the data source documents that capture the data and then select the media used to enter them into computer.

User-friendly screen format can reduce the burden on end users, who are not highly proficient in computers. An important step in input design stage is a design of source document. Source document is the form in which the data can initially capture. The next step is the design of the document layout. In the layout organizes the document by placing information, where it will be noticed and establishes the appropriate sequence of items.

User interface design is very important for any application. The interface design describes how the software communicates within itself, to system that interpreted with it and with humans who use it. The input design is the process of converting the user- oriented inputs into the computer-based format. Input design is a part of overall system design, which requires very careful attention. If data going into the system is correct, then the processing and output will magnify these errors. Thus, the designer has a number of clear objectives in the different stages of input design

- To produce a cost-effective method of input.
- To achieve the highest possible level of accuracy.
- To ensure that input is acceptable to and understand by the user.

Accurate input data is most common cause of data processing errors. If poor input design- particularly where operators must enter data from source documents-permits bad data to enter a computer system, the outputs produced are of little value. The input design process was initiated in the study phase were, as a part of the feasibility study:

1. Input data were found to be available for establishing and maintaining master and transaction files and for creating output records
2. The most suitable types of input media, for either off-line or on-line devices were selected after a study of alternative data capture techniques

The data is fed into the system using simple inactive forms. The forms have been supplied with messages so that the user can enter data without facing any difficulty. This data is validated wherever it requires in the project. This ensures that only the correct data have been incorporated into system. The goal of designing input data is to make the automation as easy and free from errors as possible. For providing a good input design for the application easy data input and selection features are adopted. The input design requirements such as user friendliness, consistent format and interactive dialogue for giving the right messages for the user at the right time are also considered for development for this project.

3.3 OUTPUT DESIGN

Computer output is the most important and direct source of information to the user. Efficient and intelligent output design improves the system's relationship and helps user decision-making. In the output design it is determine how the implementation is to be played for immediate need and also the hardcopy output. A major form of input is a hardcopy from the printer. Print- outs should be designed around the output requirement of the user. Printers, CRT screen display are the examples for providing computer-based output. The output design associated with the system includes the various reports of the table generations and query executions.

Output design is one of the, most important features of the information system. The logical design of an information system is analogous to an engineering blue print of an automobile. It shows the major features and how they are related to one another. The outputs, inputs and databases are designed are in this phase. At the beginning of the output design various types of outputs such as external, internal, operational, and interactive and turnaround are defined. Then the format, content, location, frequency, volume and sequence of the outputs are specified. The content of the output must be defined in detail. The system analysis has two specific objectives at this stage.

To interpret and communicate the results of the computer part of a system to the users in a form, which they can understand, and which meets their requirements

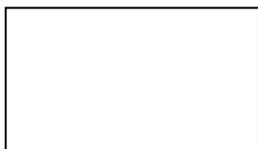
To communicate the output design specifications to programmers in a way in which it is unambiguous, comprehensive and capable of being translated into a programming language.

3.4 DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) or a bubble chart is a graphical tool for structured analysis. It was De Macro in 1978 and Gene and Carson in 1979 who introduced DFD. DFD models a system transforms the data and creates, output data-flows which go by using external entities from which data flows to a process which to other processes or external entities or files. Data in files many also flow to processes as inputs. There are various symbols used in DFD. Bubbles represent the process. Named arrows indicate the dataflow. External entities are represented by rectangles and are outside the system such as vendors or customers with whom the system interacts. They either supply or consume data. Entities supplying data are known as sources and those that consume data are called sinks. Data are stored in a data store by a process in the system. Each component in a DFD is labelled in with a descriptive name. Process names are further identified with a number. As level 0, level 1 and level 2. Thus, of top-down approach is used, starting with an overview and then working out the details. The main merit of DFD is that it can provide an overview of what data a system would process, what transformation of data are done, what files are used, and where the result flow. The data flow diagram of Co-operative Bank Management System has been represented as a hierarchical DFD context level DFD was drawn first. Then the processes were decomposed into several elementary levels and are represented in the order of importance.

BASIC DFD SYMBOLS

Square:



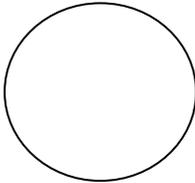
A source or sink is a person or part of an organization, which enters or receives information from the system, but is considered to be outside the context of data flow model

Arrow:



A data flow is a route, which enables packets of data to travel from one point to another. Data may flow from a source to a processor and from data store or process. An arrow lines depicts the flow, with arrowhead pointing in the direction of flow

Circle:



A Process represents transformation where incoming data flows are changed into outgoing data flows.

Open rectangle:



A data is a repository of data that is to be stored for use by one or more process may be as simple as buffer or queue or sophisticated as relational database. They should have clear names. If a process merely uses the content of store and doesn't alter it, the arrowhead goes only from the store to the process. If process alters the details in the store, then a double-headed arrow is used.

Rules for drawing Data Flow Diagram:

Establish the context of the data flow diagram by identifying all of the net input and output data flows.

- Select a starting point for drawing the data flow diagram
- Give meaningful labels to all data flow lines.
- Label all processes with action verbs that relate input and output data flows.
- Omit insignificant functions routinely handled in the programming process.
- Don't include control or flow of control information.
- Don't try to put too much information in one data flow diagram. Try to plan for the number of levels.
- Be prepared to start over.

NORMALIZATION

The process of normalization is concerned with the transformation of the conceptual schema to a computer represent able form. Normalization reduces the redundancies and anomalies.

THE FIRST NORMAL FORM

First Normal form does not allow multivalued and composite valued attributes. It states that the domain of an attribute must include only atomic values and that value of any attribute in a table must be single value from the domain of that attribute.

THE SECOND NORMAL FORM

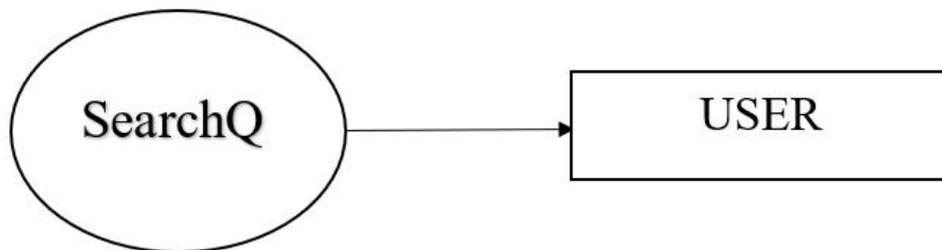
In Second Normal form, for relation where primary key contains multiple attributes, on key attribute should not be functionally dependent on a part of the primary key.

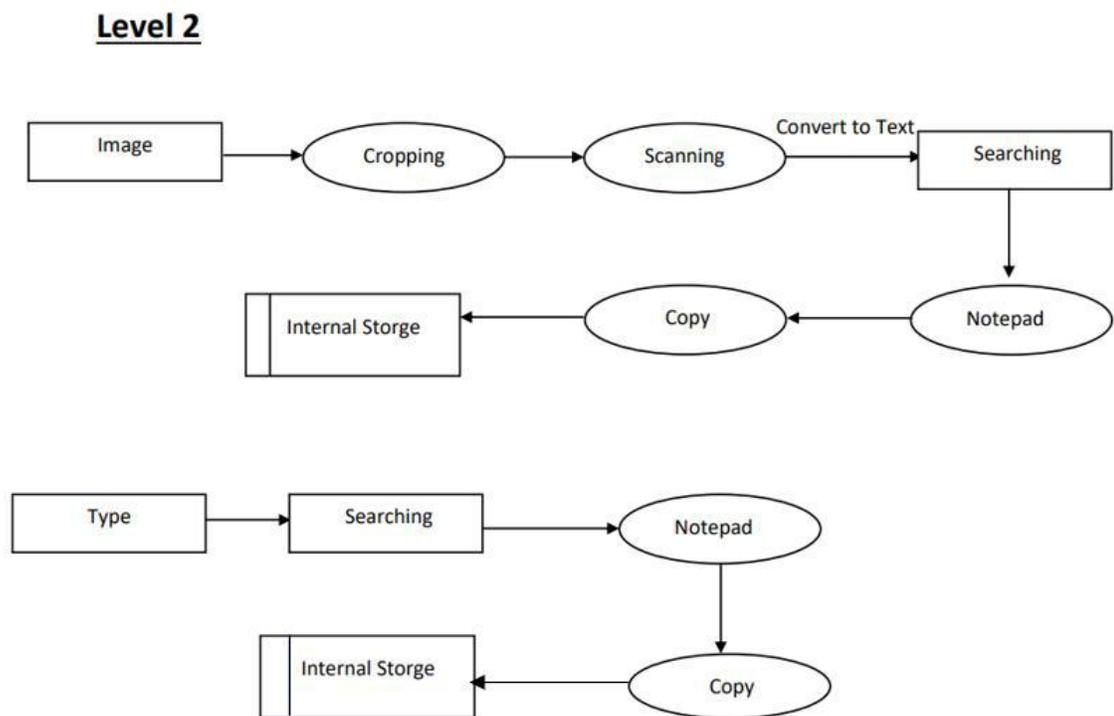
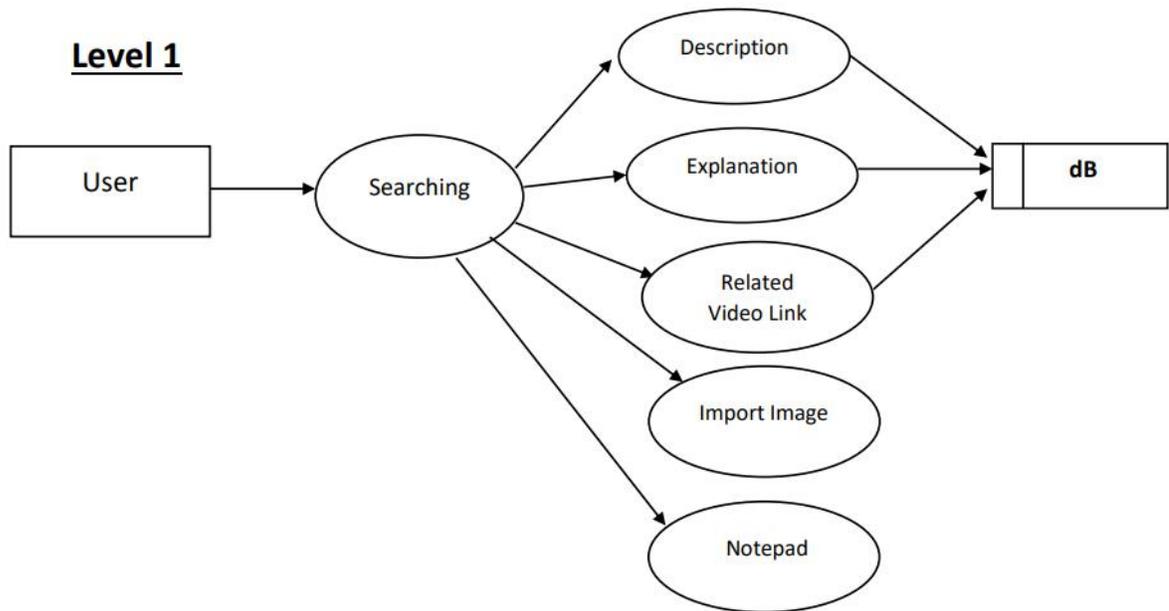
THE THIRD NORMAL FORM

In Third Normal form, relation should not have a non-key attribute functionally deter- mined by non-key attribute. That is there should be no transitive dependency of a non-key attribute on the primary key

DATAFLOW DIAGRAMS

Level 0





3.4 TABLE DESIGN

Table Name Engine

Database Character Set

Collation

Column Name	Data Type	Length	Default	PK?	Not Null?	Unsigned?	Auto Incr?	Zerofill?	Comment
<input type="checkbox"/> tableid	int	11		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Primary Key
<input type="checkbox"/> date	varchar	255		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> des	varchar	255		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> exp	varchar	255		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> link	longtext			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

tableid	date	des	exp	link	
5	02-01-2022	With donor support and as a f	https://my.hchc.edu/https://my.hcl	The Spring 2022 semester ...	256B
6	02-01-2022	With donor support and as a f	https://my.hchc.edu/https://my.hcl	The Spring 2022 semester ...	256B
7	02-01-2022	Oct 9, 2021 ... Hello sir my	https://www.instagram.com/p/CWckFI	Nov 19, 2021 ... 522k Lik...	259B
20	07-01-2022	Android is a mobile operating	https://support.microsoft.com/.../	Excel for Android phones ...	255B
24	07-01-2022	Android is a mobile operating	https://support.microsoft.com/.../	Excel for Android phones ...	334B
26	07-01-2022	Android is a mobile operating	https://support.microsoft.com/.../	Excel for Android phones ...	334B
27	07-01-2022	The full calculation of the p	https://www.treasurydirect.gov/BC/	The Savings Bond Calculat...	329B
*	(Auto)	(NULL)	(NULL)	(NULL)	0K

4. SYSTEM DEVELOPMENT

4.1 MODULE DESCRIPTION

MODULES

- Math keyboard / Advanced Scientific Calculator.
- Explanation box.
- Related link – learning resources (video, articles etc).
- Image scanning and importing from gallery.
- Notepad for copying and saving the searched source.

5. SYSTEM TESTING AND IMPLEMENTATION

5.1 TESTING

Testing is an important stage in the software development life cycle. System testing is a critical element of a software quality assurance and represents the ultimate review of specification, design and coding. All the changes and retesting are tracked through spread sheets. Applications are not allowed to launch until all identified problem are fixed. Finally, a report is prepared at the end of testing to show exactly what was tested and to list the final outcomes. The software testing methodology is applied in four distinct phases:

- Unit Testing
- Integration Testing
- User Acceptance Testing
- Output Testing

UNIT TESTING

Developers typically do unit testing in order to trace out bugs in each module of the code. Unit testing is done in parallel with coding. It includes testing each function and procedures. Unit testing is also called as module testing. In module testing each module are tested for any possible logical error.

The unit testing is done to identify

- The image entries are in the correct format.
- No duplicate entries are present.
- To check whether it provide the required result.

INTEGRATION TESTING

Integration testing is any type of software testing that seeks to verify the interfaces between components against a software design. The task of the integration test is to check that components or software applications, interacts without error. Therefore, testing the data flow between 2 modules is integration testing.

USER ACCEPTANCE TESTING

User acceptance testing is done by the user to check whether the project has met the requirement that has been mentioned at the beginning of the project. Flood alert is tested by the user by inputting values and the result generated is also validated. If the accuracy is as expected user approve the system.

OUTPUT TESTING

After performing the validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in the specific format. The output generated or displayed by the system under consideration is tested asking the users about the format required by them. Here, the output is considered in two ways, one is on the screen and other is printed format. The output format on the screen is found to be correct as the format designed according to the user needs. For the hard copy also, the output comes out as specified by the user. Hence output testing does not result in any connection in the system.

5.2 VALIDATION CHECK

The validation phase reveals the failures and the buds in the developed system. It will become to known about the practical difficulties the system faces when the operated in the true environment. Validation is the process of ensuring that user input is clean, correct, and useful

Typical validation tasks are:

- Has the user filled in all required fields?
- Has the user entered a valid email?
- Has the user entered text in a numeric field?

Form validation normally used to occur at the server, after the client had entered all the necessary data and then pressed the submit button. If the data entered by a client was incorrect or was simply missing, the server would have to send all the data back to the client and request that the form be resubmitted with correct information. This was really a lengthy process which used to put a lot of burden on the server. Most often, the purpose of validation is to ensure correct user input. Validation can be defined by many different methods, and deployed in many different

ways. Server-side validation is performed by a web server, after input has been sent to the server. Client-side validation is performed by a web browser, before input is sent to a webserver.

5.3 SYSTEM IMPLEMENTATION

The implementation phase of the software development is concerned with translating design specification into source code. The user tests the developed system and changes are made according to their needs. Our system has been successfully implemented. Before implementation several tests have been conducted to ensure that no errors are encountered during the operation. The implementation phase ends with an evaluation of the system after placing into the operation for a period of time.

The process of putting the developed system in actual use is called system implementation. This includes all those activities that take place to convert from old system to new system. The system can be implemented only after testing is done and is found to be working to specifications. The implementation stage is a systems project in its own right. The implementation stage involves following tasks:

- Careful planning.
- Investigation of system and constraints.
- Design of method to achieve change over.
- Evaluation of the changeover method.

6. SYSTEM MAINTENANCE AND FUTURE ENHANCEMENTS

6.1 SYSTEM MAINTENANCE

System maintenance is a going activity, which covers a wide variety of activities including, removing program and design errors, updating documentation and test data and updating user support system maintenance is a catchall term used to describe various forms of computer or server maintenance required to keep a computer system running properly, it can describe network maintenance which could mean that servers are being physical repaired, replaced or mode. For the purpose of convenience, maintenance may be categorized into three classes they are:

i. CORRECTIVE MAINTENANCE

This type of maintenance implies removing errors in a program, which might have kept in the system due to faulty design or wrong assumption.

ii. ADAPTIVE MAINTENANCE

In adaptive maintenance program functions are changed to enable the information system to satisfy the information needs of the user.

iii. PERFECTIVE MAINTENANCE

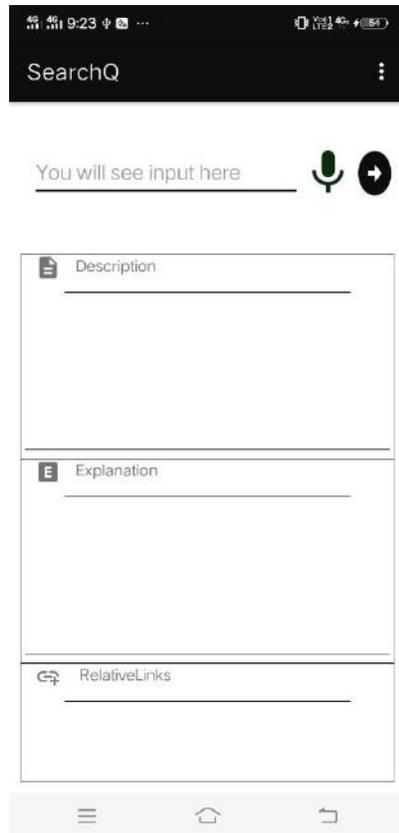
In perfective maintenance means adding new programs or modifying the existing programs to enhance the performance of the information system. This type of maintenance under taken to respond to user addition needs which may be due to the changes within or outside of the organization.

6.2 FUTURE ENHANCEMENTS

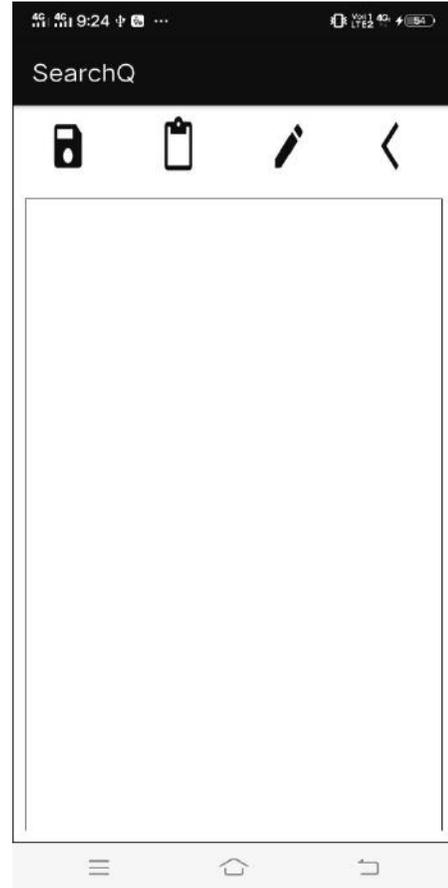
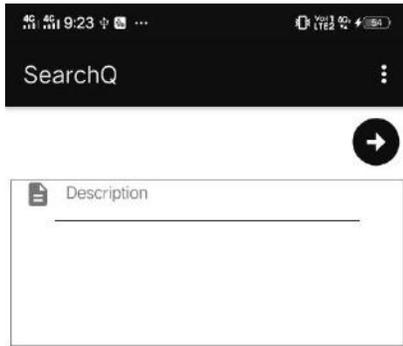
Mathematical in its methods but grew out of scientific observations which merged with inverse probability and grew through applications in the social sciences, some areas of physics, and biometrics to become its own separate, though closely allied field. Computer science, computational science, data science, quantitative biology, operations research, control theory, cryptology, econometrics, theoretical physics, continuum mechanics, mathematical chemistry and actuarial science are other fields that may be considered part of mathematical sciences

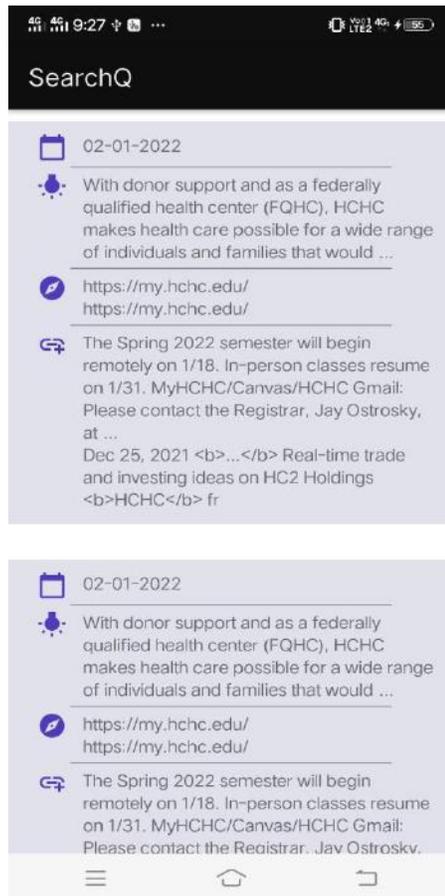
7. APPENDICES

7.1 SAMPLE INPUT DESIGN OUTPUT DESIGN



SearchQ





7.2 SOURCE CODE

```
package com.example.myapplication;

import android.content.ClipData;

import android.content.ClipboardManager;

import android.content.Intent;

import android.os.Bundle;

import android.speech.RecognitionListener;

import android.speech.RecognizerIntent;
```

SearchQ

```
import android.speech.SpeechRecognizer;

import android.util.Log;

import android.view.Menu;

import android.view.MenuItem;

import android.view.MotionEvent;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

import android.widget.Toast;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import com.android.volley.Request;

import com.android.volley.RequestQueue;

import com.android.volley.Response;

import com.android.volley.VolleyError;

import com.android.volley.toolbox.StringRequest;

import com.android.volley.toolbox.Volley;

import org.json.JSONArray;

import org.json.JSONException;

import org.json.JSONObject;
```

SearchQ

```
import java.text.SimpleDateFormat;

import java.util.ArrayList;

import java.util.Date;

import java.util.HashMap;

import java.util.Locale;

import java.util.Map;

public class Home extends AppCompatActivity {

    TextView view, datashow,secdisply,thdis,disp;

    Button ss, se;

    String getda;

    EditText showcoice;

    String getfv,gets,gett;

    @Override

    protected void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setContentView(R.layout.activity_home);

        // dd = findViewById(R.id.data);

        datashow = findViewById(R.id.txtview);

        secdisply=findViewById(R.id.seconddis);

        disp=findViewById(R.id.display);

        thdis=findViewById(R.id.thrdis);
```

SearchQ

```
    final SpeechRecognizer mSpeechRecognizer =
SpeechRecognizer.createSpeechRecognizer(this);

    final Intent mSpeechRecognizerIntent = new
Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);

    mSpeechRecognizerIntent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,

        RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);

    mSpeechRecognizerIntent.putExtra(RecognizerIntent.EXTRA_LANGUAGE,

        Locale.getDefault());

    mSpeechRecognizer.setRecognitionListener(new RecognitionListener() {

@Override

        public void onReadyForSpeech(Bundle bundle) {

        }

@Override

        public void onBeginningOfSpeech() {

        }

@Override

        public void onRmsChanged(float v) {

        }

@Override

        public void onBufferReceived(byte[] bytes) {

        }

@Override
```

```
public void onEndOfSpeech() {  
  
}  
  
@Override  
  
public void onError(int i) {  
  
}  
  
@Override  
  
public void onResults(Bundle bundle) {  
  
    //getting all the matches  
  
    ArrayList<String> matches = bundle  
  
        .getStringArrayList(SpeechRecognizer.RESULTS_RECOGNITION);  
  
  
    //displaying the first match  
  
    if (matches != null)  
  
        datashow.setText(matches.get(0));  
  
}  
  
@Override  
  
public void onPartialResults(Bundle bundle) {  
  
}  
  
@Override  
  
public void onEvent(int i, Bundle bundle) {  
  
}
```

SearchQ

```
});

ss = findViewById(R.id.searchbtn);

view = findViewById(R.id.display);

se = findViewById(R.id.searchbtn);

se.setOnClickListener(new View.OnClickListener() {

    @Override

    public void onClick(View v) {

    }

});

showcoice = findViewById(R.id.txtview);

ss.setOnClickListener(new View.OnClickListener() {

    @Override

    public void onClick(View v) {

        searchapi();

    }

});

findViewById(R.id.button).setTouchListener(new View.OnTouchListener() {

    @Override

    public boolean onTouch(View view, MotionEvent motionEvent) {

        switch (motionEvent.getAction()) {

            case MotionEvent.ACTION_UP:
```

```
        mSpeechRecognizer.stopListening();

        showcoice.setHint("You will see input here");

        break;

    case MotionEvent.ACTION_DOWN:

        mSpeechRecognizer.startListening(mSpeechRecognizerIntent);

        showcoice.setText("");

        showcoice.setHint("Listening...");

        break;

    }

    return false;

}

});

}

private void savedata() {

    com.android.volley.RequestQueue queue =
Volley.newRequestQueue(getApplicationContext());

    StringRequest request = new StringRequest(Request.Method.POST, Utility.url, new
Response.Listener<String>() {

        @Override

        public void onResponse(String response) {

            if (response.trim().equals("success")) {

                Toast.makeText(Home.this, "Yes", Toast.LENGTH_SHORT).show();
```

```
    }else{

        Toast.makeText(Home.this, "No", Toast.LENGTH_SHORT).show();

    }

}

}, new Response.ErrorListener() {

    @Override

    public void onErrorResponse(VolleyError error) {

        Toast.makeText(getApplicationContext(), "my Error :" + error,
Toast.LENGTH_LONG).show();

        Log.i("My Error", "" + error);

    }

}) {

    @Override

    protected Map<String, String> getParams() {

        Map<String, String> map = new HashMap<String, String>();

        getfv=disp.getText().toString();

        getsv=secdisply.getText().toString();

        gettv=thdis.getText().toString();

        Date currentTime = new Date();

        String currentDate = new SimpleDateFormat("dd-MM-yyyy",
Locale.getDefault()).format(new Date());
```

SearchQ

```
String time = currentTime.getHours() + ":" + currentTime.getMinutes() + ":" +  
currentTime.getSeconds();
```

```
map.put("requestType", "tabledata");
```

```
map.put("date", currentDate.toString());
```

```
map.put("des", getfv);
```

```
map.put("exp", getsv);
```

```
map.put("link", gettv);
```

```
return map;
```

```
}
```

```
};
```

```
queue.add(request);
```

```
} public boolean onCreateOptionsMenu(Menu menu) {
```

```
getMenuInflater().inflate(R.menu.menuubar, menu);
```

```
return true;
```

```
}
```

```
public boolean onOptionsItemSelected(@NonNull MenuItem item) {
```

```
switch (item.getItemId()) {
```

```
case R.id.notpad:
```

```
    // Toast.makeText(this, "open", Toast.LENGTH_SHORT).show();
```

```
    startActivity(new Intent(getApplicationContext(), Notpad.class));
```

```
    break;
```

```
case R.id.copy:

    String f=view.getText().toString();

    String s=thdis.getText().toString();

    String t=secdisply.getText().toString();

    if(f.isEmpty()||s.isEmpty()||t.isEmpty()){

        Toast.makeText(this, "No Data On Your Page", Toast.LENGTH_SHORT).show();

    }

    else {

        ClipboardManager myClipboard = (ClipboardManager)
getSystemService(CLIPBOARD_SERVICE);

        String kf=view.getText().toString();

        String ks=thdis.getText().toString();

        String kt=secdisply.getText().toString();

        String text = "Description :" +System.lineSeparator()+System.lineSeparator() + kf
+System.lineSeparator() +System.lineSeparator() + " Explantion :" +System.lineSeparator() + ks
+System.lineSeparator() + "Link :" +System.lineSeparator()+System.lineSeparator() + kt;

        ClipData myClip = ClipData.newPlainText("text", text);

        myClipboard.setPrimaryClip(myClip);

        Toast.makeText(getApplicationContext(), "Text Copied",
Toast.LENGTH_SHORT).show();

    }

}
```

SearchQ

```
        break;

    case R.id.table:

        startActivity(new Intent(getApplicationContext(),Tabledata.class));

        break;

    case R.id.keyboard:

        startActivity(new Intent(getApplicationContext(),Keyboard.class));

        break;

    case R.id.img:

        startActivity(new Intent(getApplicationContext(),ImageScan.class));

        break;

    default:

    }

    return super.onOptionsItemSelected(item);

}

private void searchapi() {

    getda = datashow.getText().toString().trim();

    // String url="
https://www.googleapis.com/customsearch/v1?q=a&key={"+"+getda+"}&cx={ AIzaSyC5SZoDo_z
kg8eT8lwRC3DCgEYHeorsxX0}";

    String url =
"http://www.googleapis.com/customsearch/v1?key=AIzaSyC5SZoDo_zkg8eT8lwRC3DCgEYHe
orsxX0&cx=01b63a4b610a287b8";
```

SearchQ

```
// String
url="http://www.googleapis.com/customsearch/v1?key=AIzaSyCTexDJ1IzvS476W9ZfqczrMpdI
qYn75dA&cx=a8db6e267400f9dda";

//AIzaSyB_KKoUqYZTSfFVUj-xX8AKZy-Skt51p-4

// String url =
"http://www.omdbapi.com/?t=${input}&apikey=AIzaSyC5SZoDo_zkg8eT8lwRC3DCgEYHeors
xX0";

// API KEy -AIzaSyCTexDJ1IzvS476W9ZfqczrMpdIqYn75dA

//<script async src="https://cse.google.com/cse.js?cx=53f292425d56b1e89"></script> <div
class="gcse-search"></div>

//Search Engine ID-a8db6e267400f9dda

//Public URL-https://cse.google.com/cse?cx=a8db6e267400f9dda

//Search Code-<script async
src="https://cse.google.com/cse.js?cx=a8db6e267400f9dda"></script> <div class="gcse-
search"></div>

//--correct URL is//

//
https://www.googleapis.com/customsearch/v1?q=hello&key=AIzaSyBdW41Blk8FvSt8HUvwy36
z8PILlYnIuso&cx=a8db6e267400f9dda&alt=json

String ry=" AIzaSyBdW41Blk8FvSt8HUvwy36z8PILlYnIuso";

String cx = "a8db6e267400f9dda";

final String searchString = datashow.getText().toString().trim();

String searchStringNoSpaces = searchString.replace(" ", "+");
```

SearchQ

```
String urlString = "https://www.googleapis.com/customsearch/v1?q=" +  
searchStringNoSpaces + "&key=" + ry + "&cx=" + cx + "&alt=json";
```

```
StringRequest request = new StringRequest(Request.Method.GET, urlString, new  
Response.Listener<String>() {
```

```
    @Override
```

```
    public void onResponse(String response) {
```

```
        try {
```

```
            JSONObject jsonObject = new JSONObject(response.toString());
```

```
            view.setText(jsonObject.getString("items"));
```

```
            JSONArray array = (JSONArray)jsonObject.get("items");
```

```
            // Log.v(array.get(1));
```

```
            // Toast.makeText(SearchApiKey.this, "Yes Success"+array,  
Toast.LENGTH_SHORT).show();
```

```
            // for (int i = 0; i < array.length(); i++) {
```

```
                JSONObject childObject = array.getJSONObject(3);
```

```
                String id = childObject.getString("snippet");
```

```
                JSONObject childsecond = array.getJSONObject(6);
```

```
                String sid = childsecond.getString("snippet");
```

```
                JSONObject childthrd= array.getJSONObject(7);
```

```
                String tid = childthrd.getString("htmlSnippet");
```

```
                String lid = childsecond.getString("formattedUrl");
```

```
String slink = childsecond.getString("link");

String tog=sid+System.lineSeparator() +tid;

String linkjoin=lid+System.lineSeparator() +slink;

view.setText(id);

//ll

secdisply.setText(linkjoin);

//ff

thdis.setText(tog);

// view.setText(jsonObject.getString("items"));

getfv=disp.getText().toString();

getsv=secdisply.getText().toString();

gettv=thdis.getText().toString();

savedata();

// }

Toast.makeText(Home.this, "Yes Sucess", Toast.LENGTH_SHORT).show();

} catch (JSONException e) {

    e.printStackTrace();

    Toast.makeText(Home .this, "Link code item error",
Toast.LENGTH_SHORT).show();

}
```

SearchQ

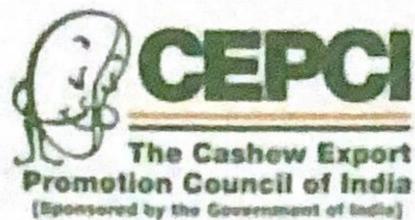
```
    }  
    }, new Response.ErrorListener() {  
        @Override  
        public void onErrorResponse(VolleyError error) {  
            Toast.makeText(Home.this, "Yes Faild" + error, Toast.LENGTH_SHORT).show();  
        }  
    });  
    RequestQueue requestQueue = Volley.newRequestQueue(this);  
    requestQueue.add(request);  
}  
}
```

8. CONCLUSION

Scientific Mathematics section of calculator is that it contains a set of activities designed to develop the advanced applied mathematical skills needed to make the most of the study of the physical sciences or engineering at university. These problems naturally follow on from the more elementary core scientific mathematics section of calculate and are primarily intended for those who intend to study physics, engineering or applied mathematics at university.

9. BIBLIOGRAPHY

- System Analysis and Design - Elias Mewed
- An Integrated Approach of Software Engineering - Pankaj Jalote
- Internet and Web Technology - Raj Kamal
- Introduction to Database Management - Naveen Prakash
- Analysis and Design of Information System - V. Rajkumar
- Web Programming - Chris Bates



“PRODUCTION OF PECTINASE ENZYME BY *ASPERGILLUS NIGER* FROM BANANA PEEL”

Dissertation submitted by

NAHIDA ABDUL NAZAR (REG NO: VM20FPT011)

In partial fulfilment of the degree of

MASTERS OF VOCATIONAL STUDIES

IN

FOOD PROCESSING TECHNOLOGY

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

Affiliated to Mahatma Gandhi University, Kottayam

Under the guidance of

Dr. Prabhakumari C

Principal scientist

Undertaken at

DEPARTMENT OF BIOTECHNOLOGY

CEPCI - CASHEW EXPORT PROMOTION COUNCIL OF INDIA, KOLLAM

July 2022

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM



CERTIFICATE

This is to certify that the project report entitled '**CHARACTERISTIC STUDY OF LIGHT DEPENDENT RESISTORS AND ITS APPLICATION AS SENSORS**' is an authentic work done by NAJEEBA A N Register Number AB19PHY032, St Teresa's College, Ernakulam, under my supervision at Department of Physics, St Teresa's college for the partial requirements for the award of Degree of Bachelor of Science in Physics during the academic year 2021-2022. The work presented in this dissertation has not been submitted for any other degree in this or any other university.

Dr. Priya Parvathi Ameena Jose

Head of Department

Supervising Guide

Date : 04-05-2022

Place : ERNAKULAM

DECLARATION

I, Najeeba Navas final year B.Sc. Physics student, Department of Physics, St Teresa's college, Ernakulam, do hereby declare that the project work entitled '**CHARACTERISTIC STUDY OF LIGHT DEPENDENT RESISTORS AND ITS APPLICATION AS SENSORS**' has been originally carried out under the guidance and supervision of Dr. Priya Parvathi Ameena Jose, Head of department of Physics, St Teresa's College (Autonomous), Ernakulam in partial fulfilment for the award of the degree of Bachelor of Physics. I further declare that this project is not partially or wholly submitted for any other purpose and the data included in the project is collected from various sources and are true to the best of my knowledge.

Date : 04-05-2022

Place: ERNAKULAM

ACKNOWLEDGEMENT

I would like to thank God Almighty for enriching our minds with knowledge and leading us along the project. I express a deep sense of gratitude to my project guide, Dr. Priya Parvathi Ameena Jose, H.O.D, Department of Physics, for providing able support and guidance.

I also express my sincere thanks to Rev. Sr. Dr. Vinitha CSST, Provincial Superior & Manager, Rev. Sr. Emeline, Director and Dr. Lizzy Matthew, Principal for their support and encouragement.

I would also like to thank all the faculty members, lab assistants and non-teaching staff for their help and co-operation throughout my work. And last but not least, I would like to thank my team members for their hard work and support.

ABSTRACT

The basic characteristics of the passive component- LIGHT DEPENDENT RESISTOR (LDR) is analysed in this project. V-I characteristics and distance-resistance relation of LDR using red LED is studied graphically. Two applications using LDR such as electronic eye-controlled security system and Automatic Street light control system were designed and constructed.

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INTRODUCTION

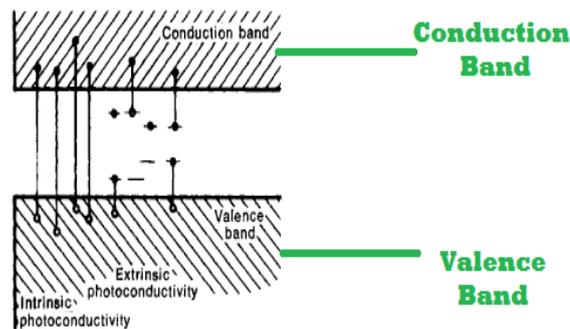
1.1 PHOTOCODUCTIVITY

The increase in the electrical conductivity of certain materials when they are exposed to light of sufficient energy is known as photoconductivity. Photoconductivity serves as a tool to understand the internal process in these materials.

Certain crystalline semiconductors, such as Silicon, Germanium, Lead Sulphide and Cadmium Sulphide and the related semimetal Selenium are strongly photoconductive. Normally semiconductors are relatively poor electrical conductors because they have only a small number of electrons that are free to move under a voltage. Most of the electrons are bound to their atomic lattice in the set of energy states called the valence band. But if external energy is provided, some electrons are raised to the conduction band, where they can move and carry current. Photoconductivity ensures when the material is bombarded with photons of sufficient energy to raise electrons across the band gap, a

forbidden region between the valence and conduction bands. This is shown in the figure 1.1.1. In Cadmium Sulphide energy gap is 2.42 eV, corresponding to a photon of wavelength 512 nm, which is visible energy. In Lead Sulphide, the gap is 0.41 eV, making this material sensitive to infrared light.

FIGURE 1.1.1) ENERGY BAND DIAGRAM



This is
2.42
visible
energy

sensitive to infrared light.

Because the current ceases when the light is removed, photoconductive materials form the basis of light controlled electrical switches. These materials are used to detect infrared radiation in military application as guiding missiles to heat producing targets.

1.2 PHOTO CELLS

A photocell is a light-sensitive module, which works on the principle of photoconductivity. It is a kind of resistor, which can be used to change its resistive value based on the light intensity. These are inexpensive, simple to obtain in numerous sizes as well as in specifications. In the dark, this photocell has a resistance of approximately 500 kΩ, and in bright light the resistance drops to approximately 10 kΩ.

Photovoltaic cell, photoresistors, charge –coupled devices, golay cells etc are examples of photocells.

Photocells are used in automatic lights to activate whenever it gets dark, and the activation/deactivation of streetlights. These are also used as timers in a running race to calculate the runner's speed, to count the vehicles on the road, in burglar alarms. They are

also used in exposure meters (which can be used with a camera for knowing the correct time of exposure to get a good photo). They act as switches as well as sensors.

Let's concentrate more on PHOTORESISTORS.

1.3 LIGHT DEPENDENT RESISTORS(LDR)

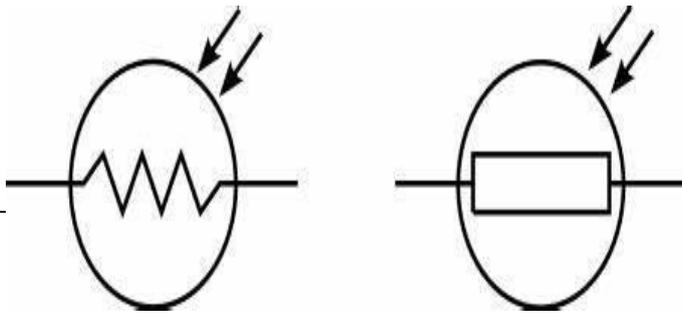
Light Dependent Resistors, also known as photoresistors or photoconductive cells work on the principle of Photoconductivity. Photoresistors are made from semiconductor materials whose resistance changes when illuminated with light energy. Such materials (also known as photoconductors) are Cadmium Sulphide (CdS), Cadmium Selenide (CdSe) and Lead Sulphide (PbS). The figure 1.3.1 shows a commonly used CdS cell. When these materials are exposed to light, the covalent bonds are broken. This produces charge carriers.

The amount of illumination on the surface of the material determines the number of electron-hole pairs generated in the material. This in turn determines the resistance of the Photoconductive cells. The greater the amount of light falling on the surface (called surface illumination), greater will be the number of electron-hole pairs generated and therefore lower will be the value of resistance of the material. The lower the amount of light falling on the surface, higher will be the value of resistance of the material. Thus, the resistance of the semiconductor varies inversely with the intensity of light.

When the device is kept in darkness, its resistance is called Dark Resistance. When light falls on it, its resistance decreases up to several kilo ohms or even hundreds of ohms, depending on the intensity of light falling on it.

The construction of the LDR consists of light sensitive material deposited on an insulating substrate like a ceramic. To get the desired resistance and power rating, the metal is deposited in the pattern of a zigzag. This pattern separates the metal deposited areas into two regions and on both sides of the pattern the Ohmic contact is prepared. The symbol of an LDR is given in the figure 1.3.2.





2) EXPERIMENT DETAILS

2.1 V-I CHARACTERISTICS OF LDR WITH RED LED

CIRCUIT DIAGRAM

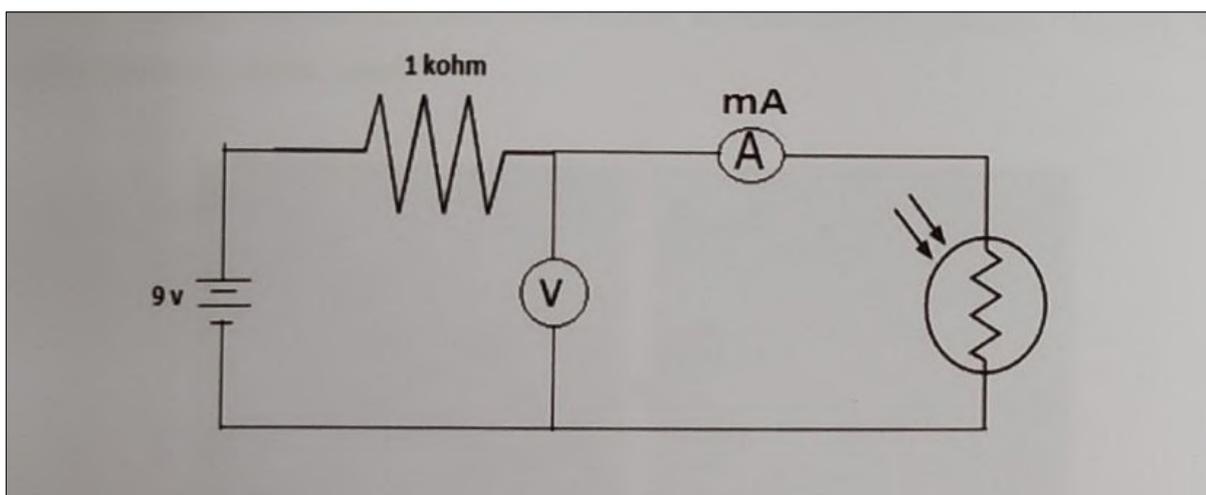


FIGURE 2.1.1

CIRCUIT COMPONENTS

- Light Dependent Resistor
- Connection Wires
- Red light
- Meter Scale

- Battery 9V
- Multimeter
- Bread Board

PROCEDURE

Connections are made as shown in the circuit diagram in figure 2.1.1. Set red LED at distances 1cm, 2 cm etc using a meter scale mount on a holder. Switch on the circuit and turn on the red light so that the light falls on the LDR. Measure corresponding current and voltage using multimeter and note down in the tabular column.

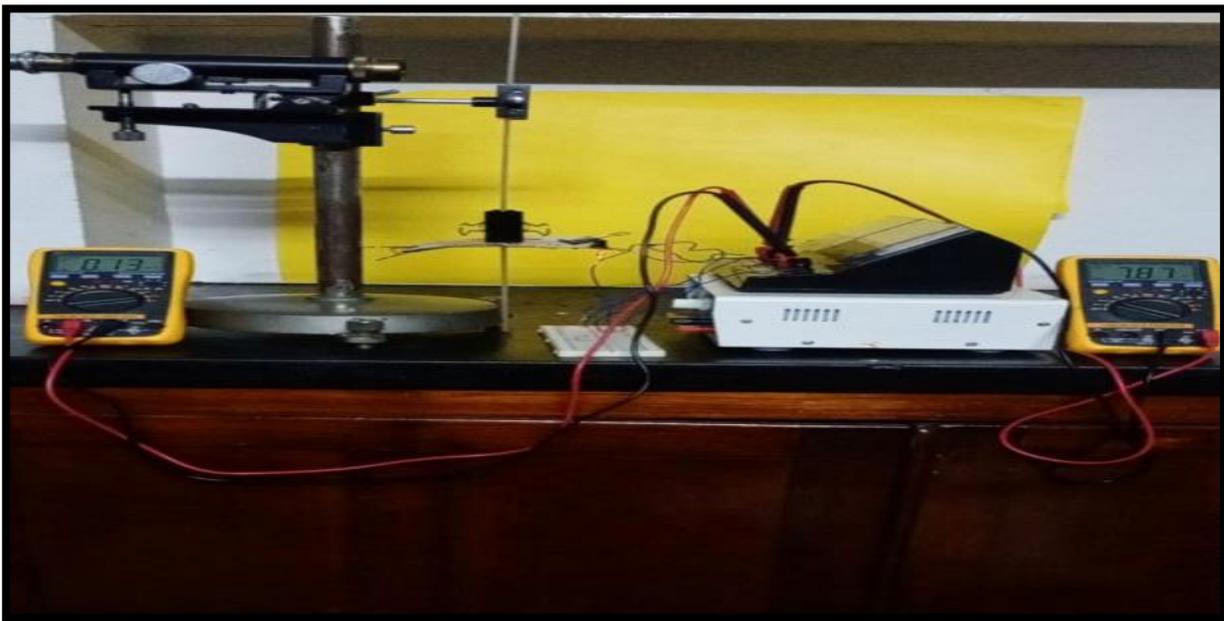


FIGURE 2.1.2) EXPERIMENTAL SETUP

OBSERVATIONS

Measurements for V-I characteristics of LDR using red LED

Distance[cm]	Voltage[volt]	Current[mA]
4	6.37 _~	0.61
5	6.88 _~	0.44

6	6.98	0.40
7	7.40	0.28
8	7.65	0.20
9_	7.72	0.18
10	7.79	0.16
11	7.93	0.11
12	8.00	0.08
13	8.10	0.06
14	8.10	0.06
15	8.15	0.05
20	8.20	0.03
25	8.23	0.02
30	8.26	0.01

V-I CHARACTERISTICS OF LDR USING RED LIGHT

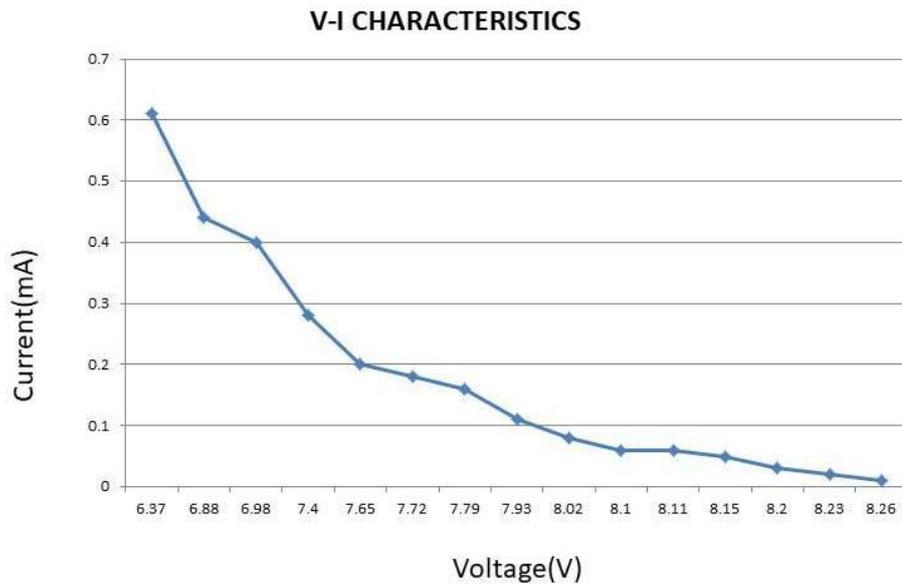


FIGURE 2.1.3

INFERENCES

From current vs voltage graph

- a Current varies across LDR for red light from various distances.
- b There is a decrease in current as distance of the light source increases.

2.2) STUDY OF RESISTANCE ACROSS THE LDR

- For red light with change in distance of the light source.

CIRCUIT COMPONENTS

- Bread Board
- Meter Scale
- Red Light
- Multimeter

PROCEDURE

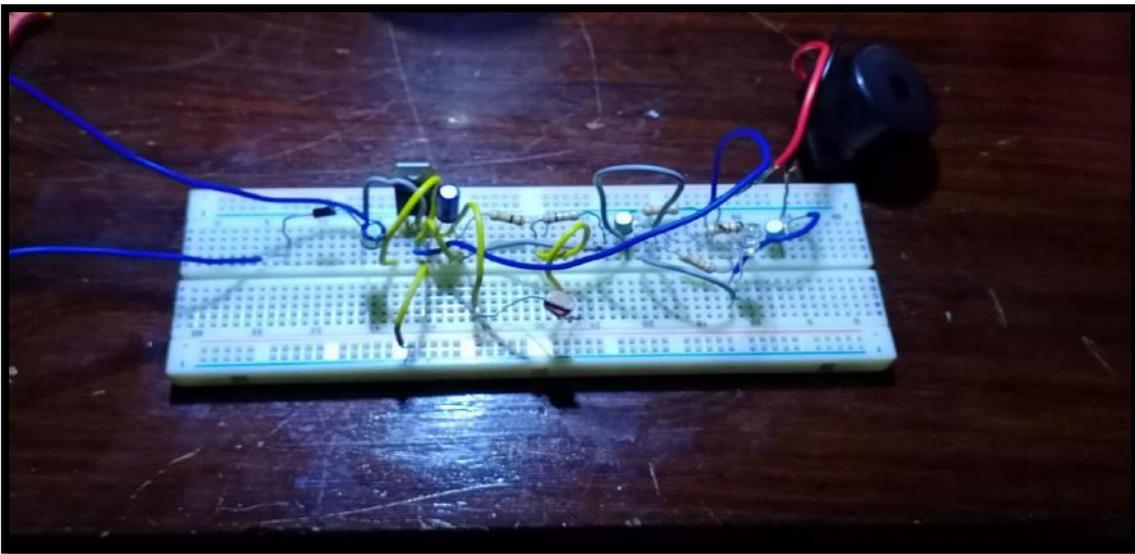
Connect the LDR in bread board. Meter scale is mount on a holder. Red light is kept at distances 1 cm ,2 cm, etc. Corresponding resistances across LDR is noted using a multimeter .

OBSERVATIONS

Measurements for distances vs resistance graph of LDR using RED LIGHT.

DISTANCE (cm)	RESISTANCE (Kilo ohm)
4	10.44
5	15.63
6	17.45
7	26.42
8	38.25
9	42.88
10	48.68
11	72.09
12	100.25
13	135
14	135.16

15	163
20	273.33
25	411.5
30	826



DISTANCE Vs RESISTANCE GRAPH OF LDR USING RED LIGHT

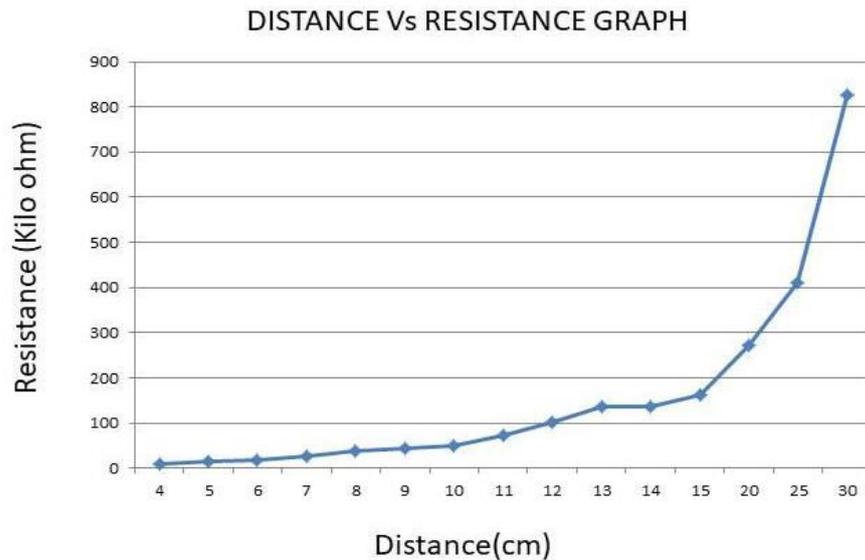


FIGURE 2.2.1

INFERENCE

- LDR resistance increases with increase in distance.
- LDR resistance increases with decrease in intensity of light.

2.3) DEMONSTRATION OF LIGHT SENSITIVITY OF LDR

The circuit is set up as shown in figure 2.3.1. The output terminals are connected to a Digital Storage Oscilloscope (DSO). The digital storage oscilloscope is defined as the oscilloscope which stores and analysis the signal digitally, i.e., in the form of 1 or 0 preferably storing them as analogue signals. The digital oscilloscope takes an input signal, store them and then display it on the screen. The digital oscilloscope has advanced features of storage, triggering and measurements. Also, it displays the signal visually as well as numerically. The LDR is exposed to red, and pulsed light and corresponding waveforms are observed.

CIRCUIT DIAGRAM

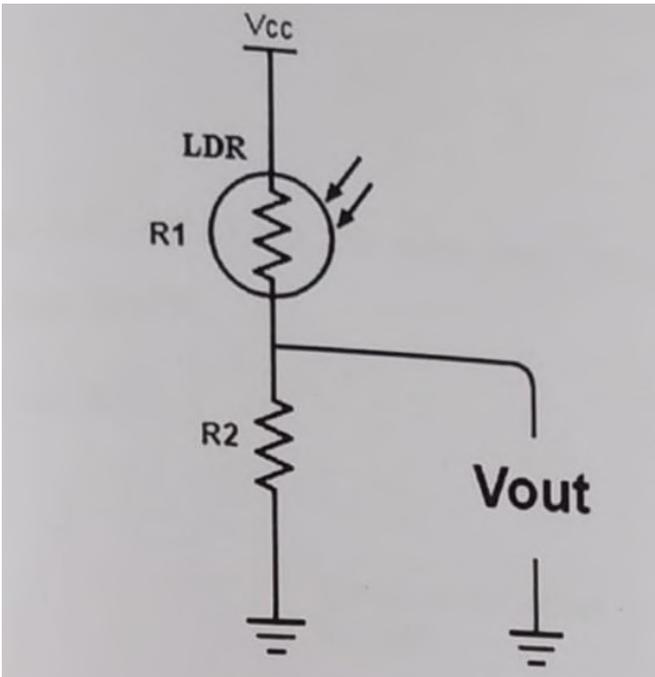


FIGURE 2.3.1

OBSERVATIONS

In the presence of RED LIGHT,
Intensity Vs Time period

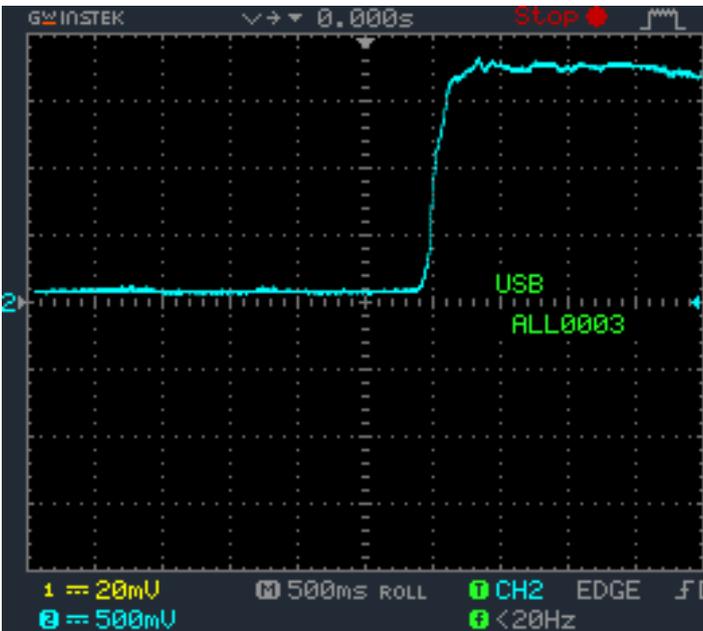


FIGURE 2.3.2

In the presence of pulsated light,

Intensity Vs Time period

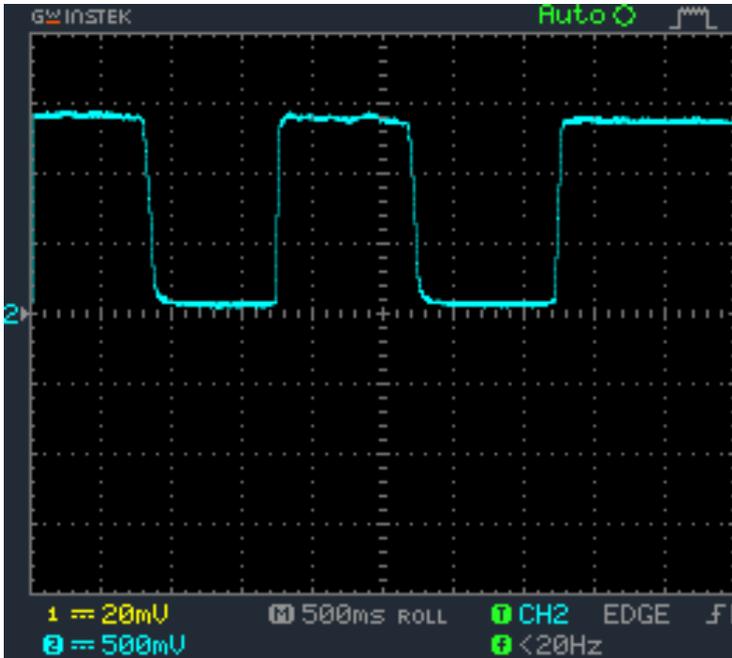


FIGURE 2.3.3

INFERENCE

- Intensity increases and stays at a peak value when LED light shines on the LDR.
- Intensity becomes zero when LED does not shine on the LDR.
- This pattern repeats for pulsated light i.e., repeatedly turning the LED on and off for varying intensities.

3) APPLICATION

There are many applications for LDR. Electronic eye-controlled security system, automatic street light control system, emergency light, control relay etc can be constructed using LDR. Here, we construct and explain the first two.

3.1) ELECTRONIC EYE CONTROLLED SECURITY SYSTEM

This is a home security application. Electronics eye controlled security system has LDR as the main sensor. It is a magic eye. As the automation is an emerging technology these days, we have a door bell that automatically rings when a person visits our home. This also provides security when any person is trying to enter the house without our permission.

PRINCIPLE

The main principle of the circuit is to ring the doorbell when there is any person at the entrance. In order to detect a person, an LDR is used as the sensor. Light on the LDR determines whether a person is present or not. When there is any object at the entrance. LDR is in dark and buzzer starts ringing and the LED starts glowing.

CIRCUIT DIAGRAM

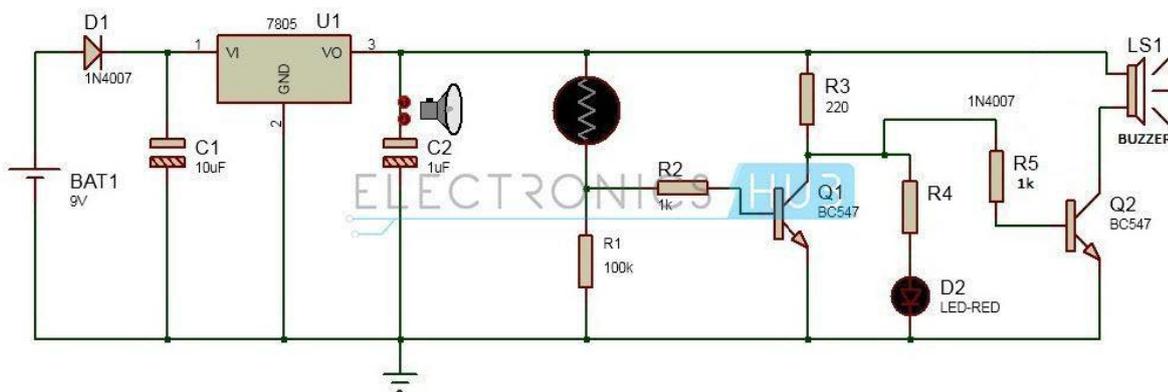


FIGURE 3.1.1

CIRCUIT COMPONENTS

- 7805 Regulator
- Resistors -220 ohm x 2, 1K ohm x 2, 100K ohm
- IN4007 PN Diode
- Capacitors – 1 micro F, 10 micro F
- Transistors –BC 547 x 2
- Light Dependent Resistor (LDR)
- Buzzer
- LED
- Bread Board
- Connecting Wires
- 9V Battery

DESIGN

This circuit can be divided into two parts. One is the power supply and the other is the logic circuit. In the power supply circuit, a 9 V supply from a battery is converted to the 5V. The logic circuit operates the buzzer and an LED when any shadow falls on the LDR.

DESIGN OF POWER SUPPLY

Power supply circuits consists of battery, diode, regulator and capacitors. Initially a 9V battery is connected to the diode. Diode used here is a simple PN junction diode of IN4007 series. In this circuit, IN4007 is connected in the forward bias condition.

The main purpose of the diode in this circuit is to protect the circuit from reverse polarity i.e., to protect the circuit if by any chance the battery is connected in reverse polarity. So, the PN junction diode connected in the forward bias allows the current to flow only on one direction and thus the circuit can be protected. There is some voltage drop across the diode.

A regulator is used for regulating the output voltage of the circuit. The regulator IC used here is 7805. 78 represent the series and 05 represent the output voltage. Thus, a voltage of 5V is produced at the output of the regulator. Two capacitors are used before and after the regulator. These two capacitors eliminate the ripples. Thus, a constant voltage is produced at the output of the regulator, which is applied to the logic circuit.

DESIGN LOGIC CIRCUIT

The logic circuit mainly consists of Light Dependent Resistor, Transistors, a Buzzer, an LED and a few passive components. A 100K ohm resistor is connected in series to the LDR in a voltage divider fashion.

LDR will have resistance in mega ohms when it is placed in the dark. This resistance value will decrease gradually when it is placed in the light, thus, there is a variation in the series resistances.

If the LDR is in dark it has a high resistance and produced the logic high value at the output whereas in the light the resistance value of the LDR decreases which causes a logic low voltage.

The output of the voltage divider is fed to a transistor which inverts the input from the LDR. The second transistor drives the buzzer. The diode is placed for protection.

We have used a 5V magnetic buzzer. It has two pins at the output. One pin is connected to the supply and the other to the collector of the second transistor. LED is used for indication only. When the output from first transistor is high, the buzzer rings. LED is also turned on.

WORKING

Initially, the circuit is connected as in the figure 3.1.1 on a bread board. Using a battery, a 9V power supply is given. LDR is placed in light. We can observe that no sound is produced from the buzzer. Place the LDR and the buzzer starts making sound. Also, the LED glows. As the intensity of light falling on the LDR increases sound produced by the buzzer decreases.

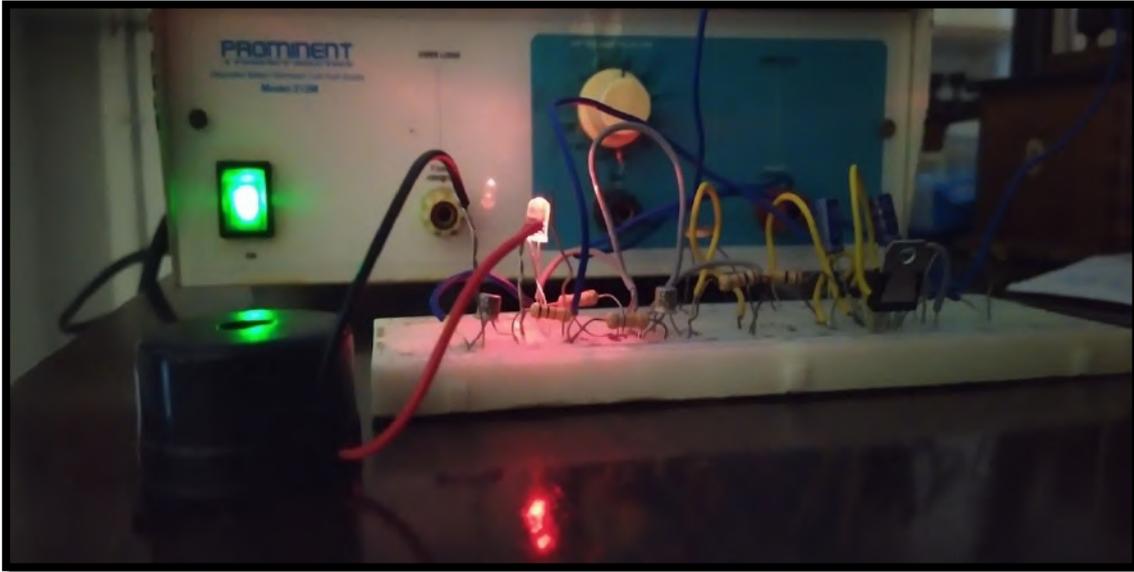


FIGURE 3.1.2) EXPERIMENTAL SETUP

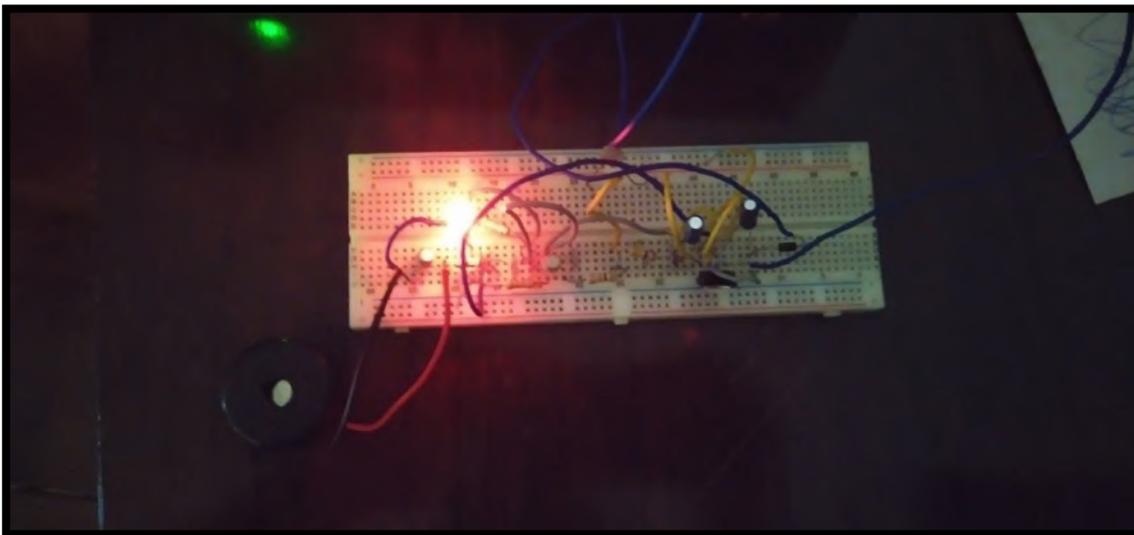


FIGURE 3.1.3) CIRCUIT WHEN LIGHT IS OFF – THE BUZZER RINGS

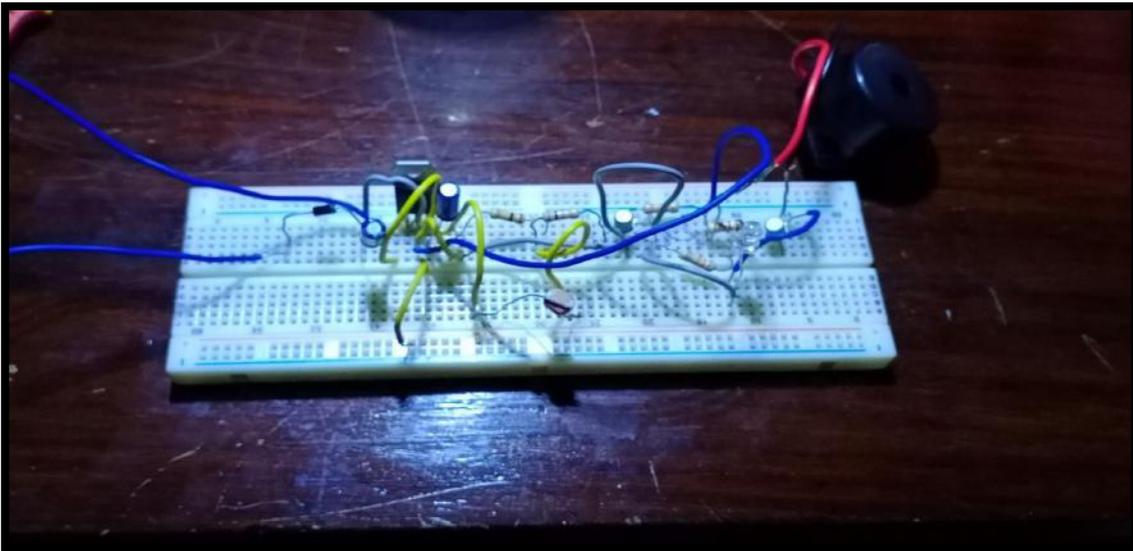


FIGURE 3.1.4) CIRCUIT WHEN LIGHT IS ON – THE BUZZER STOPS RINGING

Electronic eye can be used in security applications. It is used in doorbell applications.

3.2) AUTOMATIC STREET LIGHT CONTROL SYSTEM

We often see street lights remaining on even after sunrise. By using this Automatic system for street light controlling, we can reduce energy consumption because the manually operated streetlight are not switched off properly even after the sunlight comes and also not switched on earlier before sunset.

Also, in rainy days ON and OFF time differ noticeably which is one of the major disadvantages of using timer circuits or manual operations for switching the street light system._

This Automatic Street light control system is a simple and powerful concept which uses transistor as a switch to switch ON and OFF the street light system automatically, by using LDR as the sensor which senses the light just like our eyes._

CIRCUIT DIAGRAM

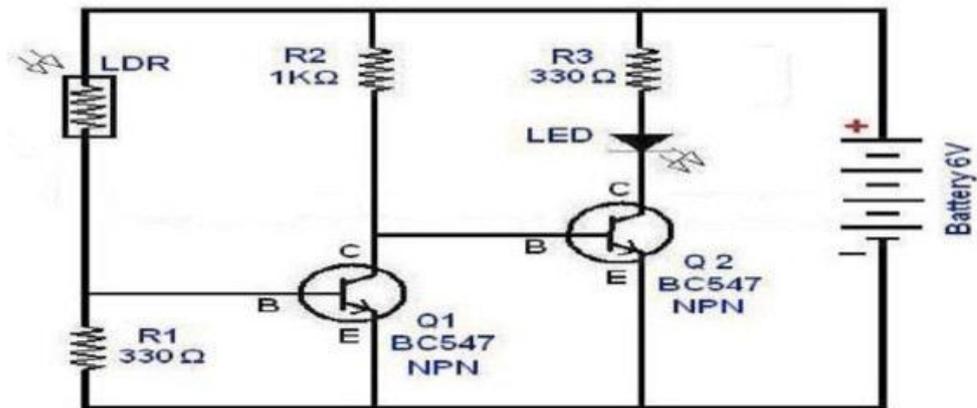


FIGURE 3.2.1

CIRCUIT COMPONENTS

- LDR
- Transistor –BC547 X 2
- Resistors -1K ohm,330 ohm,470 ohm
- Light Emitting Diode (LED)
- Connecting Wires
- 9V Battery

WORKING

The circuit is made as shown in the figure 3.2.1 Connect a 9V battery. As we block the Light Falling on LDR, the LED glows.



FIGURE 3.2.2) THE LED GLOWS WHEN THE LIGHT GOES OFF

Automatic street light control system automatically switches on lights when the sunlight goes below the visible region of our eyes. (i.e., In evening after sunset). It also switches OFF lights when sunlight falls on it (i.e., In the morning).

4) CONCLUSION

- Sensor is constructed using Light Dependent Resistors(LDR). The basic characteristics of this passive component were analysed. This includes
 - a V-I characteristics of LDR using RED LIGHT .
The V-I characteristics of LDR shows that there is a decrease in current as distance of light source increases .
 - b Study of the resistance across LDR.
It was found that LDR resistance increase with increase in distance, Also, LDR resistance increase with decrease in intensity of light .
- Light sensitivity of LDR was also demonstrated using DSO .
- The spectral response of a CdS (Cadmium Sulphide Cells) cell closely matches that of human eye. Hence it is often used in applications where human vision is a factor such as street light control. Light sensors which use LDR as the main light sensing component were constructed.
- LDR can also be used along with an LED and a resistor to construct an emergency light. When power fails, the LED glows.
- Control relays can be constructed with LDR, transistor and resistor. The relay gets turned ON in the darkness.

5) REFERENCES

- A TEXTBOOK OF APPLIED ELECTRONICS -R.S. SEDHA
- BASIC ELECTRONICS -B. L. THERAJA
- www.britannicca.com
- www.electronicshub.org
- www.eleprocus.org

PROJECT REPORT

A STUDY ON RESILIENCE AND ACADEMIC ANXIETY AMONG ORPHAN AND NON-ORPHAN HIGH SCHOOL STUDENTS

Submitted by:

NAKSHATRA NAGAN

Register No:

SB19PSY026

Under the guidance of

MS. BINDU JOHN

In partial fulfillment of the requirement for award of the degree of

B.Sc. PSYCHOLOGY



ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

Nationally Re-accredited at 'A++' level (4th cycle)

Affiliated to: Mahatma Gandhi University

MARCH 2022

CERTIFICATE

This is to certify that the project report entitled, “RESILIENCE AND ACADEMIC ANXIETY AMONG ORPHAN AND NON-ORPHAN HIGH SCHOOL STUDENTS”, is a bonafide record submitted by MS. NAKSHATRA NAGAN, Reg.no. SB19PSY026, in partial fulfillment of the requirements for the award of the Degree of Bachelor of Psychology during the academic year 2019-2022.



Ms. Bindu John

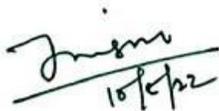
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External Examiner:



DECLARATION

I, Nakshatra Nagan, hereby declare that the study presented in the dissertation entitled, “Resilience and Academic Anxiety Among Orphan And Non-Orphan High School Students”, which is submitted to the Department of Psychology, St. Teresa’s College, Ernakulam is a bonafide record of the research work carried out by me, under the supervision and guidance of Ms. Bindu John, Assistant Professor, Department of Psychology, St. Teresa’s College, Ernakulam, in partial fulfillment of the requirements for the degree of Bachelor of Science in Psychology and has not previously formed the basis for the award of any degree, diploma, fellowship, title or recognition before.

Place: Ernakulam

Nakshatra Nagan

Date:

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Thanking you

Nakshatra Nagan

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ABSTRACT

The present study was undertaken to study resilience and academic anxiety among orphan and non-orphan high school students. A total sample of 300 high school students, where 150 were orphans and 150 were non-orphans, between the age of 13 and 16, studying in Ernakulam, Kottayam and Alleppey districts in Kerala were selected through convenience sampling for non orphans and purposive sampling for orphans. The objective of the study is to find out if there is any significant difference between orphan and non-orphan high school students with respect to resilience and academic anxiety and also to determine gender difference in resilience and academic anxiety of orphan high school students. For the collection of data, Brief Resilience Scale (BRS) and Academic Anxiety Scale for Children (AASC) was used. Mann-Whitney U test is used for statistical analysis. Results revealed that there is no significant difference between orphan and non-orphan high school students with respect to resilience, whereas there is a significant difference between orphan and non-orphan high school students with respect to academic anxiety. There is no significant gender in resilience and academic anxiety of orphan high school students.

Keywords: Resilience, Academic Anxiety, Orphans, Non-orphans, High school students

CHAPTER 1
INTRODUCTION

INTRODUCTION

BACKGROUND OF THE STUDY

The research is conducted to study the effect of resilience on academic anxiety among orphan and non-orphan high school students. A sample of 150 orphan & 150 non-orphan high school students between the age of 13 and 16 years, studying in Ernakulam, Kottayam and Alleppey districts in Kerala were selected for this study.

It is the ability, outcome, or dynamic process of successfully adapting to adversity, trauma, or other major stressors (Norris et al., 2009; Olsson et al., 2003; Richardson, 2002). American Psychological Association (2014) describes that resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats or even significant sources of stress. Academic anxiety is anxiety which afflicts students during school-related situations. It is a kind of state which relates to the impending danger from the environment of the academic institutions including teachers, certain subjects like Mathematics, English (Singh and Sengupta, 2018). An average level of anxiety is useful in keeping people motivated and responsible and also helpful for people in having a more sustainable and prosperous life (Kahan, 2008; DordiNejad, Hakimi, Ashouri, Dehghani, Zeinali, Daghighi, & Bahrami, 2011; Donnelly, 2009). Individuals with academic anxiety is noted to have school avoidance, decreased problem-solving abilities, and lower academic achievement (McLoone, Hudson, & Rapee, 2006; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). In India, the main documented cause of anxiety among school children and adolescents is parents' high educational expectations and pressure for academic achievement (Deb, 2001).

Adolescence is the period of transition from childhood to adulthood, where individuals face with many challenges and dilemmas. A common problem faced by adolescents is academic anxiety as they have pressure to excel in academics. How effectively an adolescent overcome a challenge depends upon how resilient they are. Level of resilience varies individual to individual. The present study is an attempt to understand the resilience and academic anxiety among orphan and non-orphan high school students. UNICEF defines orphan as a child under the age of eighteen who has lost one or both parents or whose parents have abandoned him/her. Orphanhood has generally been considered as stressful and is deemed a risk factor for poor mental health in children (Daniel, 2005; Lata & Verma, 2013; Luecken, 2008; Morantz et al., 2013). Parental loss or abandonment has been found to lead to situations where children are deprived of basic needs, lack physical, social and

emotional support, decline in educational attainment, instances of food insecurity, substance abuse, risky sexual behaviours, inadequate health care, poor physical and mental health, abuse as well as adverse living arrangements. All of these can lead to mental health problems such as depression, anxiety and poor quality of life in orphaned children s (DeSilva et al., 2012; Gana et al., 2014; Lin, Sandler, Ayers, Wolchik, & Luecken, 2004; Morantz et al., 2013).

PROBLEM STATEMENT

To find out whether orphans experience more academic anxiety when compared with non-orphans and also to see the role of resilience among the two groups.

NEED AND SIGNIFICANCE OF STUDY

One of the most common problems faced by the students, especially adolescents, is academic anxiety. Lack of interest, procrastination, laziness, social anxiety, and many other factors lead to academic anxiety. Academic anxiety is also found in students as their parents and teachers expect more from them and giving excess pressure. Academic anxiety affects student's academic performance, social relationship between teachers and also peers. How they cope with academic stress or challenges depends on how resilient they are. The study focuses on understanding the effect of resilience on academic anxiety among orphan and non-orphan high school students. It is very important to know the effect of resilience on academic anxiety for educational purposes. This study helps to bring light upon both orphans and non-orphans on basis of their academic anxiety and resilience, as there has not been many research on them. By focusing this, we can improve their academics and psychological wellbeing. Resilience and academic anxiety may differ based on the environment one is living. This study helps schools to prepare their syllabus and environment less anxiety inducing. Also, parents, staffs in orphanages and teachers would get to know more about the students and help them with it. It also helps to give more focus to less resilient students and helping them to increase their resilience by conducting classes, counseling, or any other methods. Government can come up with new programs and policies to help the children reduce academic anxiety and become resilient. Government and the orphanages can take more care about the orphan's mental health as they are found to be very vulnerable to psychological and social problems.

SCOPE OF THE STUDY

The study is an attempt to understand the effect of resilience on academic anxiety among orphan and non-orphan high school students. We took 150 institutionalized orphans & 150 non-orphans who live with their parents, between the age of 13 and 16 years, studying in Ernakulam, Kottayam and Alleppey districts in Kerala for this study. There is not many researches focusing on orphans and non-orphans to study the effect of resilience on academic anxiety. This study helps to have an improved understanding of the relation between resilience and academic anxiety, and also its impact. This study can give insight on the need for enhancing less resilient students to decreasing academic anxiety.

OBJECTIVES OF THE STUDY

1. To find out if there is any significant difference between orphan and non-orphan high school students with respect to resilience.
2. To find out if there is any significant difference between orphan and non-orphan high school students with respect to academic anxiety.
3. To determine gender difference in resilience and academic anxiety of orphan high school students.

LIMITATIONS OF THE STUDY

The study was restricted to Ernakulam, Kottayam and Alleppey and thus the finding cannot be generalized to a larger geographical area. Also due to time constraints sampling was only possible through surveys in the absence of interviews. The researchers were unable to collect the information from certain orphanages because of the current pandemic and also because some orphanages wanted to protect the privacy of the orphans.

CHAPTER 2
REVIEW OF LITERATURE

REVIEW OF LITERATURE

A study on influence of resilience and academic alienation on academic anxiety of adolescence was conducted by Manjeet Kaur Khangura, Dr. Shaveta Sharma, & Dr. Mohua Khosla (2020) with 500 adolescents studying in government and self-financed schools in Punjab. The results showed that academic anxiety is negatively related to resilience, whereas academic anxiety is positively and significantly related to academic alienation. They also found that the conjoint effect of resilience and academic alienation on academic anxiety of adolescents is higher than that of resilience and academic alienation separately.

The role of trait emotional intelligence (TEI) in preventing students' school burnout directly and indirectly via anxiety and academic resilience in high school students was conducted by Caterina Fiorilli, Eleonora Farina, Ilaria Buonomo, Sebastiano Costa, Luciano Romano, Rosalba Larcan and Konstantinos V. Petrides (2020). By structural equation modelling, a strong indirect effect of TEI on school burnout, mediated via anxiety and resilience was found. It was found that TEI was positively related to resilience, and negatively related to anxiety and school burnout. There was a strong negative correlation between school burnout and resilience, as well as a positive correlation between school burnout and anxiety.

Bhutnath Mahato, and Sunil Jangir (2012) conducted a study on academic anxiety among regular residential adolescent students of the age between 14 to 16 years of Minicoy Government and private Schools to find the academic anxiety among students, to evaluate and compare the academic anxiety among boys and girls and to find the relationship of school environment with the academic anxiety. The results indicated that most of the students experience academic anxiety and also gender was not found to have any impact on the anxiety scores. It was also found that the type of school and the environment had a significant relation with the academic anxiety with the students of government schools having higher academic anxiety.

Ghasem Mohammadyari (2012) conducted a comparative study of relationship between general perceived self-efficacy and test anxiety in academic achievement of male and female students, with 175 males and 175 females. It was found that there was a positive significant relationship between general perceived self-efficacy and students' academic achievement and a negative significant relationship between test anxiety and students' academic achievement. It was also found that only test anxiety has a significant negative effect on academic achievement in the

female students, whereas only self-efficacy has a significant positive effect on academic achievement in the male students.

Ajay Kumar (2013) conducted a study to find the relationship of academic anxiety and home environment of adolescents with 120 subjects from both rural and urban areas. It was found that the Academic Anxiety and Home Environment of adolescents correlated significantly.

A study was conducted by Ajay Kumar (2013) to find the gender difference in academic anxiety and academic achievement of secondary school students. The results revealed that there exist significant differences in academic anxiety and academic achievement of male and female secondary school students. Additionally, girls found to be more academically anxious and had better academic achievement than boys.

Arvindgiri K. Aparnath (2014) did a study on academic anxiety of secondary school students with relation to their gender and religion. It was found that there was no significant difference between the academic anxiety of Muslim boys & girls and Hindu girls & Muslim girls. There is more academic anxiety in Hindu girls than Hindu boys and more academic anxiety in Muslim boys than Hindu boys.

A study was conducted to find the relationship between academic anxiety and parental encouragement of secondary school students with total 120 samples from government and private secondary schools, by Gourav Mahajan (2015). The results showed that academic stress was significantly and negatively correlated with parental encouragement. There was no significant gender difference found in academic anxiety, whereas there was significant difference found between academic anxiety of govt. and private secondary school students.

In a study to understand the relationship between parental aspiration and academic anxiety of Senior Secondary School students of different socio economic groups in Delhi, conducted by Richa Mehta (2016), it was found that there is negligible relationship between parental aspiration and academic anxiety and also the parental aspirations are dependent on their socio economical status.

Rachna Sharma (2017) conducted a study to find the relationship between academic anxiety and mental health among adolescents of the age 13 – 16 years of age. The results showed that academic anxiety is significantly and negatively correlated with mental health, for both males and

females. Gender difference on academic anxiety among adolescents was found significant, whereas gender difference on Mental Health among adolescents was not found significant.

A study was conducted by Aman Azeem (2018) to find difference and relationship in between the academic anxiety and academic achievement with respect to gender and religion. The results showed that there is no significant difference in the academic anxiety and academic achievement of male and female students. Similarly, it is found that there is no significant difference in the academic anxiety and academic achievement of muslim and non-muslim students respectively. It was found that there is a significant and negative relationship between academic anxiety and academic achievement. From the findings it is inferred that a moderate level of anxiety is desired in order to excel in the academics, whereas, when anxiety crosses the limit academic achievement decreases significantly.

Hardeep Kaur, Arashmeet Chawla (2018) conducted a study to examine the level of academic anxiety and school adjustment among adolescent living in orphanages and with their families and also to examine the gender differences. The results shows that orphan adolescents have less academic anxiety than non-orphan adolescents and scores of females were higher than males. Adolescents living with family have better school adjustment than those living in orphanages. Also, females had lower level of adjustment than males.

Aasia Maqbool and M. Y. Ganai (2019) reviewed some research studies on the anxiety level among orphans, it was concluded that the orphans are high in negative emotions such as depression, distress, anxiety behavior. Lack of parental love, care and affection may lead to deterioration of their mental health in later life.

A study was conducted by Sonal Sharma and Dr. Mohd. Shakir (2019) to find the difference in academic anxiety of senior secondary school students in relation to locale (rural and urban) and type of school (government and private). It was found that there is a significant difference in the academic anxiety of senior secondary school students in relation to locale. The academic anxiety is high for Urban senior secondary school students than rural senior secondary school students. There was also significant difference in the academic anxiety of senior secondary school students in relation to type of school. Academic anxiety is high for senior secondary students studying in private than government senior secondary school students.

Farah Shafiq, Sonia Ijaz Haider, and Shamaila Ijaz (2020) conducted a study to understand the relationship between anxiety, depression, stress, and decision-making among orphans and non-orphans adolescents, with 150 orphans and 150 non-orphans. The results revealed that decision making has significant correlation with stress, anxiety, and depression. It was found that there is a significant gender difference between orphans and non-orphans. Also they found that anxiety is a significant predictor of adolescent decision making.

A study was conducted by Naima Malik, Mian Ghulam Yasin and Najma Iqbal (2012) to examine the relationship between psychological resilience, self-esteem and delinquent tendencies among orphan and non-orphan adolescents. Findings shows significant positive relationship between self-esteem and resilience. Significant negative relationship was also found between self-esteem and delinquent tendencies among adolescents. The orphan adolescents were high in terms of their resilience than non-orphan adolescents. In addition, it was also found that non-orphan adolescents had high delinquent tendencies than orphan adolescents.

Kaymarlin Govender, Candice Reardon, Tim Quinlan, and Gavin George (2014) did a comparative study on psychosocial wellbeing of orphan and non orphan children living in Africa. They found that there is no significant difference in levels of anxiety and depression, affability and resilience between orphans and non-orphans.

Belay Tefera and Missaye Mulantie (2014) conducted a study to identify risk, protection factors and resilience among orphan and vulnerable Children (OVC) in Ethiopia and indicated that most orphans and vulnerable children faced family, school and community related risks factors and both orphans as well as vulnerable children were found to be less resilient.

Sudha Katyal (2015) conducted a study on resilience among orphan and non orphan children, with orphans and non-orphans aged 12-18 years. The results revealed that there is a significant difference in resilience of orphan and non-orphan children, where orphan children having higher resilience than that of non-orphan children.

Joana Salifu Yendork & Nceba Z. Somhlaba (2015) conducted a study to find the influence perceived social support, self-efficacy and resilience on the stress experience with 200 children in Ghana (100 orphans and 100 non orphans) aged 7-17 years. It was found that both the orphans and non-orphans reported high levels of self-efficacy and resilience. Orphans had significantly stronger perceptions of social support from friends than non-orphans, whereas non-orphans had significantly

stronger perceptions of support from families than orphans. It was also found that self-efficacy is a significant positive predictor of resilience for the orphans, whereas self-efficacy and perceived social support are significant positive predictors of resilience for the non-orphans.

Sukhminder Kaur and Chandni Rani (2015) did a study to assess the psychological health (Stress-resilience, Coping Strategies and Self-concept) of orphan and intact families' adolescents. found that both orphan adolescents and intact family adolescents differ significantly on stress resiliency.

Anuja S. Panicker and Anujothi Chelliah (2016), did a research to assess the levels of resilience, depression, anxiety and stress among children and adolescents with Specific Learning Disability (SLD) with 82 children and adolescence. They also aimed to compare them with those with Borderline Intellectual Functioning (BIF) and to assess parents' awareness of their child's learning disabilities. The current study found that a majority of the participants with SLD (75%) had low level of resilience. It was found there was a statistically significant difference in Resilience, Depression, Anxiety and Stress Scores between the participants with SLD and BIF. It was also found that, in spite of 90% of parents being aware that their child has SLD, 51% of the participants with SLD were reprimanded for not performing well academically, whereas only 39% of parents gave individual attention to the child. Also majority of the participants (82.93%) did not receive any special training for SLD.

A research on resilience and its contributing factors in adolescents in long-term residential care facilities affiliated to Tehran Welfare Organization was conducted by Manijeh Nourian, Farahnaz Mohammadi Shahboulaghi, Maryam rassouli and Akbar Biglarrian (2016), with 223 adolescents (13-19 years) living in 15 different governmental residential care centers. The results revealed that 46.2% of the participants have moderate level of resilience. Females found to have significantly higher resilience than males. Additionally, primary school students found to have lower resilience than middle and high school students.

A study on the mediating role of self-regulation in the relationship between protective factors and resilience was conducted by Paulo César Dias and Irene Cadime (2017) with 393 adolescents who attended secondary education. It was found that the level of resilience of the students was predicted by the home, community and peer environment. Among these the home environment was found to be the main predictor. Goal setting and impulse control abilities were also predictors of

resilience but there was no evidence for a mediating effect of the self-regulation dimensions on the relationship between protective factors and resilience. It was also found that students from vocational courses had lower levels of self-regulation (both goal setting and impulse control abilities) and resilience than students from regular courses. Students from regular courses reported better home environment but students from vocational courses reported better school environment. No differences between students from regular and vocational courses were found for community and peer environment.

A research was conducted (2018) by R. M. Sobana on comparison of resilience between male and female orphan children with each boys and girls in 10-17 age group. The results revealed that most of the orphan children experienced social isolation, social and cultural discrimination. Girls and older children were found to be more resistant than boys and younger children. Also, it was found that there is significant difference in resilience of older children and girls than older age group and boys.

Priyanka Dey and Beena Daliya R (2019) did a study on level of resilience and psychological wellbeing among orphan and non-orphan adolescents and to examine the influence of resilience on psychological wellbeing of orphan and non-orphan adolescents. The results showed that there is no difference in the level of resilience among orphan and non-orphan adolescents but there were differences in orphan and non-orphan adolescents with respect to Positive relations with others in the level of psychological wellbeing. It revealed that resilience has no influence on the Psychological wellbeing of orphan adolescents, whereas resilience had remarkable influence on the psychological wellbeing of non-orphan adolescents.

Daneshwari Onkari and Sunanda Itagi (2019) did a study on resilience among rural orphans, with 124 orphans of 6 – 18 years. It was found that 61.3 % of the children (i.e., majority) were in the low level of resilience whereas 12.9% each of them were in below average as well as average level of resilience. Significant negative relation is found between resilience and vulnerability.

A study was conducted (2020) by Dr.Kalyani Kenneth, and Kathrin Golda J., to find the difference in gender and the relationship between self-esteem and resilience of orphan adolescent, with 60 males and 60 female. The results revealed that there is significant difference in gender relating to self - esteem and resilience among orphan adolescents and also there is significant relationship between self – esteem and resilience among orphan adolescents.

A cross sectional study was conducted by Ridhima Duggal & Pooja Wadhawan (2020) to check the resiliency of adolescents living in orphanages and adolescents living with their families, with 60 adolescents (30 orphans and 30 non orphans). The results revealed that orphans were less resilient than the non orphans. It was also found that they are lower on dimensions of sense of mastery, sense of relatedness and emotional reactivity than non orphans.

A review study was conducted by Sandhiya Priyadarshini D and Maya Rathnasabapathy (2021) on the impact of resilience among orphans. These studies shows that children who are orphan had high degree of resilience than non-orphan children. The review of research studies revealed that older orphan children had higher level of resilience than younger orphan children, whereas girls had higher level of resilience when compared to boys.

There are only few studies that give conclusive result about the resilience and academic anxiety among orphan and non-orphan population. So to gain a better understanding, the orphan and non-orphan population has been included.

CHAPTER 3
THEORETICAL FRAMEWORK

THEORETICAL FRAMEWORK

RESILIENCE

Resilience is the process of, capacity for, or outcome of, successful adaptation despite challenging or threatening circumstances, it's an ability to recover from adversity and as a positive personality characteristics that enhance individual adaptation and moderates the negative effects of stress (Wagnild & Young, 1993). Instead of allowing adversity, traumatic events or failure to overwhelm them and drain their determination, highly resilient people find a way to change course, heal emotionally and continue to move towards their goals. Resilient people can use their skills and strengths to cope with and overcome life's challenges, which may include the death of a loved one, divorce, financial problems, illness, job loss, medical disasters, natural disasters.

Resilient people often have different characteristics that help them cope with life's challenges. Some signs of resilience include:

- Survival mentality: When people are immune, they see themselves as survivors. Even when things get tough, they know they can move on until it passes.
- Effective Emotional Regulation:: Resilience is characterized by the ability to deal with emotions in the face of stress. This does not mean that resilient people do not experience strong emotions such as anger, sadness or fear. It means that they realize that those feelings are temporary and can be dealt with until they pass.
- Control experience: Resilient people have strong internal control and think that their actions can play a role in determining the outcome of events.
- Troubleshooting Skills: When problems arise, tolerant people try to come up with solutions that view the situation rationally and make a difference.
- Self-compassion: Another sign of tolerance is self-acceptance and self-compassion. Tolerant people treat themselves kindly, especially when things are difficult.
- Social support: Having a strong network of people to support is another sign of resilience. Patient people recognize the importance of support and inform when help is needed.

Types Of Resilience

Resilience represents, the ability to deal with life's setbacks, which is the overall representation of adaptation. However, there are different types of resilience, each of which can affect an individual's ability to cope with different types of stress.

Physical Resilience :

Physical resilience is how the body copes with changes and recovers from physical needs, diseases and injuries. Research shows that this type of resilience plays an important role in health. It affects how people react and recover from physical stress and medical problems.

Mental Resilience :

Mental resistance refers to an individual's ability to adapt to change and uncertainty. People with this type of resilience are more flexible and calm in times of crisis. They use this mental strength to solve problems, move forward, and stay hopeful in the face of setbacks.

Emotional Resilience :

Being able to control emotions during times of stress is used in emotional resilience.. They are aware of their emotional reactions and are in touch with their inner life. For this reason, they are able to calm their minds and control their emotions when dealing with negative experiences. This kind of resilience also helps people to maintain optimism during difficult times. Because they are emotionally tolerant, they realize that adversity and difficult feelings are temporary and will not last forever.

Social Resilience:

Social resilience, also known as community resilience, involves the ability of groups to recover from difficult situations. It involves interacting with others, solving problems, and working together to deal with issues that affect people individually and collectively. Aspects of social resistance include post-disaster cohesion, social support for each other, awareness of the dangers facing society, and the development of community awareness.

Instead of getting frustrated or running away from problems, resilience helps people to face life's hardships directly. Resilient people may also show similar traits such as being a good communicator, high emotional intelligence and effective handling of emotions, keep positive attitudes about themselves and their abilities, ability to make realistic plans and stick to them, sees himself as a fighter rather than a victim of the situation.

Causes Of Resilience

Some people naturally acquire these skills, personality traits that help them to stand up to challenges. However, these traits are not unique to a select few. Immunity is the result of a complex series of internal and external traits, including genetics, physical fitness, mental health, and the environment. ``Social support is another crucial variable that contributes to immunity. People who are mentally strong will have the support of family and friends, who will help strengthen them during difficult times.

Impact Of Resilience

It gives people the psychological power to cope with stress and adversity. Psychologists believe that resilient individuals are better able to cope with adversity and rebuild their lives after a fight. Dealing with change or loss is an essential part of life. At some point, each person experiences different levels of setbacks. Some of these challenges may be relatively minor (not getting into a class or getting a promotion at work), while others can be quite devastating (hurricanes and terrorist attacks). Those who are impatient may be discouraged by such experiences. They may get into trouble and use coping mechanisms that do not help them deal with life's challenges. Frustration or failure can lead them to unhealthy, destructive and dangerous behaviours. These individuals are slow to recover from setbacks and may experience more mental distress as a result.

It does not eliminate the tolerance factor or the difficulties in life. People with this quality do not see life through a rose-coloured lens. They realize that setbacks can happen and that sometimes life can be hard and painful. They still experience the negative emotions that come after a tragedy,

but their mental outlook can work through these emotions and bring them back. It gives people the strength to face problems, to overcome adversity and to move on with their lives. In the wake of large-scale shocks such as terrorist attacks, natural disasters, and the COVID-19 pandemic, many individuals have developed immunosuppressive behaviours — resulting in less symptoms of depression.

Resilience Theory

Resilience theory is a conceptual framework for understanding how some individuals can back down in life after experiencing a negative situation in a strength -centered approach. It is a collective defense model that has been contributed by many researchers. Notable contributions include Norman Garmezy and Masten, who started Project Competence Longitudinal Study (PCLS). When psychologists studied the effects of children at high risk for psychopathology half a century ago, the roots of immunological studies could be traced. In these children, a subgroup of them did not develop a psychopathological disorder, and grew up with surprisingly healthy patterns.

In the past, psychologists have often focused on identifying risk factors and risks that contribute to adverse outcomes in children. In fact, there have been four waves of resilience researches that are constantly revising and redefining the theory of resilience. Among the various models of resilience theory, a number of general characteristics have emerged that most resilience theorists accept.

1. Static Traits VS Dynamic Process

In the early days of resilience research, psychologists focused on identifying personality traits that led to positive outcomes in that subset of children. It was assumed that immunity was created by a person's certain intrinsic qualities. Over time, researchers have come to realize that resilience is more than just personality traits. Instead, resilience is a dynamic process that adapts to the disorder that threatens a child's functioning and development.

2. Extraordinary Asset VS Common Resources

Early resilience researchers described children who showed resilient adaptation as invincible or invulnerable, as if only a few extraordinary people could survive a very difficult situation.

Researchers later found that resilience is very common in human development when the function of basic adaptation systems is preserved and in good working order. If these systems fail during child development, the risk of developmental problems is very high.

Resilient expert Ann S. Masten called it *Ordinary Magic* because it is not an extraordinary virtue, but a common resource that protects us. Three types of protection factors have been identified to protect adaptation systems: individual, family, and community. Although personal assets such as temperament, intelligence, and gender contribute to resilience, factors that often live outside of us play an important role in determining whether or not a person can adapt positively. These are common resources available to one from the family and community, such as parental support, senior counsellors, the immediate community, and a secure neighborhood.

3. Fixed VS variable

Other new concept of resilience is that it can fluctuate over different domains over time. Adaptation is not a fixed system; Rather, it is a developmental progression with new forces and vulnerabilities coming from different life events over time.

4. Resilience Theory VS Resilience Theory

Because resilience is a dynamic process, most of the protective factors come from an individual, and many researchers now refer to it as resilience or resilience adaptation, rather than as an resiliency or resilient child, because the latter implies that it is only a benefit of the individual.

Resilience is a simple concept - coming back after adversity. But defining, analyzing and understanding resilience is a complex subject in psychology. Several resilience models have been developed, and ongoing neuroscience studies have led to understanding. Despite the complexity of the research, one thing is clear to parents: we must do our part to develop resilience, connect with our children and provide good parenting.

ACADEMIC ANXIETY

Anxiety refers to apprehension, tension, or uneasiness characterized by fear, dread, or uncertainty about something, the source of which is largely unknown or unrecognized by the individual. It may consist in persistent apprehensions of future events as well as in generalized emotional reactions to any choice point or decision (Good, 1973). Anxiety has cognitive/subjective,

physiological and behavioural components. Anxiety involves negative mood, worry about possible future threats or danger, self-preoccupation, and a sense of being unable to predict the future threat or to control it if it occurs, at the cognitive/subjective level. At a physiological level, anxiety often creates a state of tension and chronic overarousal, which may reflect risk assessment and readiness for dealing with danger should it occur. Anxiety also creates a strong tendency to avoid situations where danger might be encountered, at a behavioural level. Academic anxiety is the anxiety related to academics or school works. It is a mental feeling of uneasiness or distress in reaction to a school situation that is perceived negatively.

Components Of Academic Anxiety

Four components of academic anxiety are worry, emotionality, task generated interference, and study skills deficits.

- Worry: Thoughts and feelings that restrict the student from concentrating and completing academic works.
- Emotionality: It is the biological symptoms of anxiety such as fast heartbeat, sweating, shivering, muscle tension and so on.
- Task generated interference: Behaviours which are unproductive and prevent successful performance, related to the task at hand, such as constantly checking the time during an exam, and procrastination.
- Study skills deficits: It includes problems with the student's study methods which create anxiety, such as last-minute cramming resulting in not knowing answers to test questions, or any learning difficulties.

We can reduce the anxiety depending upon which component of anxiety you are experiencing. Effective ways to deal with worry are by using positive mental imagery, disputing negative and self-defeating thoughts with more productive, realistic thoughts, and self-hypnosis. Ways to deal with emotionality are muscle and breathing relaxation exercises. If you are experiencing task generated interference then it is best to work with a study skills instructor or a counsellor to identify the specific behaviours that cause problems and create a plan to reduce or change them. If it is study skill deficits then ask help from a study skill instructor or improve current study method.

Academic anxiety can either be healthy or unhealthy. Anxiety which are healthy create optimum level of tension and it challenge the students and promote their growth. It motivate students to study and help them for better achievement. Unhealthy, disproportionate anxiety negatively affects their well-being and disrupt day to day functioning of the students. High anxiety thus, leads to poor academic performance, procrastination, withdrawal from socializing with peers or from other situations. If there is no anxiety, the students will be less motivated to perform well in academics.

The negative effects of anxiety can be explained by the interference and the learning deficit models. According to the interference models, anxious students are distracted due to task irrelevant cognitions and negative thoughts while doing a task. The learning deficit model proposes that it is student's ineffective study habits during preparation for an examination that causes them to be anxious.

Some common forms of academic anxiety found in students are test anxiety, math anxiety and foreign language anxiety. Test anxiety is the anxiety in testing situations. It is a phenomenological, physiological, and behavioural response that accompanies concern about possible negative consequences of failure on exams (Zeidner,1998). Math anxiety is the anxiety that interfere with the ordinary manipulation of numbers and the solving of mathematical problems. Students with math anxiety feels incapable in doing math, not interested in attending math class and get poor marks in math courses. Foreign language anxiety is the anxiety experienced in learning or using a second or foreign language.

A main reason for academic anxiety is found to be parents' high educational expectations and pressure for academic achievement (Deb, 2001; Kangura & Sharma, 2020). Other reasons for academic anxiety are prior negative experiences, fear of failure, lack of preparation, poor time management, cramming, lack of confidence, pressure to perform well, unreasonable goals/perfectionism and trait anxiety.

Studies have shown that students with high academic anxiety procrastinate more frequently than students low in academic anxiety. This can be best explained by the cognitive theories of stress and coping; if people perceive a situation to be threatening and their resources inadequate to cope with the threat, they react with stress reactions, including manifest anxiety, and try to escape from the

situation. Thus, people with academic anxiety when asked to do a task, they ally their anxiety by procrastinating (Milgram & Toubiana, 1999)

Studies have shown that girls had more incidences and intensity of academic anxiety in comparison to boys (Bhansali & Trivedi, 2008; Kumar, 2013)

Theories

Attribution Theory:

Attribution theory explains how individuals perceive the causality of different events whether being external or internally based. According to this theory, students need to feel in control over the outcome of an academic task. For this, students need to understand why a certain outcome occurs. Students will be more motivated to complete a task, if they feel more control over the outcome. The causes of the outcome can be external or internal, stable or unstable, and controllable or uncontrollable. If students don't feel control over the outcome, it leads to anxiety and poor academic performance.

Attribution Theory focuses on two types of goals, learning goals and performance goals. Students who have learning goals are students who want to learn more and work hard to succeed. Students who have learning goals can see failure as a motivator. For students with performance goals, failure is anti-motivation.

Psychoanalytic theory:

Anxiety is at the core of the psychoanalytic theory of affects and is recognized as central to understanding of mental conflict. In his early works, Freud considered anxiety as a "toxic transformation" of undischarged libido. The failure of discharge could either be physiological ("realistic"), as in incomplete or unsatisfactory sexual practices, resulting in "actual neuroses" or "anxiety neuroses"; or it could arise from repression (or its failure), as a symptom of the continued pressure of unacceptable desires, which led to the "psychoneuroses"—hysterias and obsessions.

Later, he abandoned the distinction between neurotic and realistic anxiety, and the claim that repression caused anxiety. He came up with two types of anxiety, a traumatic, reality-oriented automatic anxiety and a secondary, signal anxiety. Automatic anxiety was an affective reaction to the helplessness experienced during a traumatic experience in which the helpless ego is

overwhelmed. Signal anxiety, which can be activated in the ego response to situations of danger as a kind of warning that a traumatic situation is imminent, so that defensive measures can be put into place to avoid it.

These 'danger situations' tend to gravitate around the threats that arise from the prospect of being helpless and at the mercy of others: threats of losing a loved one, of losing another's love, or of being attacked. Ultimately, Freud claimed, these threats are manifestations of a more fundamental threat, the threat of castration.

Cognitive Perspective:

According to cognitive perspective, there are three reasons for the development of anxiety; loss of control, inability to make a coping response, and state anxiety versus trait anxiety. Unpredictable or uncontrollable situations or events in one's life, lead to anxiety and/or depression, as he/she has no control over them. The inability or perceived inability to make an adaptive response to a threatening event will lead to feelings of anxiety. State and trait anxiety refers to the personality traits of an individual. State anxiety is a transitory emotional response involving feelings of tension and apprehension, whereas trait anxiety refers to an enduring characteristic of a person that can be used to explain a person's behavioural consistencies, and determines the likelihood a person will experience anxiety in stressful situations. Cognitive theory has also explained anxiety as the tendency to overestimate the potential for danger.

Social Learning Theory:

Social learning theory states that people, especially children, learn behaviours by observing and imitating the behaviour of others. Applying Social Learning Theory to the development of children's academic anxiety, it can be expected that the child's levels of academic anxiety is shaped by the parents who engage in direct instruction and modelling strategies both intentionally and unintentionally. Some strategies might be carried out entirely unconsciously as the parents don't even realize what they're doing and how they might be influencing their child.

CHAPTER 4
RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

OBJECTIVES

1. To find out if there is any significant difference between orphan and non-orphan high school students with respect to resilience.
2. To find out if there is any significant difference between orphan and non-orphan high school students with respect to academic anxiety.
3. To determine gender difference in resilience and academic anxiety of orphan high school students.

HYPOTHESIS

1. **H₀**: There is no significant difference between orphan and non-orphan high school students with respect to resilience.
H₁: There is significant difference between orphan and non-orphan high school students with respect to resilience.
2. **H₀**: There is no significant difference between orphan and non-orphan high school students with respect to academic anxiety.
H₁: There is a significant difference between orphan and non-orphan high school students with respect to academic anxiety.
3. **H₀**: There is no significant gender difference on resilience and academic anxiety among orphan high school students.
H₁: There is a significant gender difference on resilience and academic anxiety among orphan high school students.

RESEARCH DESIGN

Research design is the framework of research methods and techniques chosen by a researcher. The present study was quantitative in nature and is executed using a cross-sectional design. A cross-sectional study is a type of in which you collect data from many different individuals at a single point in time.

SOURCES OF DATA

The primary data was collected through conducting survey on institutionalized orphan and non-orphan high school students, between the age of 13 to 16, studying in Ernakulam, Kottayam and Alleppey districts in Kerala. Brief Resilience Scale and Academic Anxiety Scale For Children are used the tools used for the survey. Secondary data was collected through referring journals, articles and websites.

SAMPLE DESIGN

A sample size of 300 high school students is taken, where 150 are institutionalized orphans and 150 are non-orphans, between the age of 13 and 16. The method of selecting the orphan sample was done by purposive sampling, as the orphans are specifically selected from orphanages. Non-orphan samples are selected through convenience sampling, as the samples are collected from the places near to the researchers and their friends. All the samples are collected from Ernakulam, Kottayam and Alleppey districts in Kerala.

SAMPLE SIZE

The samples taken is 150 orphan and 150 non-orphan high school students, between the age of 13 and 16, studying in Ernakulam, Kottayam and Alleppey districts in Kerala. The sample include 75 boys and 75 girls each from orphans and non-orphans. Also 50 orphans and 50 non orphans are taken from each districts.

SAMPLING METHOD

The orphan sample for the study is drawn using purposive sampling. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their surveys. The non-orphan sample for the study is drawn using convenience sampling It is a non-probability sampling where the sample is taken from a group of people easy to contact or to reach.

METHOD OF DATA COLLECTION

Data is collected through conducting survey on orphan and non-orphan orphan high school students, between the age of 13 and 16, studying in Ernakulam, Kottayam and Alleppey districts in Kerala. The sampling method employed in this study to select orphan sample is purposive and non-

orphan sample is convenience sampling. The sample of orphans are collected from orphanages and non-orphans are selected from the places near to the researchers and their friends. The boys and girls are equal for both orphans and non-orphans, i.e., 75 boys and 75 girls. Also, 50 orphans and 50 non-orphans are taken from each district. After getting the consent from parents, teacher or orphanage warden, the questionnaire is distributed to the sample. Demographic data is also collected from the samples. The questionnaire included Brief Resilience Scale and Academic Anxiety Scale for Children. Both these scales are standardized scales. The participants took about 10 to 15 minutes to complete the questionnaire and it was ensured that they filled every item of the questionnaire. Then questionnaires are to be scored according to the scoring guidelines

DRAFTING A QUESTIONNAIRE

The assessment tools used in this study are Brief Resilience Scale (BRS) and Academic Anxiety Scale for Children (AASC). Both these scales are standardized scales.

Brief Resilience Scale (BRS)

Brief Resilience Scale (BRS) by Bruce W. Smith, Jeanne Dalen, Kathryn Wiggins, Erin Tooley, Paulette Christopher, and Jennifer Bernard. They developed this scale to determine whether it is possible to reliably assess resilience as bouncing back from stress, whether it is related to resilience resources, and whether it is related to important health outcomes. It is a 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5) and consist of 6 items. Items 1, 3, and 5 are positively worded, and items 2, 4, and 6 are negatively worded. The BRS is scored by reverse coding items 2, 4, and 6 (i.e., 5= strongly disagree to 1= strongly agree). Add the responses varying from 1-5 for all six items giving a range from 6-30. Divide the total sum by the total number of items. The individuals who have scores between 1 -2.99 have low resilience, scores between 3- 4.30 have normal resilience and scores between 4.31 – 5 have high resilience. Internal consistency of BRS was good, with Cronbach's alpha ranging from .80-.91.

Academic Anxiety Scale For Children (AASC)

Academic Anxiety Scale for Children (AASC) by Dr. A.K. Singh and Dr.Sen Gupta has 20 items with yes or no responses. It has both positive and negative items. This scale can be administered on students the age group of 13-16 years. The maximum possible score of this test is 20. Each item is scored either as +1 or 0. All positive items which are endorsed by the subjects as

'yes' and some negative items (No. 4,9, 16 & 18) which are endorsed by the subject 'No' are given a score of +1. Other answers are given a score of 0. Students scoring less than 10 were considered as students of low academic anxiety group and scoring higher than 10 were as students belonging to high academic anxiety group. The reliability of this test through test-retest method is .60 and it is significant at .01 level, and through split half method is .65 and it is also significant at .01 level. The present test has been validated against neuroticism scale, Sinha Anxiety scale and CAAT and correlation coefficients values were .31, .41, .57, respectively. These values were significant at .01 level. Thus it is a valid test.

DATA ANALYSIS TECHNIQUE

Mann-Whitney U Test

The statistical analysis was done using SPSS statistics a statistical analysis software. Mann -Whitney U test is used to find out if there is any significant difference between orphan and non-orphan high school students with respect to resilience and academic anxiety as well as to determine the gender difference in resilience and academic anxiety of orphan high school students. Mann – Whitney U test is a non-parametric test. It is used to compare difference between two independent groups when the dependent variables is either ordinal or continuous. It is considered as the non-parametric alternative to the independent t-test.

CHAPTER 5
DATA ANALYSIS

DATA ANALYSIS

The aim of the present study was to study the effect of resilience on academic anxiety among orphan and non-orphan high school students. The data obtained included responses from 300 participants, out of which 150 were orphan and 150 were non-orphan high school students. The data was collected by giving questionnaires to the participants and the statistical analysis was done using SPSS statistics. Since the data is not normally distributed, non-parametric tests were used for further analysis.

Mann-Whitney U test is used to find if there is any determine whether there is any significant difference between orphan and non-orphan high school students with respect to resilience and academic anxiety.

Table 5.1

Significance of difference in resilience between orphan and non-orphan high school students.

Variables	Group	N	Mean Rank	Mann-Whitney U	p
Resilience	Orphans	150	146.61	10666	.434
	Non-orphans	150	154.39		

From the table 5.1, we can infer that the non-orphans have high resilience than the orphans. However, since the p value of resilience is greater than 0.05, null hypothesis is accepted. That is, there is no significant difference between orphans and non-orphans with respect to resilience.

Table 5.2

Significance of difference in academic anxiety between orphan and non-orphan high school students.

Variable	Group	N	Mean Rank	Mann-Whitney U	p
Academic	Orphans	150	167.42	8712	<.001
Anxiety	Non-orphans	150	133.58		

From table 5.2, we can infer that the orphans have high academic anxiety than the orphan. Since the p value of academic anxiety is less than 0.05, null hypothesis is rejected and alternative hypothesis is accepted. That is, there is significant difference between orphans and non-orphans with respect to academic anxiety.

Mann-Whitney U test is again used to determine the gender difference on resilience and academic anxiety among orphan high school students.

Table 5.3

Significance Of Gender Difference On Resilience And Academic Anxiety Among Orphan High Students

Variables	Gender	N	Mean Rank	Mann-Whitney U	p
Resilience	Male	75	76.05	2771.500	.877
	Female	75	74.95		
Academic Anxiety	Male	75	72.71	2603	.429
	Female	75	78.29		

From table 5.3, we can infer that the orphan males have high resilience than orphan females, whereas the orphan females have high academic anxiety than the orphan males. However, since p value for resilience is greater than 0.05, there is no significant gender difference on resilience among orphans. Similarly, since the p value for academic anxiety is greater than 0.05, there is no significant gender difference on academic anxiety among orphans. Hence, the null hypothesis is accepted. That is, there is no significant gender difference on resilience and academic anxiety among orphan high school students.

CHAPTER 6

FINDINGS

FINDINGS

- The result indicates that there is no significant difference between orphan and non-orphan high school students with respect to resilience.
- The result indicates there is significant difference between orphan and non-orphan high school students with respect to academic anxiety. It is found that orphans have high academic anxiety than non-orphan high school students.
- There is no significant gender difference on resilience and academic anxiety among orphan high school students.

CHAPTER 7
RECOMMENDATIONS

RECOMMENTATIONS

The results of the study imply that there is no significant difference between orphan and non-orphan high school students with respect to resilience, whereas there is significant difference between orphan and non-orphan high school students with respect to academic anxiety. Also, there is no significant gender difference on resilience and academic anxiety among orphan and non-orphan high school students. Further studies can be done with considering large geographical area and conducting interviews with the students, parents, warden, and teachers are useful to have in-depth knowledge about the population. Also this study is only focusing on males and females, so it is better if transgenders are also included. Studies can also be conducted in students of other age groups. The study was only conducted for a very brief period of time, hence the information about the long-term effects of such variables is not studied. Perhaps, a longitudinal study on these variables could provide more significant results. Longitudinal studies also help to figure out the effect of other extraneous variables apart from resilience. The measures used in the study could be combined with other related measures to obtain more nuanced results.

CHAPTER 8
CONCLUSION

CONCLUSION

The present study was primarily conducted to determine the effect of resilience on academic anxiety among orphan and non orphan high school students. It consist of 150 orphan & 150 non-orphans with the age of 13 and 16 years, studying in Ernakulam, Kottayam and Alleppey districts in Kerala for this study. Mann-Whitney U test was used to assess differennce. It is found that there is no significant relationship between resilience and academic anxiety among orphan high school students whereas, it is found that there is significant negative relationships between resilience and academic anxiety among non orphan high school students. It is found that there is a significant impact of resilience on academic anxiety among orphan and non-orphan high school students. It is also found that here is no significant gender difference on resilience and academic anxiety among orphan high school students.

REFERENCES

- Aparnath, A. K. (2014). A study of academic anxiety of secondary school students with relation to their gender and religion. *International Journal of Indian Psychology, 1*(4).
<https://doi.org/10.25215/0104.024>
- Azeem, A. (2018). Study of academic anxiety and academic achievement among secondary school students. *International Journal of Research in Social Sciences, 8*(3), 147–161.
- Belay, T., & Missaye, M. (2014). Risks, protection factors and resilience among orphan and Vulnerable children (ovc) in Ethiopia: Implications for intervention. *International Journal of Psychology and Counselling, 6*(3), 27–31. <https://doi.org/10.5897/ijpc2013.0241>
- Bhansali, R., & Trivedi, K. (2008). Is academic anxiety gender specific: A comparative study. *Journal of Social Sciences, 17*(1), 1–3. <https://doi.org/10.1080/09718923.2008.11892627>
- children. *International Journal of Research in Social Sciences, 8*(5), 438-448.
- Deb, S. (2001, October). A study on the negative effects of academic stress. Paper presented at the International Seminar on Learning and Motivation, Kedah Darul Aman, Malaysia.
- Deb, S., Chaterjee, pooja, & Walsh, K. (2010). Deb, Sibnath, Chatterjee, Pooja, & Walsh, Kerryann (2010) Anxiety among high school students in India: Comparisons across gender, school type, social strata and perceptions of quality time with parents. *Australian Journal of Educational and Developmental Psychology, 10*, pp. 18-31. *Australian Journal of Educational and Developmental Psychology, 10*, 18–31.
- DeSilva, M. B., Skalicky, A., Beard, J., Cakwe, M., Zhuwau, T., Quinlan, T., et al. (2012). Early impacts of orphaning: Health, nutrition, and food insecurity in a cohort of schoolgoing adolescents in South Africa. *Vulnerable Children and Youth Studies, 7*, 75–87.
<http://dx.doi.org/10.1080/17450128.2011.648968>

- Dey, P., & Daliya, B. (2019). The effect of resilience on the psychological well being of orphan and Non-Orphan Adolescents. *Indian Journal of Mental Health*, 6(3), 253–260.
<https://doi.org/10.30877/ijmh.6.3.2019.253-260>
- Dias, P. C., & Cadime, I. (2017). Protective factors and resilience in adolescents: The mediating role of self-regulation. *Psicología Educativa*, 23(1), 37–43. <https://doi.org/10.1016/j.pse.2016.09.003>
- Donnelly, R. (2009). Embedding interaction within a blend of learner centric pedagogy and technology. *World Journal on Educational Technology*, 1 (1), 6-29.
- DordiNejad, F. G., Hakimi, H., Ashouri, M., Dehghani, M., Zeinali, Z., Daghighi, M. S., and Bahrami, N. (2011). On the relationship between test anxiety and academic performance. *Procedia Social and Behavioral Sciences* 15 (2011) 3774-3778.
- Duggal, R., & Wadhawan, P. (2021). Comparison between Orphans and Non orphans on the dimension of Resilience. *International Journal of Innovative Science, Engineering & Technology*, 8(1), 175–193.
- Fear and anxiety. (n.d.). Retrieved April 20, 2022, from
<http://www.csun.edu/~vcpsy00h/students/fear.html>
- Fiorilli, C., Farina, E., Buonomo, I., Costa, S., Romano, L., Larcán, R., & Petrides, K. V. (2020). Trait Emotional Intelligence and School Burnout: The mediating role of resilience and academic anxiety in high school. *International Journal of Environmental Research and Public Health*, 17(9), 3058.
<https://doi.org/10.3390/ijerph17093058>
- Fleming, J., & Ledogar, R. J. (n.d.). *Resilience, an evolving concept: A review of literature relevant to Aboriginal Research*. Pimatisiwin. Retrieved April 19, 2022, from
<https://pubmed.ncbi.nlm.nih.gov/20963184/>
- Gana, C., Oladele, E. A., Anoje, C., Saleh, M., Irene, P., Khamofu, H., et al. (2014). Targeting orphaned and vulnerable adolescents with services: Experiences with adopting a multisectorial approach in Nigeria. *Vulnerable Children and Youth Studies*, 9, 66–74.
<http://dx.doi.org/10.1080/17450128.2013.802401>.

- Govender, K., Reardon, C., Quinlan, T., & George, G. (2014). Children's psychosocial wellbeing in the context of HIV/AIDS and poverty: A comparative investigation of orphaned and non-orphaned children living in South Africa. *BMC Public Health*, *14*(1). <https://doi.org/10.1186/1471-2458-14-615>
- Hooda, M., & Saini, A. (2017). Academic Anxiety: An Overview. *Educational Quest*, *8*(3), 807–810. <https://doi.org/http://dx.doi.org/10.5958/2230-7311.2017.00139.8>
- Kahan, L. M. (2008). *The correlation of test anxiety and academic performance of community college students* (Doctoral dissertation, Capella University).
- Katyal, S. (2015). A study of resilience in orphan and non-orphan children. *International Journal of Multidisciplinary Research and Development*, *2*(7), 323-327.
- Kaur, H., & Chawla, A. (2018). A study of academic anxiety and school adjustment among adolescents. *Indian Journal of Psychiatric Social Work*, *9*(2), 106. <https://doi.org/10.29120/ijpsw.2018.v9.i2.118>
- Kaur, S., & Rani, C. (2015). Exploring psychological health of orphan adolescents: A comparative analysis. *International Journal of English Language, Literature and Humanities*, *3*(6), 27-47.
- Kenneth, K., & Golda, K. (2020). Comparative Study On Self Esteem And Resilience Among Orphaned Adolescents. *The International Journal of Analytical and Experimental Modal Analysis*, *12*(5), 1203–1214.
- Khangura, M. K., & Sharma, S. S. (2020). The Predictive Influence of Resilience And Academic Alienation on Academic Anxiety of Adolescents. *Indian Journal of Psychological Science*, *12*(1).
- Kumar, A. (2013). Academic Anxiety And Achievement Of Secondary School Students – A Study On Gender Differences. *International Journal Of Behavioral Social And Movement Sciences*, *2*(1), 27–33.
- Kumar, A. (2013). Relationship of academic anxiety among adolescents in relation to their home environment. *International Journal for Research in Education*, *2*(7).

- Lin, K. K., Sandler, I. N., Ayers, T. S., Wolchik, S. A., & Luecken, L. J. (2004). Resilience in parentally bereaved children and adolescents seeking preventive services. *Journal of Clinical Child and Adolescent Psychology*, 33, 673–683. http://dx.doi.org/10.1207/s15374424jccp3304_3.
- Mahajan, G. (2015). Academic anxiety of secondary school students in relation to their parental encouragement. *International Journal of Research in Humanities and Social Sciences*, 3(4), 23–29.
- Mahato, B., & Jangir, S. (2012). A study on academic anxiety among adolescents of Minicoy Island. *International Journal of Science and Research*, 1(3), 12–14.
- Maqbool, A., & Ganai, M. Y. (2019). Well-Being Of Orphans: A Review Of Their Academic Anxiety Level. *Journal of Applied Research in Education*, 24(1), 267–270.
- McLoone J., Hudson J.L. and Rapee R. (2006). Treating anxiety disorders in a school setting, *Education and Treatment of Children* 29; 219–242.
- Mehta, R. (2016). Relationship between parental aspiration and academic anxiety in adolescence. *International Research Journal of Management Sociology & Humanity (IRJMSH)*, 7(2), 27–37.
- Milgram, N., & Toubiana, Y. (1999). Academic anxiety, academic procrastination, and parental involvement in students and their parents. *British Journal of Educational Psychology*, 69(3), 345–361. <https://doi.org/10.1348/000709999157761>
- Mohammadyari, G. (2012). Comparative study of relationship between general perceived self-efficacy and test anxiety with academic achievement of male and female students. *Procedia - Social and Behavioral Sciences*, 69, 2119–2123. <https://doi.org/10.1016/j.sbspro.2012.12.175>
- Morantz, G., Cole, D., Vreeman, R., Ayaya, S., Ayuku, D., & Braitstein, P. (2013). Child abuse and neglect among orphaned children and youth living in extended families in Sub-Saharan Africa: What have we learned from qualitative inquiry? *Vulnerable Children and Youth Studies*, 8, 338–352. <http://dx.doi.org/10.1080/17450128.2013.764476>.
- Norris, F. H. and Wind, L., H. (2009). The experience of disaster: Trauma, loss, adversities, and community effects. *Mental health and disasters*. New York, NY: Cambridge University Press.

- Nourian, M., Shahboulaghi, F. M, Tabrizi, K. N, Rassouli, M, & Biglarrian, A. (2016). Resilience and its contributing factors in adolescents in long-term residential care facilities affiliated to Tehran Welfare Organization. *International Journal of Community Based Nursing and Midwifery*, 4(4), 386–396.
- Olsson et al., (2003). Adolescent resilience: a concept analysis. *National library of medicine*.26(1),1-11.
- Onkari, D., & Itagi, S. I. (2019). Resilience among rural orphans. *The Pharma Innovation Journal*, 8(6), 396–399.
- Pamela Li, M. S. (2021, August 7). *Resilience theory in psychology (definition & characteristics)*. Parenting For Brain. Retrieved April 20, 2022, from <https://www.parentingforbrain.com/resilience-theory/>
- Panicker, A. S., & Chelliah, A. (2016). Resilience and stress in children and adolescents with specific learning disability. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 25(1), 17.
- Priyadarshini, S., & Rathnasabapathy, M. (2021). The Impact of Resilience among Orphans: A Review. *International Journal of Indian Psychology*, 9(3), 67–74. <https://doi.org/10.25215/0903.009>
- Psychoanalysis - theory of anxiety and affects*. Theory Of Anxiety And Affects - Freud, Ego, Object, and Reality - JRank Articles. (n.d.). Retrieved April 21, 2022, from <https://science.jrank.org/pages/10905/Psychoanalysis-Theory-Anxiety-Affects.html>
- Rapee R.H., Kennedy S., Ingram M., Edwards S. and Sweeney L. (2005). Prevention and early intervention of anxiety disorders in inhibited preschool children, *Journal of Consulting and Clinical Psychology* 73, 488–497.
- Resilience*. Psychology Today (n.d.). Retrieved April 19, 2022, from <https://www.psychologytoday.com/us/basics/resilience>
- Richardson (2002). The buffering effect of resilience on depression among individuals with spinal cord injury: A structural equation model. *Rehabilitation Psychology*. 56 (3), 200

- Salifu Yendork, J., & Somhlaba, N. Z. (2015). Do social support, self-efficacy and resilience influence the experience of stress in Ghanaian orphans? an exploratory study. *Child Care in Practice, 21*(2), 140–159. <https://doi.org/10.1080/13575279.2014.985286>
- Shafiq, F., Haider, S., & Ijaz, S. (2020). Anxiety, depression, stress, and decision-making among orphans and non-orphans in pakistan. *Psychology Research and Behavior Management, 13*, 313–318. <https://doi.org/10.2147/prbm.s245154>
- Sharma, R. (2017). Relationship between academic anxiety and mental health among adolescents. *IMPACT: International Journal of Research in Humanities, Arts and Literature (IMPACT: IJRHAL), 5*(11), 113–120.
- Sharma, S., & Mohd. Shakir , M. S. (2019). A Study of Academic Anxiety of Senior Secondary School Students in Relation to Locale and Type of School. *Research and Reflections on Education, 17*(4).
- Singh, A. K.,and Gupta, Sen,(2018) A. Academic Anxiety Scale for Children. Agra National
- Sobana, R. M. (2018). Comparison of resilience between male and female orphan
- The 4 building blocks of academic anxiety | psychology Today.* (n.d.). Retrieved April 21, 2022, from <https://www.psychologytoday.com/us/blog/the-parenting-paradox/202109/the-4-building-blocks-academic-anxiety>
- Wagnild& Young, (1993). Assessing Resilience, *Journal of Psychosocial Nursing and Mental health Services.* 2009;47(12),28-33.
- Yasin, M. G., & Iqbal, N. (2013). Resilience, self-esteem, and delinquent tendencies among orphan and non-orphan adolescents. *UOS Journal of Social Sciences & Humanities, 2*(1), 1–18.

APPENDIX

APPENDIX I

TITLE: "Resilience and Academic Anxiety Among Orphan And Non-Orphan High School Students."

Research Student 1: Anna Shajee, 3rd year B.Sc Psychology, 2019-22 Batch, Department of Psychology, St. Teresa's College (Autonomous), Ernakulam

Research Student 2: Nakshatra Nagan, 3rd year B.Sc Psychology, 2019-22 Batch, Department of Psychology, St. Teresa's College (Autonomous), Ernakulam

Faculty Advisor: Mrs Bindu John, Assistant Professor & HoD, Department of Psychology, St. Teresa's College (Autonomous), Ernakulam

Key Instructions

The purpose of the study is to find out the relationship between resilience and academic anxiety among high school students and especially between orphans and non orphans.

For the study we require the participation of children aged between 13-16 years

If you choose to allow your ward to participate, please note that the child will be asked to fill a survey questionnaire which will take approximately 15 – 20 minutes

Children's answers will be not be associated with their name. Rather, each child will be given an identification number on the survey questionnaire.

There are no risks to your ward/child's safety as the questionnaire does not contain any sensitive or controversial items. The participation of your child/ward in this project, will be directly beneficial to understand anxiety and resilience among students. The child/ward can stop taking the test at any point they choose.

Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

The information shared with us in this study will be kept completely confidential to the full extent of the law.

Informed Consent Statement

I, _____, give permission for my child, _____ to participate in the research project entitled, “The Effect of Resilience On Academic Anxiety Among Orphan And Non-Orphan High School Students”. The study has been explained to me and my questions answered to my satisfaction. I understand that my child’s/ward’s right to withdraw from participating or refuse to participate will be respected and that his/her responses and identity will be kept confidential. I give this consent voluntarily.

Parent/Guardian Signature:

Name of the Guardian:

Signature of the Guardian:

Name & signature of researchers:

Anna Shajee

Nakshatra Nagan

Contact number: 8078339468, 8136847160

Email Id: annashajee2001@gmail.com

nakshatranagan@gmail.com

APPENDIX II
DEMOGRAPHIC DETAILS

Name:

Address:

Age:

Class:

School:

State/CBSE:

APPENDIX III

ACADEMIC ANXIETY SCALE FOR CHILDREN (AASC)

INSTRUCTIONS

Some statements are given in the following pages. Read each statement and express your opinion by marking tick (✓) in appropriate box against each statement. Please make sure that all statements are answered and respond honestly. None of the responses are right or wrong.

Sl. No.	Statements	Yes	No
1	When I am called by the principal of the school, I feel very nervous.		
2	I am occupied with mental tension as examination time comes nearer.		
3	When class teacher suddenly asks me to come in the staff room, I feel very much afraid.		
4	If I am late, I have no hesitation in going to the class.		
5	As a teacher of mathematics enters, I feel that I don't know anything and have forgotten everything.		
6	Suddenly, if I have to go to the office of the school due to some work, I feel afraid.		

7	If there is conversation between parents and teachers then I feel anxious as to what they will be talking about me.		
8	I always think about my good results.		
9	Even if I haven't done my homework, I don't feel afraid to go to the classroom.		
10	If I obtain low marks in any subjects, I feel ashamed to disclose or show it to my friends and members of the family.		
11	If class teacher asks any question, after being made to stand up, I feel afraid.		
12	If English teacher asks me a question suddenly in the class, I feel nervous.		
13	If it comes to my knowledge that any student or friend of mine is likely to be severely punished due to indiscipline, I become very much tensed.		
14	During examination I often dreams that I am unable to remember anything after getting the question paper.		
15	While teaching in the class, teacher come and stands before me, I become conscious.		
16	While talking to the principal, I don't feel any nervousness.		

17	Some time before commencement of examination if I am unable to go to school, I become worried.		
18	I never sit on the first bench in the class.		
19	When the examination will be commencing such curiosity always persists in me.		
20	Study of Sanskrit (or any other additional language) become the cause of mental tension because I feel pronunciation of Sanskrit is too much different/ difficult.		

APPENDIX IV

BRIEF RESILIENCE SCALE (BRS)

INSTRUCTIONS

Some statements are given in the following pages. Read each statement and indicate how much you agree or disagree with each statement by marking tick (✓) in appropriate box against each statement. Please make sure that all statements are answered and respond honestly. None of the responses are right or wrong.

Sl. No.	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I tend to bounce back quickly after hard times					
2	I have a hard time making it through stressful events.					
3	It does not take me long to recover from a stressful event.					
4	It is hard for me to snap back when something bad happens.					
5	I usually come through difficult times with little trouble.					
6	I tend to take a long time to get over setbacks in my life.					

PROJECT REPORT
A STUDY ON THE IMPACT OF CELEBRITY ENDORSEMENT
ON CONSUMERS' BUYING BEHAVIOR

Submitted by:

NAMITA SUSAN KORUTHU

Register No:

SB19PSY056

Under the guidance of

MS. JISHA SEKHAR

In partial fulfillment of the requirement for award of the degree of

B.Sc. PSYCHOLOGY



ST. TERESA'S COLLEGE (AUTONOMOUS),
ERNAKULAM

Nationally Re-accredited at 'A++' level (4th cycle) Affiliated to:

Mahatma Gandhi University

MARCH 2022

CERTIFICATE

This is to certify that the project report entitled, “THE IMPACT OF CELEBRITY ENDORSEMENT ON CONSUMERS' BUYING BEHAVIOR”, is a bonafide record submitted by MS. NAMITA SUSAN KORUTHU, Reg.no. SB19PSY0256, in partial fulfillment of the requirements for the award of the Degree of Bachelor of Psychology during the academic year 2019-2022.



Ms. Bindu John

Head of the Department

Department of Psychology

St. Teresa's College, Ernakulam



Ms. Jisha Sekhar

Assistant Professor

Department of Psychology

St. Teresa's College, Ernakulam

External Examiner:



DECLARATION

I, Namita Susan, hereby declare that the study presented in the dissertation entitled, “The Impact of Celebrity Endorsement on Consumers' Buying Behavior ”, which is submitted to the Department of Psychology, St. Teresa’s College, Ernakulam is a bonafide record of the research work carried out by me, under the supervision and guidance of Ms. Jisha Sekhar, Assistant Professor, Department of Psychology, St. Teresa’s College, Ernakulam, in partial fulfillment of the requirements for the degree of Bachelor of Science in Psychology and has not previously formed the basis for the award of any degree, diploma, fellowship, title or recognition before.

Place: Ernakulam

Namita Susan Koruthu

Date: 07/05/2022

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I extend my sincere thanks to my parents and all who have supported me throughout this time. My thanks and appreciations also go to my friends in developing the project and people who have willingly helped me out with their abilities.

Above all, I thank God Almighty for blessing me in all stages of this project and for its successful completion.

Thanking You

Namita Susan Koruthu

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CHAPTER 1
INTRODUCTION

INTRODUCTION

1.1 BACKGROUND

Watching popular personalities convert themselves to excellent salesmen is something that we witness quite often. Celebrities vouching for or promoting brands and their products is one of the quickest ways for brands to develop an association and a bond in the mind of its consumers. Hence celebrity endorsements are naturally recognized as a viable option for brands to increase their popularity, awareness and credibility. In a world where celebrities are treated as role models, people are changing their life to replicate that of their favourite celebrity. This influence endorsed by the celebrities creates a great impact on the buying behavior of common people. Which attracts the customers and ultimately increases the company productivity.

Celebrities are not always creating any kind of effect on an individual's mind in terms of buying. But mostly it gives a great impact on the perception of choosing any product. We are always thinking that if our favourite celebrity is using them, then we should use that to be like them. These celebrities need not be a superstar, but someone who the target audience can relate to. It has been recognized as a single psychological effect that purchasing a product that has been promoted by a celebrity an individual admires, will allow that particular individual to emulate the celebrity's desired characteristics or attract similar people into their lives.

From the past 150 years advertising is changing in different phases from taking classical forms to modern. Now a days it's the best strategy used by marketers to influence customers by showing celebrities with their products, which includes different appeals like, exciting, absurdity, sexual etc. Belch, G. and Belch, M. acknowledged that the main aim of formulating such specific strategies is to get high brand revelation, longing, concentration and curiosity. For this, marketers attach famous personalities with their products.

McCracken (1989) stated that these famous personalities' had great influence on the consumer's buying behavior that's why it comes off as the most attractive tool of advertising today. The major aim to do advertising and adopt this strategy is to influence customers towards the products. Marketing values have transformed throughout the years. Today marketers make use of celebrities to endorse their products so that they can achieve an edge over their competitors. But this requires

great understanding of the concept in order for the celebrity endorsement to be successful. Hence several factors have to be weighed in order for the celebrity endorsement to be successful.

1.2 PROBLEM STATEMENT

Does celebrity endorsement encourage consumers to take some kind of action towards buying the endorsed product(s)? The study aims to find whether the use of celebrities while endorsing cosmetics products have any impact on the purchase intention among young adult females in Ernakulam district.

1.3 NEED AND SIGNIFICANCE OF THE STUDY

This research will help to achieve major insights into the impact celebrity endorsements have on consumers' buying behavior. It will assist the marketers to get a better understanding on the different attributes that are important and matters the most to the consumers. Celebrity endorsement influences the behaviours of consumers to buy a specific product through cognition. These perceptions are perceived by consumers through their senses, discernment, attention, recall, reasoning, language, et cetera. Hence this research would provide major help to increase productivity in various businesses.

1.4 SCOPE OF THE STUDY

This is a study done to check whether celebrity endorsements affect buying behavior of the people and to check whether there is a shift in their behavior because of celebrity endorsements. Major emphasis of this research is to determine how marketers select particular celebrities to influence consumers' buying patterns. It also emphasizes how the marketers create a desired image for themselves by selecting strong publicly desirable celebrities. This research also aims at identifying the key factors that may influence consumers buying behavior through celebrity endorsement.

1.5 OBJECTIVES OF THE STUDY

The main aim of studying the impact and influence of celebrity endorsement on consumers buying intention is to find the answers to the following:

- To assess the impact celebrities have on the consumers' buying intention with regards to the credibility of the chosen celebrity.
- To assess the impact celebrities have on the consumers' buying intention with regards to the attractiveness of the chosen celebrity.
- To assess the impact that celebrity endorsement have on its consumers in terms of product fit match between the product/brand and the celebrity.
- To see how celebrities transfer meaning to the products they endorse and to what extent does it convince and shape consumers' buying intention.

1.6 LIMITATIONS OF THE STUDY

The limitations of this study are as follows:

- As the research will be conducted within Ernakulam district, the perspective of consumers outside Ernakulam district will be left unnoticed.
- Since the respondents will be of young female individuals (between the ages of 18 and 30), individuals above the age of 30 would not be taken into consideration whose opinion regarding celebrity endorsement would likely be very different from the selected sample.
- Respondents belonging to the urban sector, who have an understanding of this issue, are selected while individuals of rural areas will be ignored. Hence, the opinions of people residing in rural areas are not taken into consideration in this study.

CHAPTER 2
REVIEW OF LITERATURE

REVIEW OF LITERATURE

2.1 LITERATURE REVIEW

Advertisers regularly practice the strategies intended to attract customer's interest to their message and to differentiate their offerings from rival products with the anticipation of influencing buying behavior of the customer. In today's competitive world, a quality is positioned on an approach, which can accomplish these objectives. One challenge at such a plan includes the use of a celebrity representative. According to Atkin and Block (1983), there are numerous bases as to why a famous endorser may be dominant. First, such a representative attracts consideration toward the commercials into the messy flow of communication. In addition, celebrities are conventionally observed as being greatly active individuals with eye-catching and likable traits.

The use of famous persons in promotions is traced back to the nineteenth century and these general promotional practices have revealed a large quantity of intellectual as well as realistic considerations. Mainly academic analysis of celebrity support encompasses the sphere of spokesperson credibility and charismatic representatives, and recommends that famous persons exercise their impact on customers through apparent traits. A number of research studies reveal that use of eye-catching celebrities serve as a foundation to enhance feelings towards the ads. This mind-set to the commercials is identified as psychological circumstances that are exercised by persons to systematize the manner, how to recognize the surroundings as well as organize the manner a person reacts towards it.

Today the mass media are flooded through descriptions along with information concerning superstars, and because of this, celebrities have high reputations, distinctive traits, and fascinating descriptions according to the community's opinion. Celebrities regularly emerge in promotions in connection among customer goods or services. By means of skill to pierce the hectic mess of publicity, portray customer consideration, produce high memory rates, generate as well as distinguish brand descriptions thus, create trade and income, superstar endorsement have demonstrated to be a helpful approach. No doubt dealers spend huge amounts of capital in utilizing superstars to sponsor their brands.

McCracken (1998) proposes that a superstar is considered like a memorial, entertainer or representative of the business organization. Investigation has established that spokesperson

endorsement influences consumers' mind-set in common and it may change the feelings of customers towards the commercial and products as well. This may perhaps effect the improvement of the acquisition plan and as an outcome in the increase of trade. Researchers have intended for extensive concentration to consumer's mind-set to the commercial as a sentimental creation and intervening influence on brand attitudes and acquiring intentions.

This study's main purpose was to study the impact of the celebrity endorsement on effective brand management and evaluate associated factors that contribute to the success or failure of the endorsement. Celebrity endorsement effects are moderated by brand symbolism, such that brands that communicate something about the user yield stronger effects than brands that do not. So, it explains that not just the celebrity but existing brand value plays a very crucial and important role in changing the perception of the target market. This study portrays the light on different purchase patterns of a commodity or a service, when a celebrity is associated with them. The methodology adopted by the researchers was collection of data from libraries and first hand data to conclude the study. The result was that the people would purchase more of the same goods or services due to celebrity endorsements as the consumer tends to neglect the negative effects of the use of that product and also becomes more loyal to the brand.

The researchers of the study focus on the decision making process of consumers after and before the association of a celebrity with a product. The study also showcases the adverse effects of celebrity endorsements. The endorsement is only successful when the right celebrity is associated with the right product. Hence, celebrity endorsement can't be treated as a 'mantra' for success.

2.2 RESEARCH GAP

This research about the "impact of celebrity endorsement on consumers buying behavior" will be useful in many ways :

- There is a lack of research in the field of cosmetic segments in terms of celebrity endorsement. So, the results of this research will highlight how effective the technique of celebrity endorsement is in the cosmetics industry.

- The research about celebrities appearing in cosmetics advertisements in Ernakulam district is rarely done. Hence, the conclusions that would be derived with this research will help in understanding the buying behavior of the females in Ernakulam district.
- This research will help to understand the reaction of women towards celebrity endorsed cosmetic products and will help to judge how much trust women place in celebrities endorsing cosmetics products.

CHAPTER 3

THEORETICAL FRAMEWORK

THEORETICAL FRAMEWORK

Celebrities

Erdogan (1999) concludes that celebrities are those people who are well known by the large number of people. They have special uniqueness and features like magnetism, unusual standard of living or special skills that are not commonly experiential in common people. That it can be said that in society they are different from the common people. Among the model forms of celebrities, actors (e.g. Saif Ali Khan, Shah, Salman Khan, Amitabh Bachan etc), models (e.g. Parineeti Chopra, Ali Zafar, Bipasha Basu, Kareena Kapoor etc), Sports-men (e.g. Yousuf Pathan, Shahid Afridi, Sachin Tendulkar, etc.) are significant.

Celebrity Endorsement

Khatri (2006) studied that celebrity endorsement is the Promotion strategy to attract the customers. By analyzing the current market, now it's become the need of the marketers to use the different famous personalities to relate with their brands to create unique identity of the brand and to do famous his company's brand or product, which results high expenditure for the company to use that strategy, however nowadays it is used to be a powerful strategic tool to get maximum profit. It also shows that this can carry risk, because there is no sureness that the celebrity can come up with the sales generation of the firm. But it creates a buzz and gives popularity to the company and the brand. This can increase the expectation of the customers in terms of real stars by delivering the company promise. There are certain perspectives where the real person can work better than the celebrities' endorsement, but not always.

Factors Affecting Celebrity Endorsement and Relevant Models

There are different factors of celebrities influencing the consumer buying behavior when such celebrities endorse any brand. Marketers have to consider some factors while selecting celebrities to endorse brands to get the desired result to use this strategy of celebrity endorsement in terms of brand image, consumer buying behavior and attainment of desired market share. Past researchers have focused on a different mix of factors related to celebrity endorsement influencing consumer

buying behavior, this research is focused on a relatively different and most appropriate mix of factors that a marketer should consider while selecting celebrities to endorse any brand to get a desired effect on consumer buying behavior.

a) Credibility

It refers to the level of believability a beneficiary has towards a message given by the source and expertise of the source or deliverer. In the past source credibility was just considered as an endorser credibility in a commercial. It is proved as a significant basis affecting customer buying behavior and their attitude towards marketing communications. Past publications described three facets of it which are trustworthiness, expertise & attractiveness.

❖ Source Credibility Model.

Celebrity's integrity relies on his or her physical attractiveness, trustworthiness and expertise that's why researchers who want to study the effectiveness of celebrity endorsement have to consider this model (Ohanian, 1990).

i) Trustworthiness

Trustworthiness is the degree of believability or trust listeners have for communicators (Hovland, 1953). In the case of celebrities it refers to the buyer's trust on celebrities' message for the brand (Ohanian, 1991). In other words if customers have a trust on celebrities being endorsed then the message of such celebrities will be more influential and will help a lot in changing the minds of customers towards the desired action that organizations want for their brand. (Miller and Baseheart, 1969).

→ Impacts of Trustworthiness

Previously it was researched that more the customers have a trust on communicator the more they get persuaded by the message of that communicator and more the chances of getting customers mind change for the purchase of that brand (Miller & Baseheart, 1969)

ii) Expertise

Expertise is the measure of a communicator's aptitude and attitude which influences customers' decision towards purchase of a brand. Researchers believe that celebrities with relative and high

expertise prove to be more successful in persuading the customers than those who just have physical attractiveness not the combination of attractiveness and expertise (Till and Busler 1998).

→ **Impacts of Expertise**

Expertise is the ability of a communicator that proves as a helpful factor in taking the decision by a shopper. They generally get inspired by the sayings of learned and expert communicators. Proficient learning skills and expertise of endorsers has a significant reliability impact on customers' belief towards the communication of such endorsers (David H. Silvera, Benedikte Austad, 2004).

b) Physical Attractiveness

Attractiveness has the power that can easily grab the attention of viewers but it doesn't just relate with the body but the entire physical traits comes under the measure of attractiveness which includes, hair color, facial features, height, weight, complexion, etc and normally public figures have to be attractive to have an influence on their audience and viewers (Temple, 2009).

❖ **Source Attractiveness Model**

Attractive celebrities are more commonly used by organizations for brands' promotions since the inception of this marketing strategy (Erdogan, 1999), once the customers get inspired with the attractive personality of celebrity then they get more involved in the message such celebrities give and then the chances of customers conviction towards the communication of celebrities become more fruitful (Baker & Churchill, 1977; Chaiken, 1979; Debevec & Keman, 1984) such fruitful results probability is normally low with less attractive celebrities.

i) Similarity

The human brain recognizes celebrities similarly to how it recognizes people we actually know. The effect is that, if consumers happen to be fans, they place a higher value on products that celebrities are endorsing – it is as if they are receiving advice from a valued friend. Consumers feel more sympathetic towards a brand, if their products are promoted by a celebrity they admire or relate to. It's a simple psychological effect: Subconsciously people believe that purchasing a product that's promoted by a celebrity they admire, will allow them to emulate the celebrity's desired traits or attract similar people into their lives. They will associate the celebrities' success,

beauty, athletic skill etc. with a particular product. Shimp (2007) asserted that celebrity similarity involves the degree to which celebrity endorser of a brand matches the target viewers of commercials in terms of some features such as age, gender, ethnicity, et cetera. It is perceived that consumers tend to prefer and rely on messages from celebrity endorsers of a brand that shares these common characteristics. When celebrity endorsers and consumers share similar qualities, such as needs, goals, interest, lifestyle, et cetera the celebrity endorser is better valued in the eyes of the consumers.

ii) Familiarity

Familiarity is a form of remembering in which a situation, event, place, person, or the like provokes a subjective feeling of recognition and is therefore believed to be in memory, although it is not specifically recalled. Familiarity has been shown to be positive and reassuring for most people, while perceived similarity results in the assumption that people have more in common, facilitating warmer, more comfortable interactions (Schneider et al., 2012), all of which facilitate attraction. People are more attracted to that which is familiar. Hence, familiarity with celebrity endorsers can play a role in consumer buying behavior.

iii) Likeability

Likability pulls people toward you. When we think someone likes us, we tend to like them as well. Hence, celebrities who are liked by consumers are better consumers may buy products only best they care aft the person who doong. Likability virtually always helps boost their reputation among their peers. Likeability can increase conformity among people.

c) Emotional Involvement

Emotional Involvement means the purchase decision of customers is directly proportional to the use and likeness by celebrity (endorser) for the brand that celebrity is endorsing (Cronley et al., 1999; Silvera and Austad, 2004). Adding to this, emotional attachment of viewers with their favorite celebrities becomes more fruitful in terms of their believability for the message given by that celebrity.

❖ Emotional Involvement Model

Endorser likes and uses the item he supported. (Cronley et al., 1999; Silvera & Austad, 2004). When an endorser is accepted to like or utilize the item being supported, the purchaser states of mind towards the brand and promotion enhancement.

d) Meaning Transfer

(McCracken 1986), he says that in simple terminology we can say that endorsers carry their individual meaning to the product. Every celebrity has their own distinctive set of meaning and lifestyle. It clarifies the adequacy of big name spokespersons in terms of what purchasers connect with the endorser and in the end exchange to the brand.

❖ Meaning Transfer Model

Process of transferring a concept of a product through an endorser to a customer (McCracken, 1986). The appropriate fit between brand features and advocator's personality brings higher chances of likelihood of consumers observation and purchase intention. There are three stages to it. First stage covers the message transferred by celebrity to the brand, in the second stage a message from the brand gets transferred to the customer and in the third stage that message leaves the impact on the customer's psyche and ultimately on customers' decision to buy that brand.

e) Product Match-Up

Product match-up is construed as ensuring a similarity between the spokesperson's characteristics and the product attributes so as to enhance the advertisement effectiveness. Product specific associations include the associations that vary in their importance depending on the type of product category. The findings have significant implications for academics, brand managers and celebrity management companies.

❖ The Product Match-Up Hypothesis

The above model explains that there has to be an almost ideal match between the celebrity characteristics of the personality and the features of the brand. (Erdogan 1999) says that a successful matchup can be determined by the extent of the fitness between the celebrity and the brand endorsed by that celebrity. This same concept is further stated by Michael (1989) who believes the same. Another study done by Ohanian in 1991 reveals that simply such celebrities should be endorsing who is compatible and the consumers perceive them to possess expertise too.

Consumer Buying behavior

Buying behavior is a process by which a person searches for the product/services they need or want, make a decision to buy the required and most suitable one from different alternatives, use and then dispose of it. For making a marketing decision, the buying process model is playing a very important role for any one. It makes marketers think about each step of this process rather than just purchase decisions because if marketers just consider the purchase decision, it may be too late for a business to influence the choice of customers. According to this model the customer passes through all stages for purchasing every goods or services. However, in more regular purchases, customers often skip some stages (Kirmani & Shiv1998).

Stages in Consumer Choice Making

Process starts by acknowledging a need or problem called the problem recognition stage. Then a person starts searching the information regarding the solution of a problem this is known as the information search stage. Then as a result of the information collected individuals become able to evaluate the alternatives they have to resolve their problem. Then the time comes to make a purchase decision for the most appropriate alternative they have evaluated among all they have in their choice. Then on using the selected alternative, buyers become able to assess the performance of the brand whether it fulfilled the desired expectations or not or whether to buy it again or not.

Factors affecting Buying Behavior

Brewster, Sparrow and Vernon (2007) explain about factors that affect buying behavior and vary from person to person, age to age, and area to area. Every society follows its own norms, culture and values. At different stages of life our preferences change because of our age, needs, lifestyle, earning and psychological factors. These factors can be Internal (memory and way of thinking) or External (media, word of mouth, publicity and feedback).

There are several factors, which pressure the buying behavior :

a) Cultural influences

It has the broadest and the deepest influence on buying behavior. Brewster, Sparrow and Vernon (2007) define culture as a shaping process, ' for a culture to exist, member of a group or society having different values and norms, which vary from time to time. Cultural values can change and have to be watched by marketers. Ignoring this deepest and widest factor can be very costly for a company in terms of image and profit.

b) Social influences

Social influences are those influences that clearly mold buying behavior, it affects through reference group, family members and social class (Ahmed & Saeed 2014).

c) Family influences

Family life cycle and family decision making has the most influence on one's buying behavior.

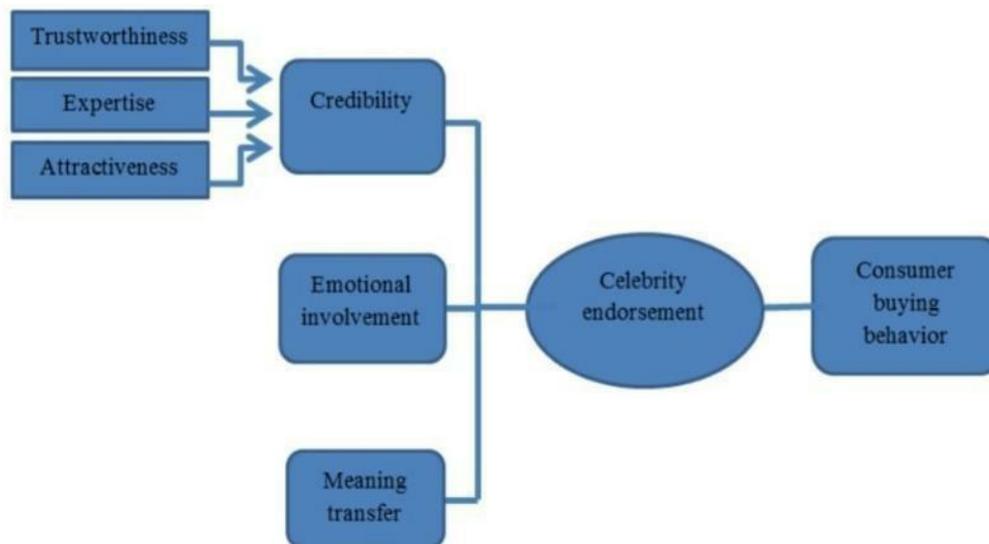
d) Psychological influences

These influences are related to our perception, learning, memory and motivation. It changes buying behavior through making the perceived picture of the product in the customer's mind. Customer buying behavior can be influenced by different factors like: perception, beliefs, society, personality, information choices, preferences and communication.

Impact of Endorsement on Buying Behavior

Ranjbarian, Shekarchizade & Momeni (2010) agreed that advertisement is the action that persuades individuals of any particular market to buy services and products or services. Through different ways the advertisement message can be spread like TV ads, radio publicity, print promotion, online advertising, billboard marketing, in-store advertisement, WOM advertising, and endorsement. Now the question arises which category of promotion is best? The best nature of advertisement depends on the type of industry or firm and its necessities and desires. McCracken (1989) found that celebrities' endorses characterized an effective way of transferring meaning to brands. The common conviction of the marketers is that there is a significant and huge impact of

those advertisements, which are endorsed by the famous celebrities comparable with the non-endorsed celebrities.



Positive Effects of Celebrity Endorsement

(R. Croft) cited that as competition is increasing between the firms to attract more consumers towards their brands, celebrities are increasingly used by the marketers to endorse their products. (Kulkarni and Gaulkar 2005) mentions that featuring a famous personality helps markers in solving the problem of over communication. Celebrities because of their well knownness can assist advertisements to become more popular and stand out from the clutter and increase communicative ability. Celebrity endorsement helps in improving the brand's image and also polishes the company's image. Celebrity endorsement can also prove to be a powerful tool in entering foreign markets, it helps the company to overcome numerous issues. For instance, L'Oreal uses Ashwariya Rai and Sonam Kapoor in their White Perfect range, Kareena Kapoor in Lakme Eye conic kajal and Kajol in Olay aging cream are all considered popular in India. It is also seen that those products which are endorsed by celebrities' stand out from other competing products because of their high level of recall and celebrities also create an impact on consumers' minds by making the advertisement memorable so it can be easily retrieved at the time of shopping. Lastly, celebrities

who appear in any advertisement for endorsing a product, they are actually capable of breathing life in a falling brand and can help that falling brand to rise, in other words, they create new interest and excitement in consumers. All these arguments point to one conclusion that celebrity endorsement creates a positive impact on consumers' buying behavior (Goldsmith, Lafferty and Newell 2000).

Negative Effects of Celebrity Endorsement

However celebrity endorsement has countless benefits but there are also certain risk factors that are associated with celebrity endorsement as a marketing strategy. Negative publicity regarding the celebrity is a major risk with endorsing a celebrity and there are other factors that can lead to serious consequences like :

- Popularity starts decreasing
- Moral issues
- Over endorsing can lead losing credibility
- Overshadowing of endorsed products.

Negative publicity about a celebrity endorsing a brand can change the perception of the consumer about that celebrity and it may also damage the brand reputation resulting in marketers to pay a big price over the celebrity's misdeeds and face serious humiliation and embarrassment. (Kumar 2010) mentions that there are times when consumers actually only notice the celebrity appearing rather than the product, hence this idea to promote that brand fails miserably. (Cooper 1984) says that "the product, not the celebrity, must be the star." This overshadowing is also called "vampire effect" because there is lack of clarity for the consumers because they are found to take more notice and interest in the celebrity rather than the interest. Another issue that arises is overexposure when marketers employ well recognized celebrities to endorse their brands and it ultimately confuses the consumers and they are unable to correctly recall about that brand which celebrity stands for.

Consumer's buying behavior in India

India is home to a host of languages, climates, and traditions. Defining the target audience is key to understanding consumer behavior in India. While city startups attract major investment, rural villages hail electricity and sanitation. Marketing in this diverse region can be daunting. But the potential is huge. India is set to overtake the US economy by 2030, second only to China. It already has the second-largest internet population – and only 41% of citizens are online. Big brands are already investing in Indian expansion.

India is known as a country of savers, though spending is on the rise. Disposable income is increasing. By 2030, 80% of households will be middle-income, compared to 50% today. This growing middle class is expected to drive consumer spending – buying more and buying better.

Access to credit also plays a key role. Indian millennials still value traditional priorities, like income and home ownership. But they have other goals, too. This shows in their spending priorities. Value for money is an important factor in determining consumer behavior in India. Indian shoppers are well-informed and want to get a good deal – even for luxury products. Moreover, eCommerce is new to many Indians, particularly outside the big cities. Programs like Amazon Easy are connecting traditional stores to the eCommerce sector. Innovative strategies like this help bridge the gap between customers and new technology. It's not surprising personal communication and trust are so highly valued.

Bargaining is a national pastime. Building trust also means ears to the ground. Research your audience carefully and consider expanding one city at a time. Then follow up with great service and a clear returns policy. The Indian family is changing. Traditional, multi-generational households are in decline. This can affect buying behavior. Marriage is still central to most people's lives. It's not unusual for people to spend 20% of their lifetime's earnings on their wedding. This means weddings are a major focus for the apparel, beauty, events, and luxury sectors. Themes of nurture, care, and affection are prominent in advertising – and successful. Hence, consumer behavior in India is complex and fast-changing.

Celebrities Appearing in Cosmetics Advertisements

Impact of Celebrity Endorsement on Consumer Buying Behaviour

BRANDS	PRODUCTS	NAME OF CELEBRITIES
L'Oreal	White Perfect	Ashwaria Rai
Oriflame	Foundation and Lip Color	Sonali Bendre
Lakme	Eyeconic	Kareena Kapoor
Olay	Aging Cream	Kajol

CHAPTER 4
RESEARCH AND METHODOLOGY

RESEARCH AND METHODOLOGY

4.1 RESEARCH OBJECTIVES

The objectives of this research study are to get information about:

- The impact celebrities have on consumers' buying intention in regards of credibility.
- The impact attractiveness of celebrities have on the extent to which consumers convinced.
- The impact celebrity endorsement creates on consumers in terms of product fit match between the product and the celebrity.
- The extent of transfer of meaning to the products endorsed by celebrities in shaping buying intention.

4.2 HYPOTHESIS

Following are the hypothesis of this research:

H1: Celebrity endorsed advertisement is considered to be effective in terms of buying intention in the cosmetic industry, when the celebrity used is credible.

H2: Celebrities who are attractive, create a positive impact on consumer's buying intention.

H3: The celebrity/product match-up positively influence consumers to purchase the celebrity endorsed product.

H4: Celebrity endorsed products transfer meanings which positively affect consumers buying intention.

4.3 RESEARCH DESIGN

The research design of this study is also cross-sectional as it takes place at a single point in time. The participants are selected based on particular variables of interest. It considers numerous characteristics at once and can provide information about the current population.

4.4 SOURCES OF DATA

Primary Data: Primary data will be gathered through the distribution of questionnaires to the respondents and their answers will be recorded, which will be the primary data.

Secondary Data: Secondary data would be collected through information given in reports, newspapers, magazines, articles and textbooks.

Software Used: SPSS, Excel and spreadsheets would be used.

4.5 SAMPLE DESIGN

The population involves the desired sample size of 303 females aged between 18 to 30 years from Ernakulam district. The method of selecting the sample was done by using the snowball sampling. The respondents were required to be regular purchasers of cosmetic products.

4.6 SAMPLE SIZE

The sample size is 303 respondents from the adult female population aged between 18 to 30 years.

4.7 SAMPLING METHOD

The sampling method of snowball sampling has been used in the study. It is a form of non-probability sampling. The participants selected were all females within the age group of 18-30. In the present study, the selected participants recommended potential participants, who themselves were observed and asked to nominate others and so on until a sufficient number of participants were obtained.

4.8 METHOD OF DATA COLLECTION

The data in the present study has been collected from the population by giving out an online questionnaire through Google Forms. A consent form was provided at the beginning of the questionnaire to make sure that the confidentiality of the participant's data will be maintained. This was followed by a few questions that collected the demographic details of the participants. The participants took about 10 to 15 minutes to complete the questionnaire and it was ensured that they filled every item of the questionnaire. The questionnaire involves a number of questionnaire items that asks a question and provides a set of response options for participants to choose from. From this, the highest responses given in each item is considered for further analysis and the final results are to be obtained using the SPSS software version 28.0.

4.9 DRAFTING QUESTIONNAIRE

The questionnaire used in this study is used to assess the impact of celebrity endorsements on consumer buying behavior. The first three questions were scored based on a four point, two point and three point likert scale respectively. The fifth question was scored based on a choice scale of preference. The remaining questions were scored based on rating scales.

4.10 DATA ANALYSIS TECHNIQUE

CORRELATION

The data analysis technique of correlation is to be used in the present study. A correlation is a statistical measurement of the relationship between two variables. Correlation means association - more precisely it is a measure of the extent to which two variables are related. There are three possible results of a correlational study: a positive correlation, a negative correlation, and no correlation. Possible correlations range from +1 to -1. A zero correlation indicates that there is no relationship between the variables.

A positive correlation is a relationship between two variables in which both variables move in the same direction. Therefore, when one variable increases as the other variable increases, or one

variable decreases while the other decreases. A negative correlation (inverse correlation) is a relationship between two variables in which an increase in one variable is associated with a decrease in the other. A zero correlation exists when there is no relationship between two variables.

There are four types of correlations in statistics;

- a) Pearson correlation
- b) Kendall rank correlation
- c) Spearman correlation
- d) Point-Biserial correlation.

→ **Spearman correlation**

Spearman's rank correlation coefficient or Spearman's ρ , named after Charles Spearman and often denoted by the Greek letter rho, is a nonparametric measure of rank correlation (statistical dependence between the rankings of two variables). It assesses how well the relationship between two variables can be described using a monotonic function.

REGRESSION

Regression is a statistical technique that is used to measure and describe the strength and shape of the relationship between two or more variables. It is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of the relationship between variables and for modeling the future relationship between them. Regression analysis includes several variations, such as linear, multiple linear, and nonlinear. The most common models are simple linear and multiple linear. Nonlinear regression analysis is commonly used for more complicated data sets in which the dependent and independent variables show a nonlinear relationship. Regression analysis offers numerous applications in various disciplines, including finance.

CHAPTER 5
DATA ANALYSIS

DATA ANALYSIS

The aim of the present study was to investigate the impact of celebrity endorsements in consumer buying behavior. Spearman's correlation and linear regression was used to find the degree of relation as well as the prediction level.

The normality test between the independent and dependent variables didn't follow normal distribution. Hence the test used in the analysis of the data is non-parametric

CORRELATION

TABLE 4.1: Correlation coefficient between Celebrity Endorsement and Consumer Buying Behavior (Spearman's rho)

Independent Variable N	Dependent Variable	r	p (2 tailed)
Celebrity Endorsement 303	Consumer Buying Behavior	.266**	.001

** Correlation is significance at 0.01 level (2 tailed)

Spearman's correlation coefficient was computed to assess the relationship between celebrity endorsements and consumer buying behavior. From Table 4.1, the p-value is less than 0.001. This indicates that there is a statistically highly significant low positive relationship between celebrity endorsements and consumer buying behavior ($p = .001$, $r = 0.266$). In other words, we can infer that there is a weak relationship between the two variables.

REGRESSION

TABLE 4.2: Regression Analysis Model Summary table between Celebrity Endorsement and Consumer Buying Behavior

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.217	0.047	0.024	2.18651

a. Predictors: (Constant), Celebrity Endorsement

In table 4.2, R value represents the simple correlation between the variables. It points out the linear relationship between two variables (celebrity endorsement and consumer buying behavior) which is .217. This indicates a low degree of correlation. R Square is the coefficient of determination. The R square value indicates how much of the total variation in the dependent variable (consumer buying behavior), can be explained by the independent variable (celebrity endorsement). In this case, 4.7% of variance in consumer buying behavior is accounted for by celebrity endorsement. It shows that there is a positive weak relationship between the two variables

TABLE 4.3: Regression Analysis ANOVA table.

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	69.642	7	9.949	2.081	.045
	Residual	1410.345	295	4.781		
	Total	1479.987	302			

- a. Dependent Variable: Consumer Buying Behavior
- b. Predictors: (Constant), Celebrity Endorsement

The ANOVA table predicts how well the regression equation fits the data (ie. predicts the dependent variable). It shows whether the overall model has been accepted or not, which is determined by the significance value. In table 4.3, the significance level is 0.45 which is greater than the p value. This indicates that there is stronger evidence in favor of the alternative hypothesis. Also, p value is less than 0.001 which is less than 0.05. This indicates that the regression model statistically significantly predicts the outcome variable (ie., it is a good fit for data).

TABLE 4.4: Regression Analysis Coefficients table

Model		Unstandardized B	Standardized Coefficients Beta	t	Sig.
1	Constant	9.950		24.591	<.001
0.254	Expertise of the celebrity	0.164	0.105	1.143	
0.188	Trustworthiness of the celebrity	0.219	0.131	1.318	
0.188	Similarity between the endorser and consumer	0.060	0.031	0.398	

0.280	Familiarity of the celebrity	0.182	0.100	1.083
0.944	Likeability of the celebrity	-0.011	-0.006	-0.070
0.910	Product-celebrity matchup	-0.019	-0.010	-0.113
	Meaning transferred to the product	0.317	0.188	2.117 0.035

a. Dependent Variable: Consumer Buying Behavior

Table 4.4 shows the regression analysis coefficients obtained for each dimension of celebrity endorsement and consumer buying behavior. A linear regression was calculated to predict consumer buying behavior based on celebrity endorsement. Results of the linear regression indicated that there was a collective significant effect between celebrity endorsement and consumer buying behavior.

From table 4.4, it was found that the impact the expertise and trustworthiness of the celebrities have on consumer buying behavior had a significant level which was more than 0.001. These two factors are the subsequent properties of one of the dimensions measured in celebrity endorsement, which is credibility. This indicates that the credibility of the celebrity has no effect on consumer buying intention. Hence, hypothesis 1 is rejected.

Similarly, the impact the similarity between the endorser and consumer, familiarity of the celebrity and likeability of the celebrity have on consumer buying behaviour also had a significant level which was more than 0.001. Since these three factors are the subsequent properties of another of the dimensions measured in celebrity endorsement, which is attractiveness, it can be interpreted that the attractiveness of the celebrity has no effect on consumer buying intention. Hence, hypothesis 2 is rejected.

It was also found that the factor of product-celebrity matchup also had a significance level of more than 0.001. Which can again be interpreted that product-celebrity matchup had no significant effect on consumer buying intention. Hence, hypothesis 3 is rejected.

However, the aspect of meaning transfer to the product of celebrity endorsement on consumer buying behavior was found to have a significance level less than 0.001. This indicates that the property of meaning transfer in celebrity endorsement does have a positive effect on consumer buying behavior. Therefore, hypothesis 4 is accepted. That is celebrity endorsed products do transfer meanings which positively affect consumers buying intention.

CHAPTER 6

FINDINGS

FINDINGS

The findings show that celebrity endorsement is effective and a relationship is one between four elements of celebrity endorsement with consumer's purchase intention.

The first attribute of celebrity endorsement is "credibility" which comprises two factors namely expertise and trustworthiness. As the research suggests, consumers, in the field of cosmetics, frame their purchase intention which is not necessarily in favor of those cosmetics which are endorsed by such celebrities who have some expertise in that field and are considered to be trustworthy. This might be an indication of the consequence in the recent loss of trust in celebrities due to a lack of perceived genuinity and expertise in them as perceived by consumers, especially young female consumers. Young females in the current generation are becoming less impressionable and seem to value other aspects of an endorser when it comes to their evaluation process in decision making and their ultimate choice of decision.

The second attribute of celebrity endorsement is "attractiveness", which is further divided into three factors namely similarity, familiarity and likeability. Since the domain of cosmetics is very fragile therefore attractiveness of a celebrity here doesn't play a very vital role because liking a celebrity wouldn't mean that a cosmetic will actually produce the desired result to the consumer or their skin as it did to the celebrity endorsing it. The research may also imply that young females, while making a decision regarding the purchasing of cosmetics, are very selective since the purchasing of cosmetics is highly subjective in its use and benefits. That is, the superficial qualities of the celebrity doesn't play a significant role in consumers' buying intention. Hence, the study suggests that attractiveness of a celebrity has no relationship with purchase intention.

The third attribute of celebrity endorsement is "product celebrity match-up", which means that the celebrity endorsing a product has an image that goes with the product he/she is endorsing. This attribute implies that the product should match with the celebrities in different ways including personality, passion and career. In other words, the products endorsed by the celebrity must show some level of relevance with them. The study suggests it has no relationship with the purchase intention. This might indicate that even if the product does match-up with the celebrity, female consumers of cosmetics still, for some reasons, find it a good enough reason to purchase cosmetic

items. This can again come down to the perceived genuinity of the celebrity and also likeness and need for the endorsed products.

The fourth and the last attribute of celebrity endorsement is “meaning that is transferred to the product by the celebrity”. The study found it has a positive relationship with the purchase intention because often consumers think that using such celebrity endorsed cosmetics will make them look more glamorous and classy. In other words, female consumers at the end of the day, buy cosmetics goods for the perceived appeal of not the celebrity, but what it brings to them. It also depends on how much the products resonate and can meet their needs and wants. It can also depend on the effectiveness in the transference of meaning of the product to the consumers by the endorser. It can also be what the seeming product value and brand name brings for the consumer.

Therefore “meaning transferred” positively impacts the purchase intention of female consumers in the field of cosmetics. That is, even if the celebrity endorser is credible, attractive and has a relevant matchup with the product endorsed, it ultimately depends upon the impact the product or the celebrity endorser has on the consumers' psyche which ultimately comes down to the consumer's decision why or why not to buy a particular brand or product.

CHAPTER 7
RECOMMENDATIONS

RECOMMENDATIONS

According to the study, marketers while using celebrities to endorse their cosmetics products, and subsequently their brand, should make sure that they fulfill the criteria of the following:

- Celebrities, while transferring meaning to the product they are endorsing, should depict reality. Unrealistic beauty standards and goals do not sit well with the current generation, especially in females. Moreover, inclusivity is a huge factor in the industry of cosmetics, especially nowadays. Marketers while using celebrities in endorsements must aim at setting a realistic example without coming off as fake or biased. The consumers must in turn find the endorsement genuine, relevant and meaningful.
- Celebrities with any kind of negative publicity should not endorse products. This holds true for any business, not just in cosmetics. One of the most important things a brand/business can do is to show their hands on commitment towards customer satisfaction and commitment. If consumers find the endorsement meaningless or even disregarding or disrespectful in any way through the use of an infamous celebrity, it can come off as extremely ignorant and distasteful. It can even lead to the defamation of the brand indefinitely.
- Marketers must always concentrate on what their brand stands for when thinking of potential endorsers. It will not generate sales and revenue to have a celebrity conflicting with brand identity just to capitalize on a current “it” person. If marketers are unsure of their brand’s identity with consumers, conduct initial research to see what consumers associate with your brand. In this age of social media, having a celebrity endorser who is ‘off brand’ could potentially hurt a company’s identity. In other words, celebrity endorsement should not come off as a "PR stunt".
- Celebrities, who possess a good name and profile in the field of cosmetics and in general, should endorse cosmetics as consumers get influenced by such appeal and more importantly, their reputation. With the ongoing "jumping on the bandwagon" trend, consumers might as well buy products just because it is popular to do so. Hence, marketers must be highly selective and adequate in choosing and employing celebrity endorsers. A consumer may buy the product because it might give them some sort of status or recognition that is tied with the celebrity endorsing the product.

CHAPTER 8
CONCLUSION

CONCLUSION

The study at hand was primarily conducted to examine the relationship between and the impact of celebrity endorsements on consumer buying behavior. It has been concluded that there is a statistically highly significant low positive relationship between celebrity endorsements and consumer buying behavior. The attribute "meaning transfer to the product" of celebrity endorsement is found to have a significant impact on behavior and intention of buying cosmetics among females in the young adult population of Ernakulam district. That is, female consumers may be interested to buy cosmetics goods for reasons other than the celebrity endorsement. These reasons may be the price, availability, quality and quantity of the product. Moreover, celebrity endorsement and consumer buying behavior was found to have a weak correlation.

REFERENCES

- Baker, M. J., & Churchill, G. A. (1977). The impact of physically attractive models on advertising evaluations. *Journal of Marketing Research*, 14(4), 538–555.
<https://doi.org/10.1177/002224377701400411>
- Chaiken, S. (1979). Communicator physical attractiveness and persuasion. *Journal of Personality and Social Psychology*, 37(8), 1387–1397. <https://doi.org/10.1037/0022-3514.37.8.1387>
- Friedman, H. H., Termini, S., & Washington, R. (1976). The effectiveness of advertisements utilizing four types of endorsers. *Journal of Advertising*, 5(3), 22–24.
<https://doi.org/10.1080/00913367.1976.10672647>
- Goldsmith, R. E., Lafferty, B. A., & Newell, S. J. (2000). The impact of corporate credibility and celebrity credibility on consumer reaction to advertisements and brands. *Journal of Advertising*, 29(3), 43–54. <https://doi.org/10.1080/00913367.2000.10673616>
- McCracken, G. (1989). Who is the celebrity endorser? Cultural Foundations of the endorsement process. *Journal of Consumer Research*, 16(3), 310. <https://doi.org/10.1086/209217>
- Misra, S., & Beatty, S. E. (1990). Celebrity spokesperson and brand congruence. *Journal of Business Research*, 21(2), 159–173. [https://doi.org/10.1016/0148-2963\(90\)90050-n](https://doi.org/10.1016/0148-2963(90)90050-n)
- Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, 19(3), 39–52. <https://doi.org/10.1080/00913367.1990.10673191>
- Roy, S., Jain, V., & Rana, P. (2013). The moderating role of consumer personality and source credibility in celebrity endorsements. *Asia-Pacific Journal of Business Administration*, 5(1), 72–88. <https://doi.org/10.1108/17574321311304549>
- Silvera, D. H., & Austad, B. (2004). Factors predicting the effectiveness of celebrity endorsement advertisements. *European Journal of Marketing*, 38(11/12), 1509–1526.
<https://doi.org/10.1108/03090560410560218>
- Till, B. D., & Busler, M. (1998). Matching products with endorsers: Attractiveness Versus Expertise. *Journal of Consumer Marketing*, 15(6), 576–586.
<https://doi.org/10.1108/07363769810241445>

APPENDIX

Impact of Celebrity Endorsement on Consumers' Buying Behavior

1) How frequently do you encounter celebrity endorsed advertisements?

- Very often
- Occasionally
- Hardly
- Never

2) Which advertisement catches your attention the most?

- Celebrity endorsed advertisement
- Non celebrity endorsed advertisement

3) Do you trust celebrity endorsed advertisements?

- Yes always
- No, not at all
- Sometimes only

4A) Do you purchase cosmetics based on celebrity endorsed advertisements?

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

4B) Will your purchase intention be negative to purchase cosmetics which has side effects

but are endorsed by a celebrity?

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

5) Which of the factor listed below influence you to purchase celebrity endorsed cosmetics product?

- Credibility of the celebrity
- Attractiveness of the celebrity
- Product celebrity match up
- Meaning that are transferred to the product

9) Rate these factors based on their importance and effectiveness that celebrities in the cosmetics field should possess (1 being the lowest and 5 being the highest)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Celebrities in ads help me recall products more promptly					
I perceive celebrity endorsement as very effective					
Celebrity endorsements are very influential					
Expertise of the celebrity influence my purchase decision					
Trustworthiness of celebrity influence mu purchase decision					
Familiarity of the celebrity influence my purchase decision					

Impact of Celebrity Endorsement on Consumer Buying Behaviour

Likeability of the celebrity influence my purchase decision					
Product and celebrity match influence my purchase decision					
Celebrities can provide or transfer meaning to the product and this influences my purchase decision					
Negative publicity of the celebrity also impact my purchase decision					
I find celebrity endorsed product more classy, desirable and a symbol of status					
Using celebrity endorsed product makes me feel more glamorous and I feel more confident about myself					
I also recommend my friends to use celebrity endorsed products					

**CHARACTERISTICS STUDY OF LIGHT
DEPENDENT RESISTORS AND ITS
APPLICATIONS AS SENSORS**

PROJECT REPORT

Submitted by

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In partially fulfillment of the requirements for the Award of

BACHELOR DEGREE OF SCIENCE IN PHYSICS



DEPARTMENT OF PHYSICS

ST.TERESAS COLLEGE (AUTONOMOUS), 2022

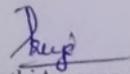
ST. TERESA'S COLLEGE (AUTONOMOUS) ERNAKULAM



**B.Sc. PHYSICS
PROJECT REPORT**

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YEAR OF WORK : 2021-2022

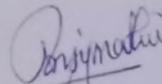
This is to certify that this project work entitled 'CHARACTERISTIC STUDY OF LIGHT DEPENDENT RESISTORS AND ITS APPLICATIONS AS SENSORS' is an authentic work done by NANDANA S.


Dr. Priya Parvathi Ameena Jose

Head of the department
Staff member in charge

Submitted for the external examination held at St Teresa's College(Autonomous),Ernakulam.

Date : 04/5/22
Examiner:


Suseen

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM



CERTIFICATE

This is to certify that the project report entitled '**CHARACTERISTIC STUDY OF LIGHT DEPENDENT RESISTORS AND ITS APPLICATION AS SENSORS**' is an authentic work done by **NANDANA S**, Register Number **AB19PHY020**, St Teresa's College, Ernakulam, under my supervision at Department of Physics, St Teresa's college for the partial requirements for the award of Degree of Bachelor of Science in Physics during the academic year 2021-2022 .The work presented in this dissertation has not been submitted for any other degree in this or any other university .

Dr. Priya Parvathi Ameena Jose

Head of Department

Supervising Guide

Date :04-05-2022

Place : ERNAKULAM



DECLARATION

I, final year B.Sc. Physics student, Department of Physics, St Teresa's college, Ernakulam, do hereby declare that the project work entitled '**CHARACTERISTIC STUDY OF LIGHT DEPENDENT RESISTORS AND ITS APPLICATION AS SENSORS**' has been originally carried out under the guidance and supervision of Dr. Priya Parvathi Ameena Jose, Head of department of Physics, St Teresa's College (Autonomous), Ernakulam in partial fulfilment for the award of the degree of Bachelor of Physics. I further declare that this project is not partially or wholly submitted for any other purpose and the data included in the project is collected from various sources and are true to the best of my knowledge.

Date : 04-05-2022

Place: ERNAKULAM

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I would like to thank God Almighty for enriching our minds with knowledge and leading us along the project. I express a deep sense of gratitude to my project guide, Dr. Priya Parvathi Ameena Jose, H.O.D, Department of Physics, for providing able support and guidance.

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ABSTRACT

The basic characteristics of the passive component- LIGHT DEPENDENT RESISTOR (LDR) is analysed in this project. V-I characteristics and distance-resistance relation of LDR using red LED is studied graphically. Two applications using LDR such as electronic eye-controlled security system and Automatic Street light control system were designed and constructed.

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1) INTRODUCTION

1.1) PHOTOCONDUCTIVITY

The increase in the electrical conductivity of certain materials when they are exposed to light of sufficient energy is known as photoconductivity. Photoconductivity serves as a tool to understand the internal process in these materials.

Certain crystalline semiconductors, such as Silicon, Germanium, Lead Sulphide and Cadmium Sulphide and the related semimetal Selenium are strongly photoconductive. Normally semiconductors are relatively poor electrical conductors because they have only a small number of electrons that are free to move under a voltage. Most of the electrons are bound to their atomic lattice in the set of energy states called the valence band. But if external energy is provided, some electrons are raised to the conduction band, where they can move and carry current. Photoconductivity occurs when the material is bombarded with photons of sufficient energy to raise electrons across the band gap, a forbidden region between the valence and conduction bands. This is shown in the figure 1.1.1. In Cadmium Sulphide energy gap is 2.42 eV, corresponding to a photon of wavelength 512 nm, which is visible green light. In Lead Sulphide, the energy gap is 0.41 eV, making this material

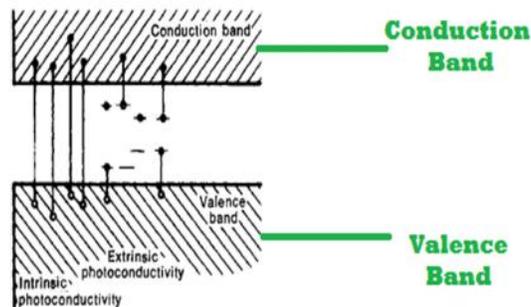


FIGURE 1.1.1) ENERGY BAND DIAGRAM

sensitive to infrared light.

Because the current ceases when the light is removed, photoconductive materials form the basis of light controlled electrical switches. These materials are used to detect infrared radiation in military application as guiding missiles to heat producing targets.

1.2) PHOTO CELLS

A photocell is a light-sensitive module, which works on the principle of photoconductivity. It is a kind of resistor, which can be used to change its resistive value based on the light intensity. These are inexpensive, simple to obtain in numerous sizes as well as in specifications. In the dark, this photocell has a resistance of approximately 500 k Ω , and in bright light the resistance drops to approximately 10 k Ω .

Photovoltaic cell, photoresistors, charge –coupled devices, goley cells etc are examples of photocells.

Photocells are used in automatic lights to activate whenever it gets dark, and the activation/deactivation of streetlights. These are also used as timers in a running race to calculate the runner's speed, to count the vehicles on the road, in burglar alarms. They are

also used in exposure meters (which can be used with a camera for knowing the correct time of exposure to get a good photo). They acts as switches as well as sensors.

Let's concentrate more on PHOTORESISTORS.

1.3) LIGHT DEPENDENT RESISTORS(LDR)

Light Dependent Resistors, also known as photoresistors or photoconductive cells works on the principle of Photoconductivity. Photoresistors are made from semiconductor materials whose resistance changes when illuminated with light energy. Such materials (also known as photo-conductors) are Cadmium Sulphide (CdS), Cadmium Selenium (CdSe) and Lead Sulphide (PbS). The figure 1.3.1 shows a commonly used CdS cell. When these materials are exposed to light, the covalent bonds are broken. This produces charge carriers.

The amount of illumination on the surface of the material determines the number of electron-hole pairs generated in the material. This in turn determines the resistance of the Photoconductive cells. The greater the amount of light falling on the surface (called surface illumination), greater will be the number of electron-hole pairs generated and therefore lower will be the value of resistance of the material. The lower the amount of light falling on the surface, higher will be the value of resistance of the material. Thus, the resistance of the semiconductor varies inversely with the intensity of light.

When the device is kept in darkness, its resistance is called Dark Resistance. When light falls on it, its resistance decreases up to several kilo ohms or even hundreds of ohms, depending on the intensity of light falling on it.

The construction of the LDR consists of light sensitive material deposited on an insulating substrate like a ceramic. To get the desired resistance and power rating, the metal is deposited in the pattern of a zigzag. This pattern separates the metal deposited areas into two regions and on both sides of the pattern the Ohmic contact is prepared. The symbol of an LDR is given in the figure 1.3.2.



FIGURE 1.3.1) CdS LDR

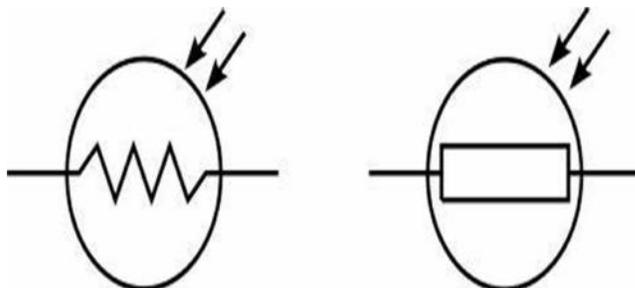


FIGURE 1.3.2) SYMBOL OF LDR

2) EXPERIMENT DETAILS

2.1 V-I CHARACTERISTICS OF LDR WITH RED LED

CIRCUIT DIAGRAM

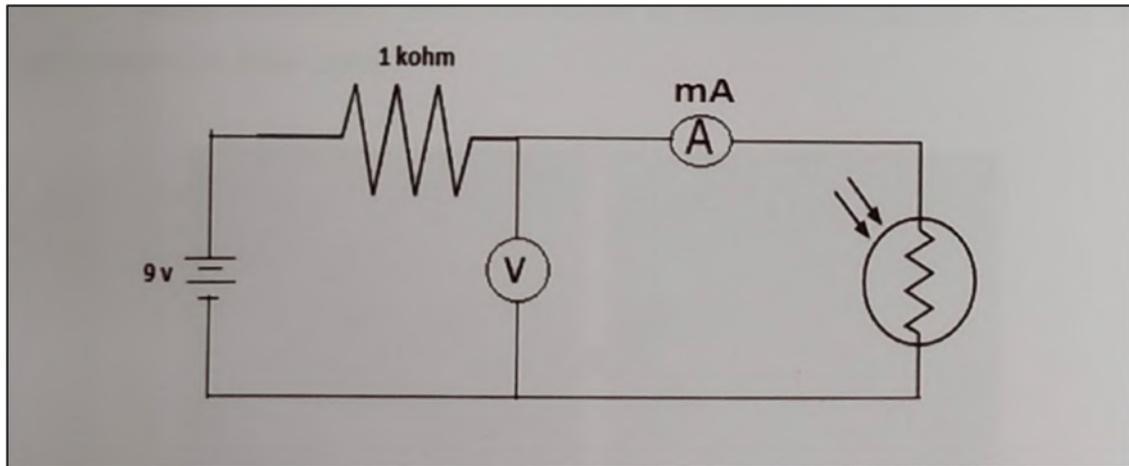


FIGURE 2.1.1

CIRCUIT COMPONENTS

- Light Dependent Resistor
- Connection Wires
- Red light
- Meter Scale
- Battery 9V
- Multimeter
- Bread Board

PROCEDURE

Connections are made as shown in the circuit diagram in figure 2.1.1. Set red LED at distances 1cm, 2 cm etc using a meter scale mount on a holder. Switch on the circuit and turn on the red light so that the light falls on the LDR. Measure corresponding current and voltage using multimeter and note down in the tabular column.

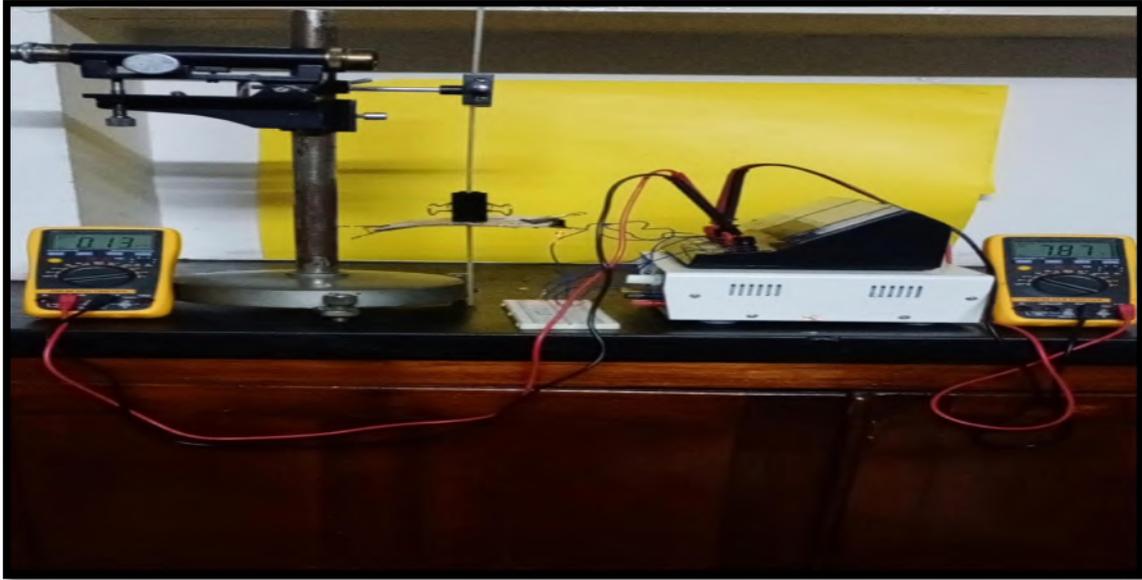


FIGURE 2.1.2) EXPERIMENTAL SETUP

OBSERVATIONS

Measurements for V-I characteristics of LDR using red LED

Distance[cm]	Voltage[volt]	Current[mA]
4	6.37	0.61
5	6.88	0.44
6	6.98	0.40
7	7.40	0.28
8	7.65	0.20
9	7.72	0.18
10	7.79	0.16
11	7.93	0.11
12	8.00	0.08
13	8.10	0.06
14	8.10	0.06
15	8.15	0.05
20	8.20	0.03
25	8.23	0.02
30	8.26	0.01

V-I CHARACTERISTICS OF LDR USING RED LIGHT

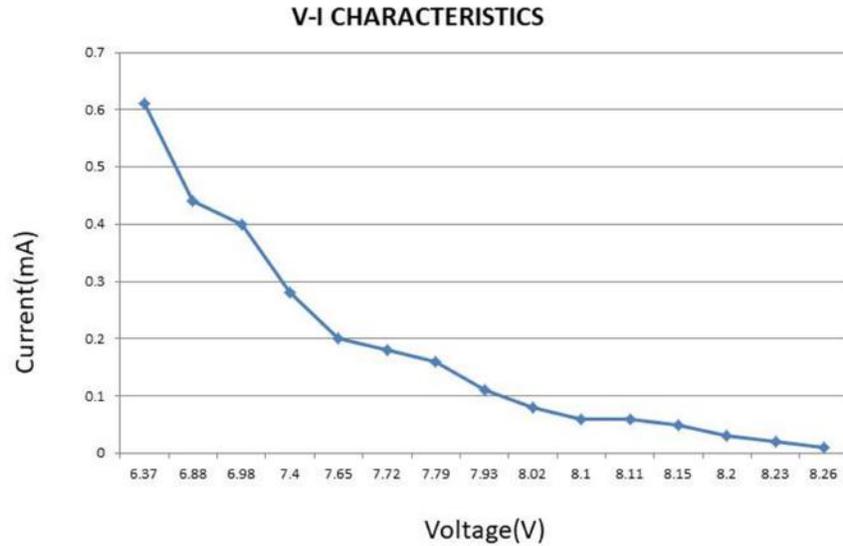


FIGURE 2.1.3

INFERENCES

From current vs voltage graph

- a) Current varies across LDR for red light from various distances.
- b) There is a decrease in current as distance of the light source increases.

2.2) STUDY OF RESISTANCE ACROSS THE LDR

- For red light with change in distance of the light source.

CIRCUIT COMPONENTS

- Bread Board
- Meter Scale
- Red Light
- Multimeter

PROCEDURE

Connect the LDR in bread board. Meter scale is mount on a holder. Red light is kept at distances 1 cm ,2 cm, etc. Corresponding resistances across LDR is noted using a multimeter.

OBSERVATIONS

Measurements for distances vs resistance graph of LDR using RED LIGHT.

DISTANCE (cm)	RESISTANCE (Kilo ohm)
4	10.44
5	15.63
6	17.45
7	26.42
8	38.25
9	42.88
10	48.68
11	72.09
12	100.25
13	135
14	135.16
15	163
20	273.33
25	411.5
30	826

DISTANCE Vs RESISTANCE GRAPH OF LDR USING RED LIGHT

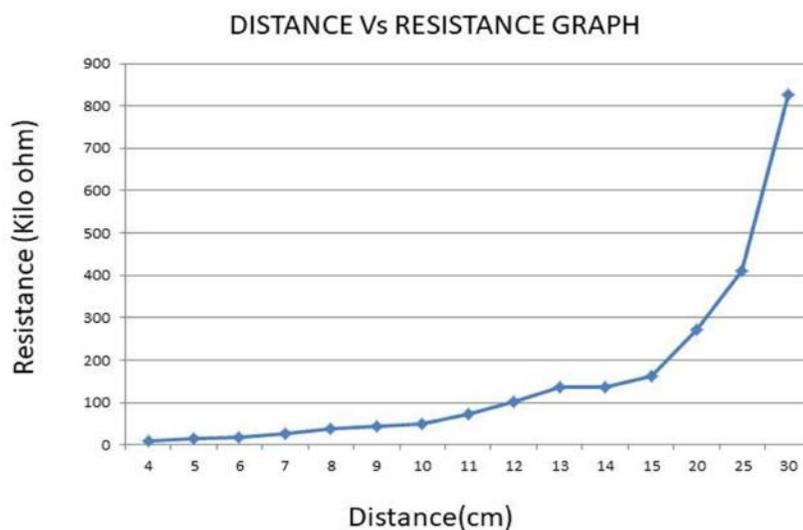


FIGURE 2.2.1

INFERENCE

- LDR resistance increases with increase in distance.
- LDR resistance increases with decrease in intensity of light.

2.3) DEMONSTRATION OF LIGHT SENSITIVITY OF LDR

The circuit is set up as shown in figure 2.3.1. The output terminals are connected to a Digital Storage Oscilloscope (DSO). The digital storage oscilloscope is defined as the oscilloscope which stores and analysis the signal digitally, i.e., in the form of 1 or 0 preferably storing them as analogue signals. The digital oscilloscope takes an input signal, store them and then display it on the screen. The digital oscilloscope has advanced features of storage, triggering and measurements. Also, it displays the signal visually as well as numerically. The LDR is exposed to red, and pulsed light and corresponding waveforms are observed.

CIRCUIT DIAGRAM

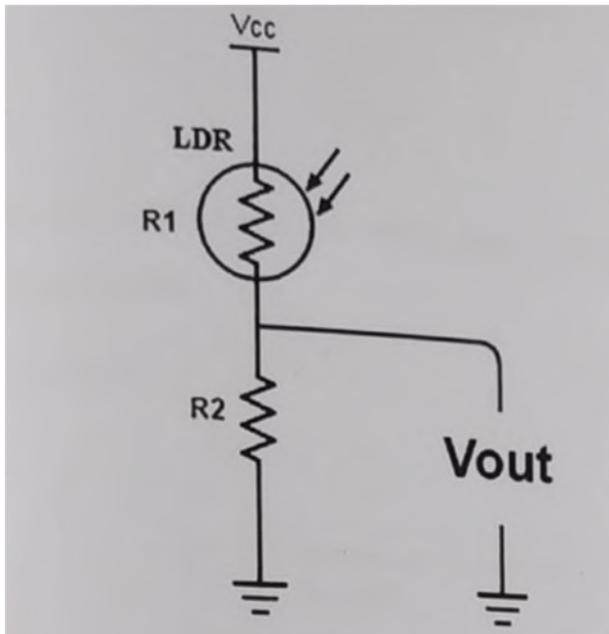


FIGURE 2.3.1

OBSERVATIONS

In the presence of RED LIGHT,
Intensity Vs Time period

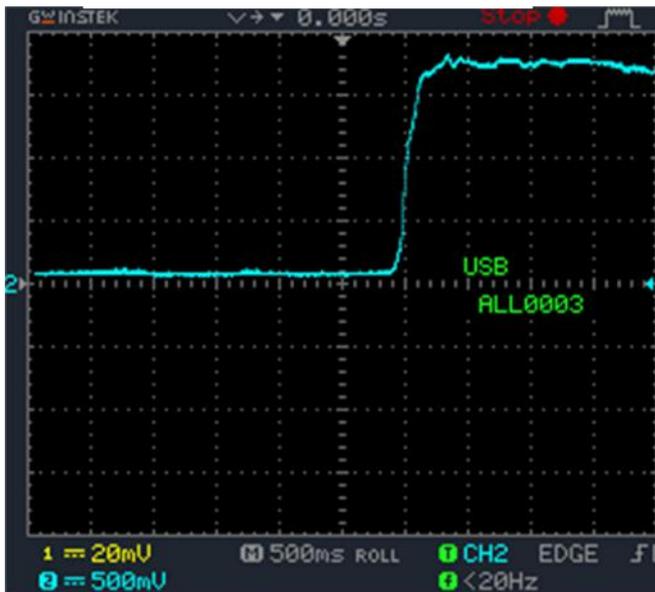


FIGURE 2.3.2

In the presence of pulsated light,
Intensity Vs Time period

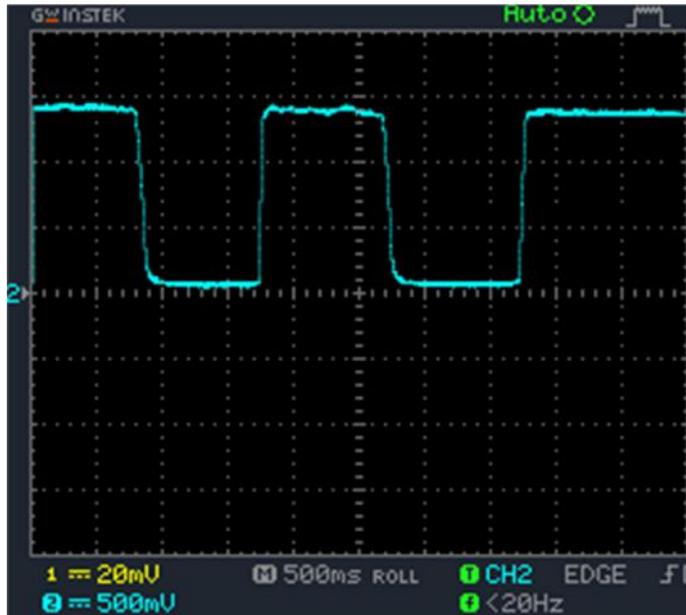


FIGURE 2.3.3

INFERENCE

- Intensity increases and stays at a peak value when LED light shines on the LDR.
- Intensity becomes zero when LED does not shine on the LDR.
- This pattern repeats for pulsated light i.e., repeatedly turning the LED on and off for varying intensities.

3) APPLICATION

There are many applications for LDR. Electronic eye-controlled security system, automatic street light control system, emergency light, control relay etc can be constructed using LDR. Here, we construct and explain the first two.

3.1) ELECTRONIC EYE CONTROLLED SECURITY SYSTEM

This is a home security application. Electronics eye controlled security system has LDR as the main sensor. It is a magic eye. As the automation is an emerging technology these days, we have a door bell that automatically rings when a person visits our home. This also provides security when any person is trying to enter the house without our permission.

PRINCIPLE

The main principle of the circuit is to ring the doorbell when there is any person at the entrance. In order to detect a person, an LDR is used as the sensor. Light on the LDR determines whether a person is present or not. When there is any object at the entrance. LDR is in dark and buzzer starts ringing and the LED starts glowing.

CIRCUIT DIAGRAM

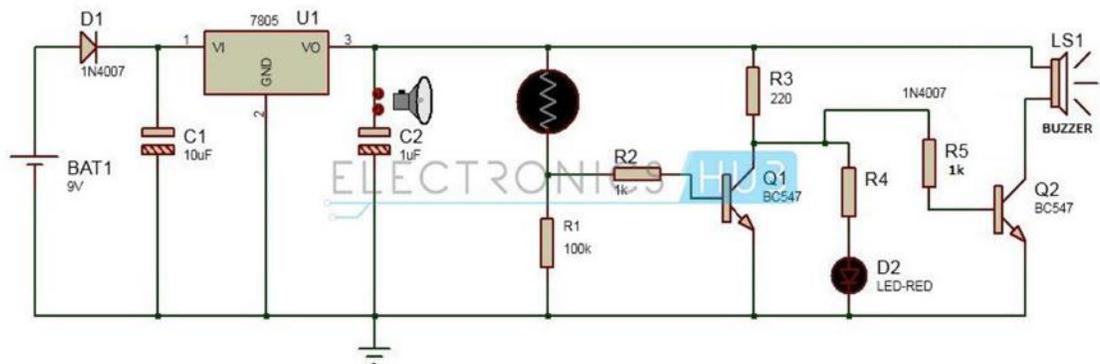


FIGURE 3.1.1

CIRCUIT COMPONENTS

- 7805 Regulator
- Resistors -220 ohm x 2, 1K ohm x 2,100K ohm
- IN4007 PN Diode
- Capacitors – 1 micro F,10 micro F
- Transistors –BC 547 x 2
- Light Dependent Resistor (LDR)
- Buzzer
- LED
- Bread Board
- Connecting Wires
- 9V Battery

DESIGN

This circuit can be divided into two parts. One is the power supply and the other is the logic circuit. In the power supply circuit, a 9 V supply from a battery is converted to the 5V. The logic circuit operates the buzzer and an LED when any shadow falls on the LDR.

DESIGN OF POWER SUPPLY

Power supply circuits consists of battery, diode, regulator and capacitors. Initially a 9V battery is connected to the diode. Diode used here is a simple PN junction diode of IN4007 series. In this circuit, IN4007 is connected in the forward bias condition.

The main purpose of the diode in this circuit is to protect the circuit from reverse polarity i.e., to protect the circuit if by any chance the battery is connected in reverse polarity. So, the PN junction diode connected in the forward bias allows the current to flow only on one direction and thus the circuit can be protected. There is some voltage drop across the diode.

A regulator is used for regulating the output voltage of the circuit. The regulator IC used here is 7805. 78 represent the series and 05 represent the output voltage. Thus, a voltage of 5V is produced at the output of the regulator. Two capacitors are used before and after the regulator. These two capacitors eliminate the ripples. Thus, a constant voltage is produced at the output of the regulator, which is applied to the logic circuit.

DESIGN LOGIC CIRCUIT

The logic circuit mainly consists of Light Dependent Resistor, Transistors, a Buzzer, an LED and a few passive components. A 100K ohm resistor is connected in series to the LDR in a voltage divider fashion.

LDR will have resistance in mega ohms when it is placed in the dark. This resistance value will decrease gradually when it is placed in the light, thus, there is a variation in the series resistances.

If the LDR is in dark it has a high resistance and produced the logic high value at the output whereas in the light the resistance value of the LDR decreases which causes a logic low voltage.

The output of the voltage divider is fed to a transistor which inverts the input from the LDR. The second transistor drives the buzzer. The diode is placed for protection.

We have used a 5V magnetic buzzer. It has two pins at the output. One pin is connected to the supply and the other to the collector of the second transistor. LED is used for indication only. When the output from first transistor is high, the buzzer rings. LED is also turned on.

WORKING

Initially, the circuit is connected as in the figure 3.1.1 on a bread board. Using a battery, a 9V power supply is given. LDR is placed in light. We can observe that no sound is produced from the buzzer. Place the LDR and the buzzer starts making sound. Also, the LED glows. As the intensity of light falling on the LDR increases sound produced by the buzzer decreases.

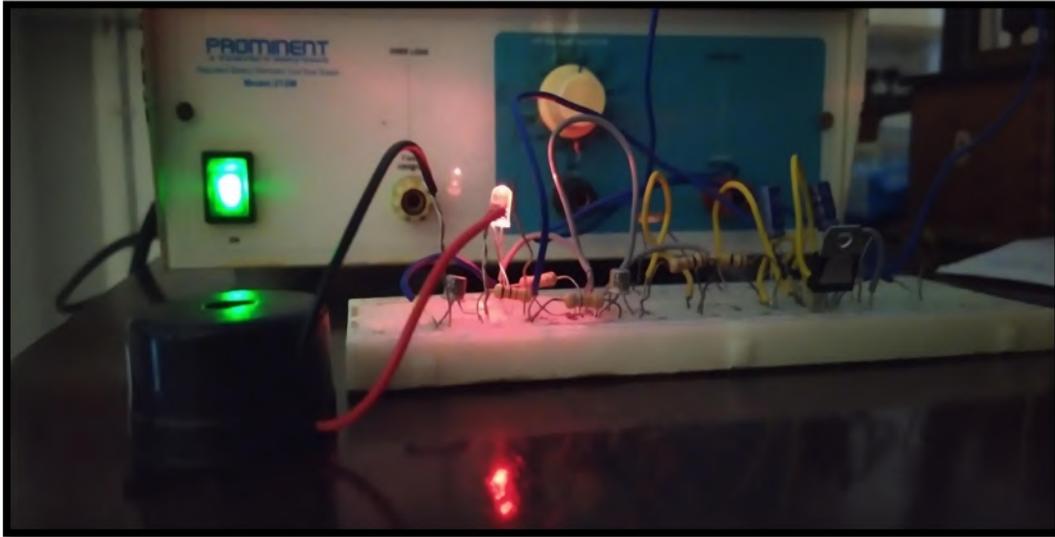


FIGURE 3.1.2) EXPERIMENTAL SETUP

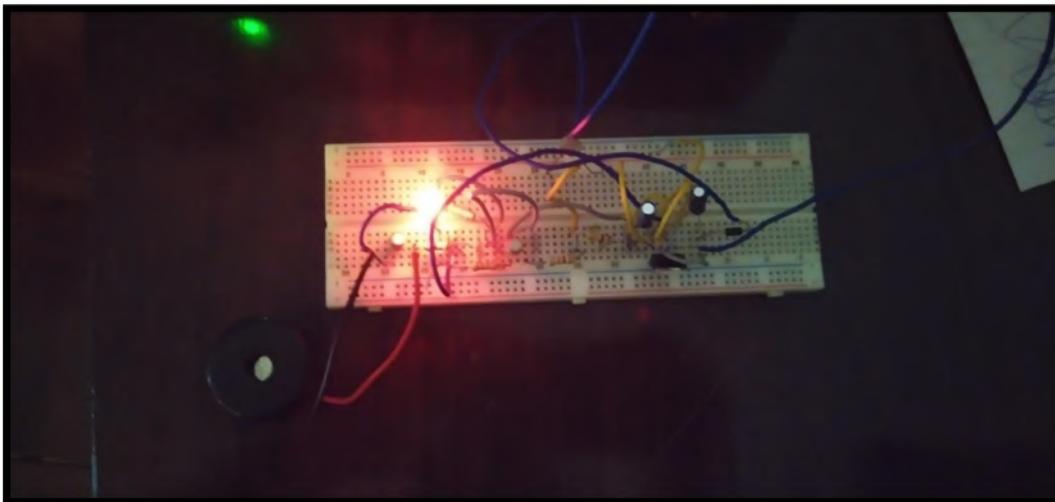


FIGURE 3.1.3) CIRCUIT WHEN LIGHT IS OFF – THE BUZZER RINGS

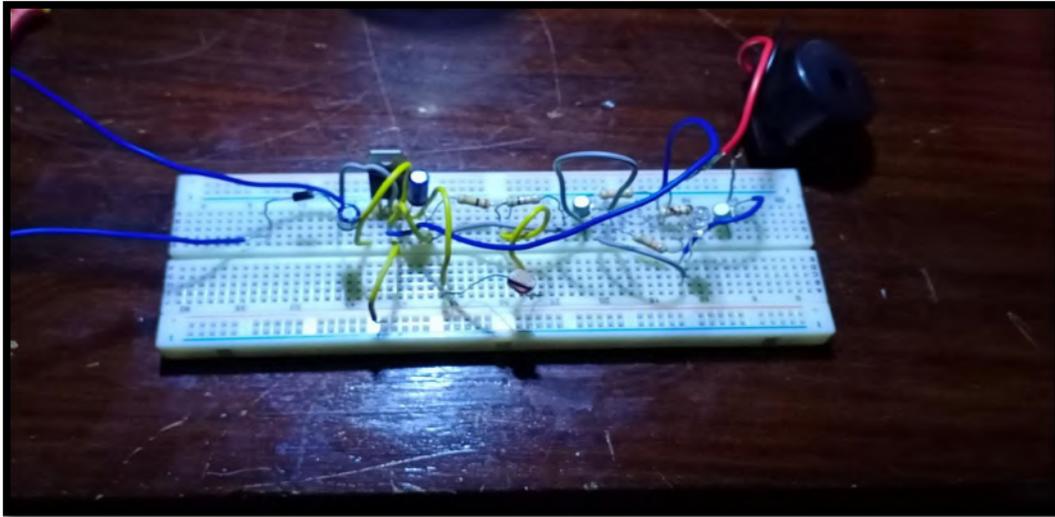


FIGURE 3.1.4) CIRCUIT WHEN LIGHT IS ON – THE BUZZER STOPS RINGING

Electronic eye can be used in security applications. It is used in doorbell applications.

3.2) AUTOMATIC STREET LIGHT CONTROL SYSTEM

We often see street lights remaining on even after sunrise. By using this Automatic system for street light controlling, we can reduce energy consumption because the manually operated streetlight are not switched off properly even after the sunlight comes and also not switched on earlier before sunset.

Also, in rainy days ON and OFF time differ noticeably which is one of the major disadvantages of using timer circuits or manual operations for switching the street light system.

This Automatic Street light control system is a simple and powerful concept which uses transistor as a switch to switch ON and OFF the street light system automatically, by using LDR as the sensor which senses the light just like our eyes.

CIRCUIT DIAGRAM

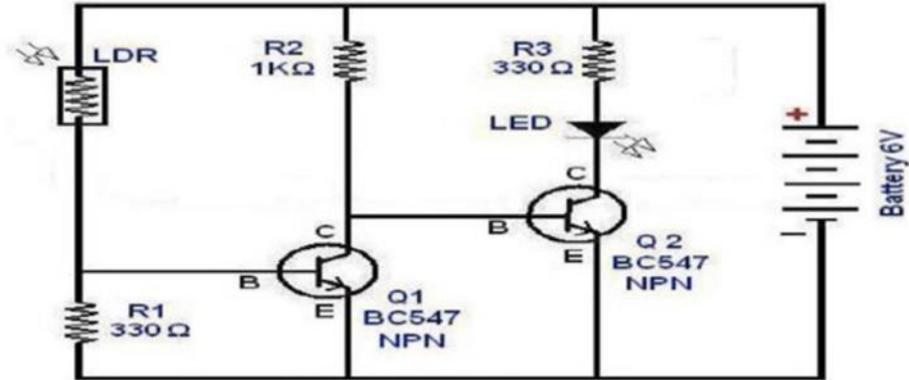


FIGURE 3.2.1

CIRCUIT COMPONENTS

- LDR
- Transistor –BC547 X 2
- Resistors -1K ohm,330 ohm,470 ohm
- Light Emitting Diode (LED)
- Connecting Wires
- 9V Battery

WORKING

The circuit is made as shown in the figure 3.2.1 Connect a 9V battery. As we block the Light Falling on LDR, the LED glows.

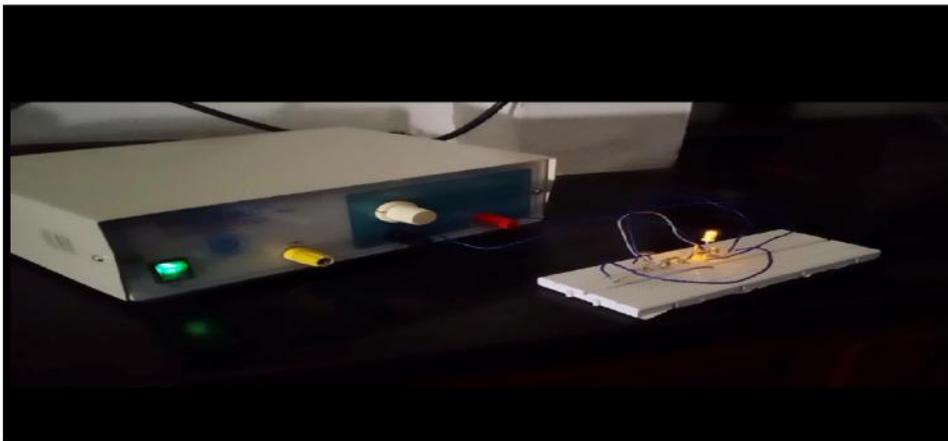


FIGURE 3.2.2) THE LED GLOWS WHEN THE LIGHT GOES OFF

Automatic street light control system automatically switches on lights when the sunlight goes below the visible region of our eyes. (i.e., In evening after sunset). It also switches OFF lights when sunlight falls on it (i.e., In the morning).

4) CONCLUSION

- Sensor is constructed using Light Dependent Resistors(LDR). The basic characteristics of this passive component were analysed. This includes
 - a) V-I characteristics of LDR using RED LIGHT .
The V-I characteristics of LDR shows that there is a decrease in current as distance of light source increases .
 - b) Study of the resistance across LDR.
It was found that LDR resistance increase with increase in distance, Also, LDR resistance increase with decrease in intensity of light .
- Light sensitivity of LDR was also demonstrated using DSO .
- The spectral response of a CdS (Cadmium Sulphide Cells) cell closely matches that of human eye. Hence it is often used in applications where human vision is a factor such as street light control. Light sensors which use LDR as the main light sensing component were constructed.
- LDR can also be used along with an LED and a resistor to construct an emergency light. When power fails, the LED glows.
- Control relays can be constructed with LDR, transistor and resistor. The relay gets turned ON in the darkness.

5) REFERENCES

- A TEXTBOOK OF APPLIED ELECTRONICS -R.S. SEDHA
- BASIC ELECTRONICS -B. L. THERAJA
- www.britannica.com
- www.electronicshub.org
- www.eleprocus.org

DIGITAL THERMOMETER USING ARDUINO AND LM35
TEMPERATURE SENSOR

PROJECT REPORT

Submitted by

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Submitted to,

Mahatma Gandhi University, Kottayam

In partial fulfilment of the requirement for the Award of

BACHELOR'S DEGREE OF SCIENCE IN PHYSICS



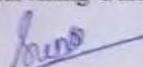
ST.TERESA'S COLLEGE (AUTONOMOUS)
ERNAKULAM



CERTIFICATE

This is to certify that the project report entitled "**DIGITAL THERMOMETER USING ARDUINO AND LM35 TEMPERATURE SENSOR**" is a bonafide work by Nandhana Chishor, St.Teresa's College Ernakulam, under my supervision at the Department of Physics, St.Teresa's College, Ernakulam for the partial fulfilment of the award of Degree Of Bachelor of Science in Physics during the academic year 2020-'21 .The work presented in this dissertation has not been submitted for any other degree in this or any other university.

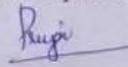
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Assistant Professor



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Place: Ernakulam

Date: 10/05/2020

ST. TERESA'S COLLEGE(AUTONOMOUS)

ERNAKULAM



BSc PHYSICS

PROJECT REPORT

Name : NANDHANA CHISHOR

Register Number : AB19PHY033

Year of work : 2021 - 2022

This is to certify that this project work entitled ' **DIGITAL THERMOMETER USING ARDUINO AND LM35 TEMPERATURE SENSOR** ' is an authentic work done by **NANDHANA CHISHOR**

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Staff member in-charge

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Dr. PRIYA PARVATI AMEENA JOSE

Submitted for the University examination held at St. Teresa's College, Ernakulam.

DATE: 10/05/2022

EXAMINERS:

Priyathir
Susan

DECLARATION

I, **Nandhana Chishor** (Register Number: **AB19PHY033**), final year B.Sc. Physics student, Department of Physics, St. Teresa's College, Ernakulam do hereby declare that the project work entitled “ **DIGITAL THERMOMETER USING ARDUINO AND LM35 TEMPERATURE SENSOR**“ has been originally carried out under the guidance and supervision of Dr. Sunsu Kurian, Assistant Professor, Department of Physics, St. Teresa's College (Autonomous), Ernakulam in partial fulfilment for the award of the Degree of Bachelor of Physics. I further declare that this project is not partially or wholly submitted for any other purpose and the data included in the project is collected from various sources and are true to the best of my knowledge.

PLACE: Ernakulam

DATE: 10. 05. 2022

ACKNOWLEDGMENT

I am bringing out this project report with immense pleasure and sense of satisfaction. I feel obliged to acknowledge the support and guidance that came from various quarters during the course of competition of this project. I would like to express our sincere gratitude to Dr. Sunsu Kurian, the project in charge, for guiding me throughout the entire duration of the project work. This work would not have succeeded without her support and motivation.

I would also like to extend our sincere thanks to all the faculty members of the Physics Department for their valuable suggestions and corrections. I would also like to thank all our friends for being with us whenever we were in need. Above all, I owe my heartfelt gratitude to the Almighty for showers abundant blessings upon me to get through this project.

ABSTRACT

The main objective of the project is to develop a digital thermometer and measure its accuracy. The project is designed by using an Arduino UNO Board, LM35 temperature sensor, LED display, potentiometer, connecting wires and breadboard. The sensor LM35 is a temperature sensor that outputs an analog signal which is proportional to the instantaneous temperature. The output voltage can easily be interpreted to obtain a temperature reading in Celsius. Due to its small size the temperature sensor can be used in a wide variety of applications.

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CHAPTER 1

INTRODUCTION

Temperature measurement in today's industrial environment encompasses a wide variety of needs and applications. Temperature is a very critical and widely measured variable for most mechanical engineers. To a medical practitioner's temperature is a fundamental quantity that must be measured in order to attain a healthy life in the world of medicine but in the world of engineering temperature is either conserved for the purpose of effective work or release not to damage the job. The need to measure and quantify the temperature of something started around 150 AD when Galen determined the 'complexion of someone based on four observable quantities. The actual science of 'thermometry' did not evolve until the growth of the sciences in the 1500's the first actual thermometer was an air-thermoscope described in Natural Magic (1558, 1589), which all led to the development of thermometer. The first calibrated thermometer was the liquid in glass thermometer which was later divided into mercury in glass thermometer and alcohol in glass thermometer. During the invention of this thermometer some facts were not in place which led to their disadvantages and with the aid of technological advancement digital thermometer came into existence. Microcontroller based temperature measurement in today's environment encompasses a wide variety of needs and applications. To meet this wide array of needs the process controls industry has developed a large number of sensors and devices to handle this demand. In this project we will be using LM35 temperature sensors thus , will be able to understand the concepts and use of the LM35 sensor all together . In advancement in technology, digital thermometers can be added to home automation utilises, IOT service for medical records, industrial jobs and many more.

1.1 LITERATURE REVIEW

Literature review is an assignment of previous tasks done by some authors and collection of information or data from research papers published in journals to progress our task. It is a way through which we can find new ideas, concept. There is a lot of literature published before on the same task; some papers are taken into consideration from which idea of the project is taken. [1].

Microcontroller can be regarded as a single-chip special-purpose computer dedicated to executing a specific application. As in general purpose computers, a microcontroller consists of memory (RAM, ROM, and Flash), I/O peripherals, and processor core. However, in a microcontroller, the processor core is not as fast as in a general purpose-computer, the memory size is also smaller. Microcontroller has been widely used in embedded systems such as, home appliances, vehicles, and toys. There are several microcontroller products available in the market, for example, Intel's MCS-51 (8051 family), Microchip PIC, and Atmel's Advanced RISC Architecture (AVR). We mention Atmel ATmega8535 and LM35 temperature sensor in this project.

CHAPTER 2

EXISTING SYSTEM OF THERMOMETERS

2.1 Thermometers

A thermometer is a device used to measure the temperature of any particular device or living body and displays the reading. A thermometer scale can be in Fahrenheit or Celsius.

2.1.1 Conventional thermometers used earlier are

1. Bulb or Mercury Thermometers

These thermometers consist of a sealed glass tube with a bulb-like glass container at the end. It works on the principle that liquids expand on getting heated. However, a disadvantage of these thermometers is that they can measure temperature only up to a certain extent.



Fig: 1 :Mercury Thermometer

2. Bimetallic Thermometers:

These thermometers consist of two metals joined together and as these metals get heated, they get expanded at different rates causing the bending of either of the metals. This bimetallic strip is attached to a dial with a calibrated temperature scale to indicate the

readings. However, these systems are also easily prone to breakage. The calibration is not accurate and can change easily.

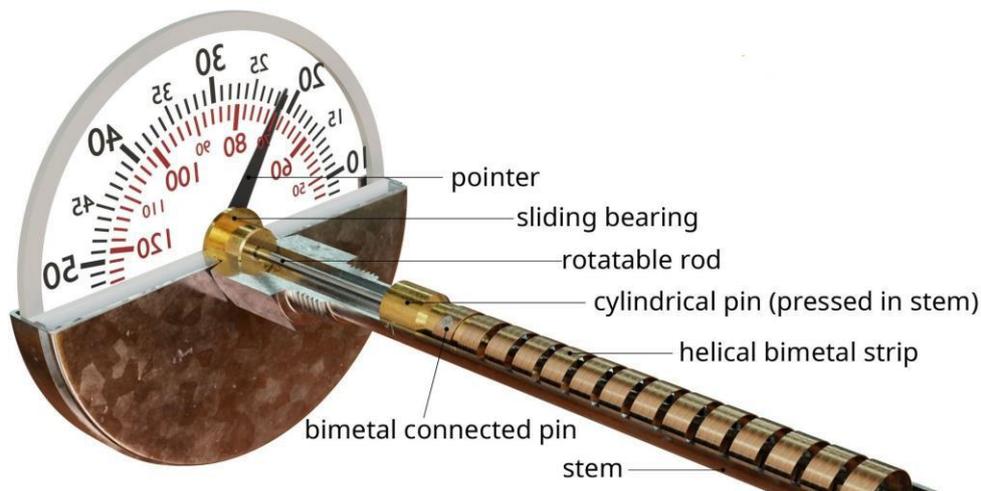


Fig 2: Bimetallic Thermometers

2.12 Digital Thermometer

It consists of a thermistor to sense the temperature and an electronic display of the temperature. Digital thermometers are used orally, rectally, or under the arm. It can read the temperature from 94°F to 105°F.



Fig 3 : Digital Thermometer

Principle of Working:

The digital thermometer basically consists of a sensor that measures the change in resistance due to heat and converts this change in resistance to temperature. It relies on the principle that

the electrical resistance of metal changes with temperature. All the sensors work by producing a resistance, current or voltage in reaction to a change in temperature. These changes are referred to as analogue output signal.

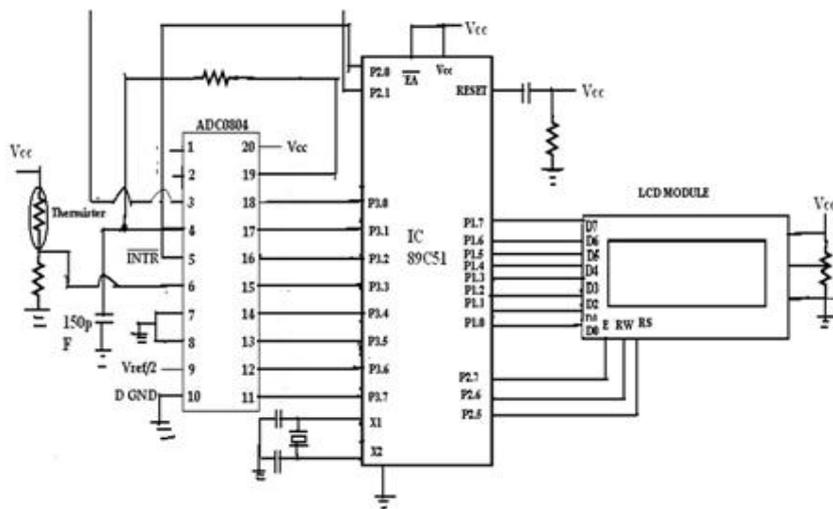


Fig 4: Digital Thermometer Circuit

2.12.1 Digital Thermometer components:

1. Battery: It is a button cell LR41 battery made up of metal and provides around 1.5V supply to the thermometer.
2. Body: The body of the thermometer is made up of hard plastic and is 100.5mm long and its width varies from bottom to top, with the bottom being thinner.
3. Thermistor: It is a semiconductor material made up of ceramic and is used to sense the temperature. It is placed at the tip of the thermometer by binding with epoxy and is enclosed inside a cap made up of stainless steel.
4. LCD: It is the display of the thermometer and measures around 15.5mm long and 6.5mm wide. It displays the reading for 3 seconds and then starts flashing indicating the next temperature to be measured.
5. Circuit: It consists of an ADC and a microcontroller along with some passive components.

2.12.2 Modern Available Digital Thermometers:

1. Digital Thermometer ref ECT-1: It measures temperature from 32°C to 42°C with an accuracy of 0.1°C. It is used mainly in medical applications.

2. Digital Thermometer Model Number: EFT-3: It measures temperature from 50°C to 125°C. It is used to measure the temperature of solid and liquid food

3. Thermolab digital thermometer IP65: It measures temperature range from 50 to 200 °C with an accuracy of +/-1°C.

2.2 Advantages of Digital Thermometers:

- Accuracy: The temperature reading doesn't depend on scale reading and instead shown directly on the display. Hence temperature can be read exactly and accurately.
- Speed: Digital thermometers can reach a final temperature in 5 to 10 seconds compared to conventional thermometers.
- Safety: Digital thermometers don't use mercury, hence the hazards of mercury are eliminated in case the thermometer breaks.
- Strong: The thermometer doesn't need to be shaken for the proper mercury level, hence the risk of the tube getting broken is eliminated.

2.3 Applications of Digital Thermometer:

- Medical Applications: The digital thermometers are used to measure human body temperature around 37°C. These thermometers are mostly probe type or ear type. It measures oral, rectal, and armpit body temperature.
- Marine Applications: Digital thermometers with a high-temperature exhaust gas sensor as the temperature sensor can be used in marine applications for measuring the local temperature.
- Industrial Applications: Digital thermometers are also used in power plants, nuclear power plants, blast furnaces, shipbuilding industries, etc. They can measure temperature from -220°C to +850°C

CHAPTER 3

PROPOSED SYSTEM

The proposed system is to design a Digital Thermometer using Arduino and LM35 Temperature Sensor that is more accurate, precise, cost effective and efficient compared to the existing system. In the proposed system, digital temperature sensor with Arduino Uno is used to control the whole process. Temperature measurement in today's industrial environment encompasses a wide variety of needs and applications. Industry has developed a large number of sensors and devices to handle this demand. An LM35 temperature sensor is used for sensing environment temperature which gives 1 degree temperature on every 10mV change at its output pin. The measured temperature will be directly displayed on a 16*2 LCD. Here LM35 is capable of reading the temperature in Centigrade scale. The output voltage of the sensor is directly proportional to temperature in Centigrade scale. Also there is no need of physical contact to measure temperature. The work is accomplished by proper mounting of the circuit and execution.

3.1 Advantages of the system

The LM35 series are precision integrated-circuit temperature devices that have an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 sensor has low-output impedance and precise inherent calibration which makes interfacing to readout or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies and most suitable for remote applications. It is easily applied in the same way as other integrated-circuit temperature sensors. Glue or cement the device to a surface and the temperature should be within about 0.01°C of the surface temperature. Typically operates from 4 to 30 volts and draws only 60 µA from the supply, and has a very low self-heating of less than 0.1°C in still air. We can monitor temperature or can make a power cut off when heat exceeds above limits using this digital thermometer and can be used in multiple ways. The small size of the sensor makes it useful for a wide range of application. The LM35 is a very popular sensor hence its very easy to use and has varied applications. It does not need any additional circuit to be used. It is powered directly from a 5V source and delivers an analog output between 0V to 1.5V. This analog voltage can be read by the ADC from a microcontroller like PIC or Arduino, Can be used to measure skin temperature and also to measure liquids

temperature but covering the pins with water proof materials, can be used in transportation vehicles to determine the icing conditions of the road. Based on the readings of the thermometer, the air conditioning systems, heating and cooling systems can be controlled either manually or automatically. Sensor is small so it can be used in a wide variety of applications viz thermometers, thermostats, monitoring systems, home automation utilises, IOT service for medical records, industrial jobs also in restaurants and schools.^[2]

3.2 ADVANTAGES AND ECONOMIC IMPORTANCE OF DIGITAL THERMOMETER:

- Digital thermometer can accurately take, decide and measure temperature with the aid of a temperature sensor and digital display.
- Digital thermometer is easier to read compare to glass thermometer
- Digital thermometers are fast, accurate and convenient for use.
- In digital thermometers using Arduino UNO and LM35 the temperature is calculated by converting it from volt to Celcius , making it more accurate.
- Digital thermometer has a wide range of applications, it is usually applied to measure gas, liquid and solid temperature. In numerous fields, it can be applied in several areas such as the Hospital, restaurant and schools.

CHAPTER 4

OVERVIEW OF COMPONENTS

The following table shows the hardware and software components required to design the room model of the proposed system of digital thermometer.

Hardware components	Software components
<ul style="list-style-type: none">● Arduino UNO R3 Development Board● LM35 Analog Temperature Sensor● LCD Display● 10k Potentiometer● 2 Breadboards● Connecting wires● Personal computer or laptop	<ul style="list-style-type: none">● Arduino IDE(Integrated Development Environment)for arduino board programming version-1.8.14.0

Table 1.0 : Hardware and software components

4.1 Hardware specifications

These are the hardware components used to implement the proposed system of Digital thermometer :-

4.11 ARDUINO UNO R3

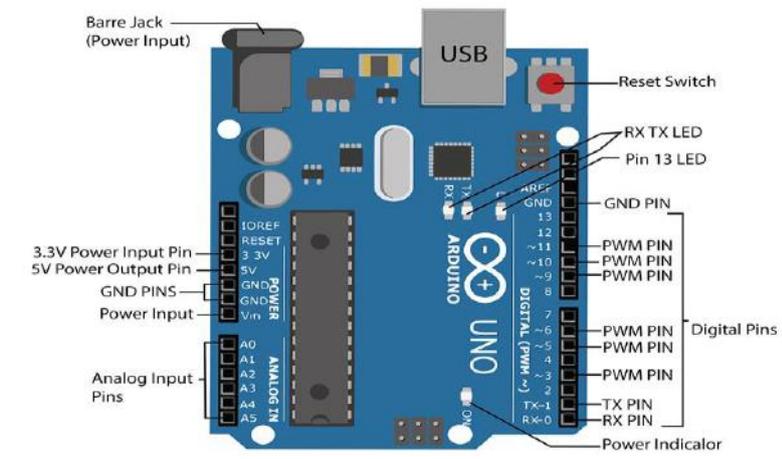


Fig 4.1 Arduino Board

Arduino UNO is a largely and most widely used microcontroller based on ATMEGA328P, which was developed by Arduino.cc. The board has both the set of digital and analog input/output pins. The board contains 14 digital pins and 6 analog pins. It is programmable with Arduino IDE(Integrated development environment)based on the programming languages,C and C++. It can be powered by the USB cable or by an external battery. The main advantage of using arduino UNO is that you can directly load the programs into the device without the need of a hardware programmer to burn the program.^[3]

Features Of Arduino Uno Board Microcontroller ATmega328.

- Operating Voltage 5V
- Input Voltage (recommended) 7-12V Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PW output)
- Analog Input Pins6 DC Current per I/O Pin 40 mA

- Linear + 10-mV/°C Scale Factor
- 0.5°C Ensured Accuracy (at 25°C)
- Rated for Full -55°C to 150°C Range
- Suitable for Remote Applications
- Low-Cost Due to Wafer-Level Trimming
- Non-linearity Only $\pm 1/4^\circ\text{C}$ Typical
- Low-Impedance Output, 0.1 Ω for 1-mA load
- Less than 60- μA Current Drain
- Operates from 4 V to 30 V

WORKING:

LM35 output voltage is proportional to centigrade/Celsius temperature. LM35 Celsius/centigrade resolution is 10mV. 10mV represents one degree centigrade/Celsius. So if LM35 outputs 100mV the equivalent temperature in centigrade/Celsius will be $100/10 = 10$ centigrade/Celsius. LM35 can measure from -50 degree centigrade/Celsius up to 150 degree centigrade/Celsius.

Arduino analog pin is used to read the analog output signals from the sensor. The circuit diagram of the project is given below. To Pin#1 of LM35 apply 5V, make Pin#2 ground, and the third one the middle pin is the output pin. It gives a voltage signal that is actually the temperature of the particular place.

Note: LM35 is an absolute temperature sensor. It can only measure the temperature of the surroundings within the circle of between 100 to 500 feet . So if you are using the internet and you are matching your temperature reading from the one that is given for your city on a weather forecast site then your reading will not be the same as theirs. It will be near but not the same.

LM35 TEMPERATURE SENSOR VOLTAGE TO TEMPERATURE CONVERSION

Now one of the most difficult thing is how to convert the voltage generated/output by the LM35 at output in Celsius or Fahrenheit scales. Well this needs you to first go through the data sheet of the temperature sensor and know about the characteristics of the sensor.

LM35 Output temperature in Celsius form. It Increments the output by 1 on every 10 mV change in temperature.

- when the sensor outputs 500 mv voltage, the temperature in Celsius is 50 degree Centigrade.
- For 400 mV output temperature in Celsius is 40 degree centigrade.
- For 600 mV the temperature is 60 degree Celsius.

4.13 LCD DISPLAY

16×2 LCD is a basic 16 character by 2 line display Yellow/Green Backlight. Utilises the extremely most common HD44780 parallel interface chipset (datasheet). Even more, it has JHD162A Compatible Pinout Diagram, and Command Interface code is freely available. Finally, You will need 7 general I/O pins (If used in 4-bit Mode) to interface to this LCD screen. It also includes an LED back-light



Fig 4.3 LCD display.

Features of 16×2 Display LCD:

- Commonly Used in Student Project, College, copiers, fax machines, laser printers, industrial test equipment, networking equipment such as routers and storage devices
- LCD display module with Green/Yellow Backlight
- SIZE: 16×2 (2 Rows and 16 Characters per Row)
- Can display 2-lines X 16-characters
- Operate with 5V DC

- Wide viewing angle and high contrast
- Built-in industry standard HD44780 equivalent LCD controller

4.14 10K POTENTIOMETER

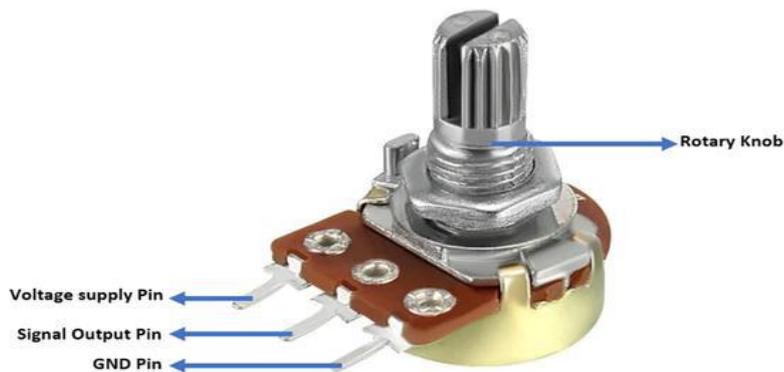


Fig 4.4 10K Potentiometer

These potentiometers are also commonly called a rotary potentiometer or just POT in short. These three-terminal devices can be used to vary the resistance between 0 to 10k ohms by simply rotating the knob.

4.15 BREADBOARD

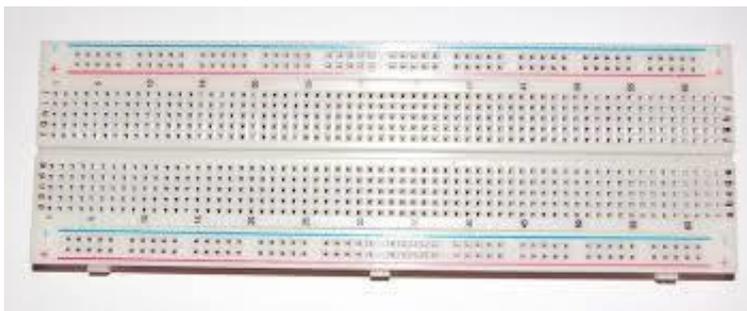


Fig 4.5 Breadboard

A Breadboard is a construction base for prototyping of electronics. The word referred to a literal breadboard , a polished piece of wood used for slicing bread. Later solderless breadboards became available which means it is reusable and this reason makes it popular among students for many projects. The bread board consists of clips which are called tie or contact points, the clips will be maintaining a gap of 2.54mm between each one of them. They are connected from one pin to another using metal strips.

4.2 Software specifications

The software needed to implement digital thermometer using an Arduino and LM35 temperature sensor is Arduino IDE , or Integrated Development Environment ,version-1.8.14.0.The software is downloaded and installed on the PC or laptop. This is an open source software that makes it easy to write code to Arduino Uno.^[6] The programs written in this IDE are called sketches. The software can easily be downloaded from the official website ,www.arduino.cc. The software of the Arduino is well-suited with all kinds of in operation systems like Linux, Windows, and Macintosh, etc.Some of the basic functions of Arduino technology are,

- void setup()-It is technically a function that you create at the top of each program. Inside the curly brackets is the code that you want to run one time as soon as the program starts running.
- Void loop()-This is where the bulk of the Arduino sketch is executed
- digitalRead()- It reads the digital value of the given pin.
- digitalWrite()-It is used to write the digital value to the given pin.
- analogRead()-It reads the analog pin and returns the value.
- analogWrite()-It is used to write the analog value to the given pin.
- pinMode()- It is used to set the pin to I/O mode.

- `Serial.begin(9600)`- It is used to set the beginning of serial communication by setting the rate of bit.
- `Serial.println()`-It is used to print any message, any value of a variable or the values returned by the functions on the serial monitor, which is a screen that displays such information for the user.^[6,8]

Given below are the steps to upload a sketch to the arduino board:-

Step 1:Enter the code in the arduino IDE.

Step 2:Compile the program and correct the syntax errors.

Step 3:Connect the Arduino using the USB cable.

Step 4:Select the port.

Step 5: Choose the upload option to upload the sketch to the arduino UNO.



Fig 4.6:Arduino IDE software

CHAPTER 5

METHODOLOGY

5.1 CONSTRUCTION

Digital thermometer using an arduino uno board and LM35 temperature sensor is constructed in the following steps:

1. Interfacing of LM35 with arduino UNO

Output of the temperature sensor LM35 is given to the analog channel of the A1 of Arduino UNO for sensing real time temperature.

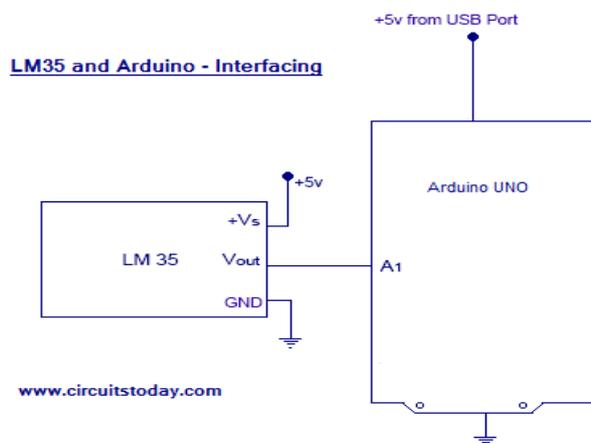


Fig 5.1 LM35 and Arduino interfacing

2. Interfacing arduino with LCD

Interfacing of Arduino with LCD is as shown in figure 5.2. Circuit diagram for Arduino based digital thermometer is shown in the figure. Here the 16x2 LCD unit is directly connected to Arduino in 4-bit mode. Data pins of LCD, namely RS, EN, D4, D5, D6, D7 are connected to Arduino digital pin number 7, 6, 5, 4, 3, 2. A temperature sensor LM35 is also connected to Analog pin A0 of Arduino, which generates 1 degree Celsius temperature on every 10mV output change at its output pin.^[7]

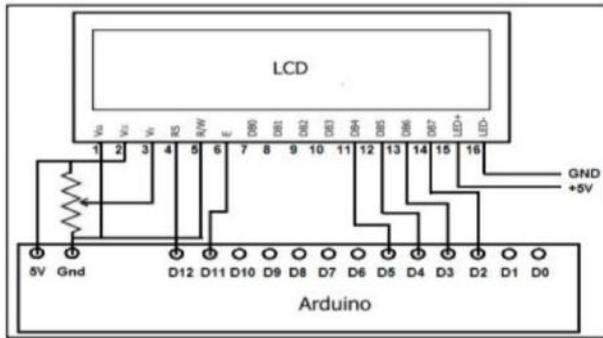


Fig 5.2 Arduino LCD circuit

5.2 DIGITAL THERMOMETER USING ARDUINO UNO , LM35 AND LCD CIRCUIT

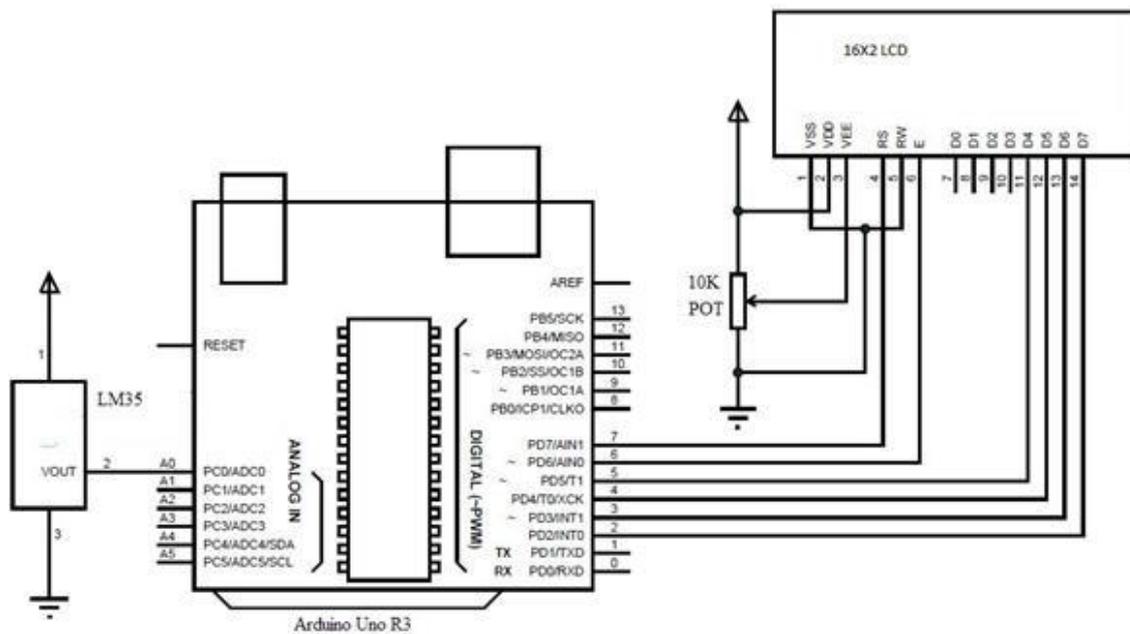


Fig 5.3 Circuit diagram for digital thermometer using Arduino UNO, LM35 and LCD

- Connect LCD PIN 1 to Ground and PIN 2 to Supply respectively.
- Connect LCD PIN 3 to the 10K Potentiometer and connect the rest of the terminals to the ground.
- Connect LCD PIN 15 to Ground and PIN 16 to Supply respectively.
- Connect LCD PINS D4,D5,D6 and D7 to PINS 5 - 2 of the Arduino.
- Connect LCD PIN 4(RS) to PIN 12 of the Arduino.

- Connect LCD PIN 5(RW) to Ground.
- Connect LCD PIN 6(E) to PIN 11 of the Arduino.
- Attach the LM35 to the Bread Board.
- Take the output of the LM35 i.e. PIN 2 of the LM35 and connect it to the Analog Input Ao of the Arduino.
- The Rest of the Connections made are to connect the Two Breadboards together.

5.3 LM35 VOLTAGE CONVERSION TO TEMPERATURE FORMULA / EQUATION DERIVATION FOR ARDUINO

LM35 Celsius/centigrade resolution is 10Mv

- Arduino analog pins can measure up-to +5 volts OR the voltage on which it is working normally +5 volts.
- The Arduino analog pin resolution is 1023 starting from 0. On +5 volts input it counts to 1023.
- LM35 max voltage output is 1500mV(At 150 degree centigrade). 1500mV is equal to $1500/1000 = 1.5$ volts. So LM35 at max outputs 1.5 volts.
- Arduino analog pin count for 1.5 volts equals to $(1.5 / 5) * 1023 = 307.5$. At +5 volts it's 1023 and at 1.5 volts it's 307.5.
- New Arduino-LM35 Resolution = $307.5 / 150 = 2.048$. Now if the arduino analog pin counts 2.048 it is equal to 1 degree change in centigrade/Celsius temperature of LM35.

5.4 CODING

The code for Temperature Measurement using LM35 is simple. First we include a library for the LCD unit and then we define data and control pins for the LCD and temperature sensor. After getting analog value at an analog pin we read that value using the analog read function and store that value in a variable. And then convert the value into temperature by applying the below given formula.

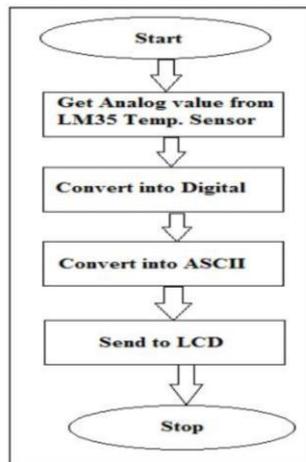


Fig 5.4 Software algorithm of arduino uno microcontroller

The temperature condition at any instant as sensed by the LM35 is displayed on a Liquid Crystal Display (LCD). To do this the Arduino UNO is programmed to copy the output. of the ADC (which is inbuilt ADC) and convert the result to ASCII then transfer to the LCD to be displayed. The flow chart in the figure shows the software algorithm of the Arduino UNO microcontroller.

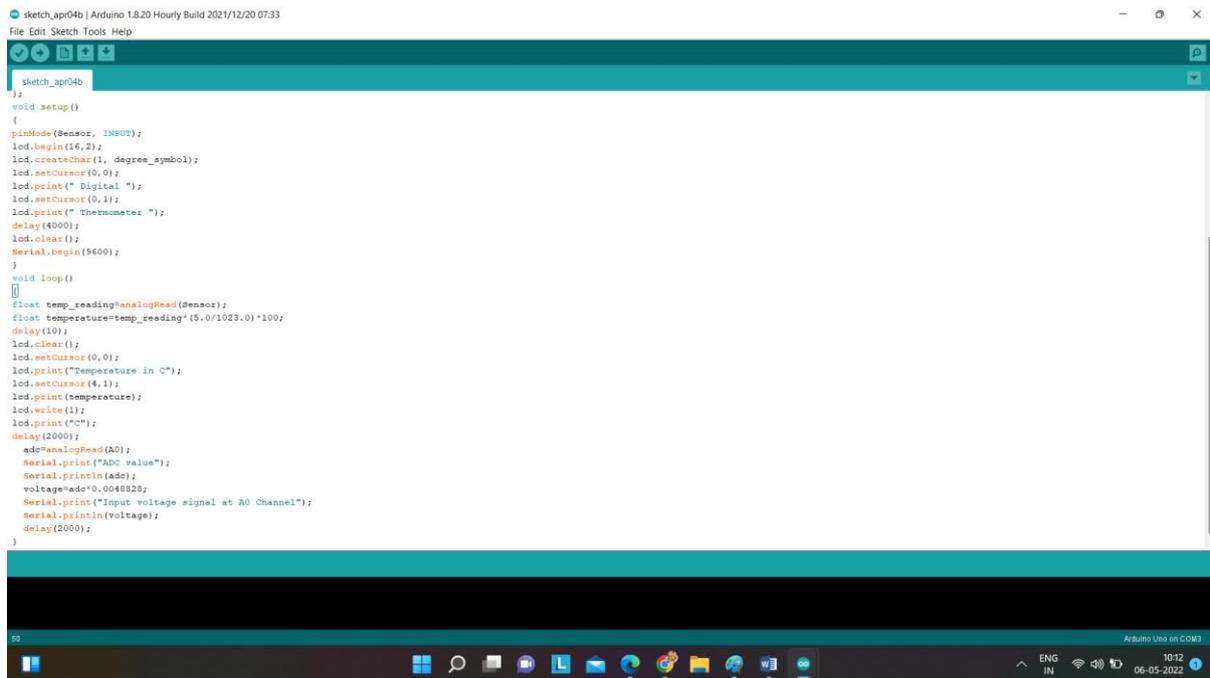
The code that we used is given below:

```

sketch_apr04b | Arduino 1.8.20 Hourly Build 2021/12/20 07:33
File Edit Sketch Tools Help

sketch_apr04b
#include <liquidcrystal.h>
LiquidCrystal lcd(12,11,5,4,3,2);
const int Sensor = A0;
int adc=0;
float voltage=0;
byte degree_symbol[8] =
{
  0b00111,
  0b00101,
  0b00111,
  0b00000,
  0b00000,
  0b00000,
  0b00000,
  0b00000
};
void setup()
{
  pinMode(Sensor, INPUT);
  lcd.begin(16,2);
  lcd.createChar(1, degree_symbol);
  lcd.setCursor(0,0);
  lcd.print(" Digital ");
  lcd.setCursor(0,1);
  lcd.print(" Thermometer ");
  delay(4000);
  lcd.clear();
  Serial.begin(9600);
}
void loop()
{
  float temp_reading=analogRead(Sensor);
  float temperature=temp_reading*(5.0/1023.0)*100;
  delay(10);
  ...
}
  
```

Fig 5.5 Programme code(a)



```
sketch_apr04b | Arduino 1.8.20 Hourly Build 2021/12/20 07:33
File Edit Sketch Tools Help
sketch_apr04b
}
void setup()
{
  pinMode(Sensor, INPUT);
  lcd.begin(16,2);
  lcd.createChar(1, degree_symbol);
  lcd.setCursor(0,0);
  lcd.print(" Digital ");
  lcd.setCursor(0,1);
  lcd.print(" Thermometer ");
  delay(4000);
  lcd.clear();
  Serial.begin(9600);
}

void loop()
{
  float temp_reading=analogRead(Sensor);
  float temperature=temp_reading*(5.0/1023.0)*100;
  delay(10);
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Temperature in C");
  lcd.setCursor(4,1);
  lcd.print(temperature);
  lcd.setCursor(11);
  lcd.print("C");
  delay(2000);
  adc=analogRead(A0);
  Serial.print("ADC value");
  Serial.println(adc);
  voltage=adc*0.0048828;
  Serial.print("Input voltage signal at A0 Channel");
  Serial.println(voltage);
  delay(2000);
}
Arduino Uno on COM3
10:12
ENG IN 06-05-2022
```

Fig 5.6 Programme code(b)

5.5 WORKING

A high precision digital thermometer is designed in this project. It is constructed with simple components like Arduino, LM35 temperature sensor and an LCD display. The working of the circuit is very simple and is explained below.

Once the connections are completed and the coding is done, the USB pin of the Arduino UNO is connected to a computer. The temperature sensor i.e. LM35 continuously monitors the room temperature and gives an analogue equivalent voltage which is directly proportional to the temperature. This analogue data is given to Arduino through A0. As per the code written, the Arduino converts this analogue voltage value to digital temperature readings. This value is displayed on the LCD. Our Arduino Uno has an in-built 10-bit ADC (6 channel). We can make use of this inbuilt ADC of Arduino to convert the analog output of LM35 (or other device/sensor) to digital output. As Arduino Uno has a 6-channel inbuilt ADC, there are 6 analog input pins numbered from A0 to A5. You can connect an analog output of LM35 to any of these analog input pins of an Arduino but we are using A0 for now.

The rate of change of temperature capture can be programmed in the code. The output displayed on the LCD is an accurate reading of temperature in centigrade.^[8]

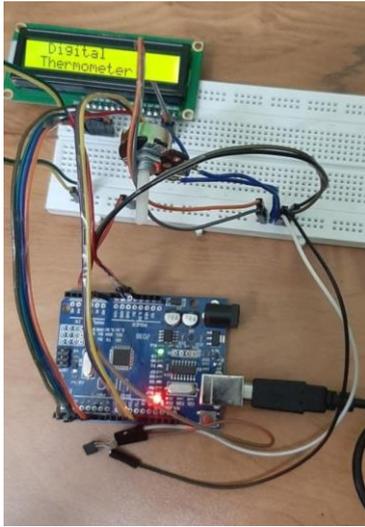


Fig 5.7 Constructed Circuit (a)

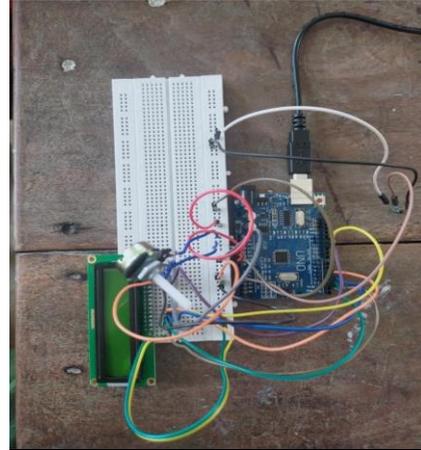


Fig 5.8 Constructed Circuit(b)

5.6 OBSERVATION

If we need to measure the temperature of a specific object, for example if we need to measure the temperature of the soldering iron, we have to place it on the tip of the LM35 temperature sensor, now we will be able to see the increase in temperature on the LCD screen. Similarly, if we remove the soldering iron from the tip of the LM35 temperature sensor, we will be able to observe the decrease in temperature on the LCD screen.

Actual Temperature	Temperature using the constructed Digital Thermometer	Difference	Percentage Error
36.9	36.1	0.8	2.17%
35.4	34.2	1.2	3.39%
37.7	36.6	1.1	2.92%
39.2	38.3	0.9	2.29%

37	35.2	1.8	4.86%
37.6	36.3	1.3	3.45%

Table 5.1 Observation

The experimental observation shows the difference between constructed digital thermometer and the actual temperature. Also the percentage error of corresponding temperatures also identified.

SUBSTITUTION:

Difference = Actual temperature- temperature measured using the constructed digital

$$\text{Thermometer} = 36.9 - 36.1 = 0.8$$

Percentage Error = (Difference/ Actual Temperature)*100

$$= (0.8/36.9) * 100 = 2.17$$

Average Percentage Error = (2.17+3.39+2.92+2.29+4.86+3.45)/6

$$= 3.18\%$$

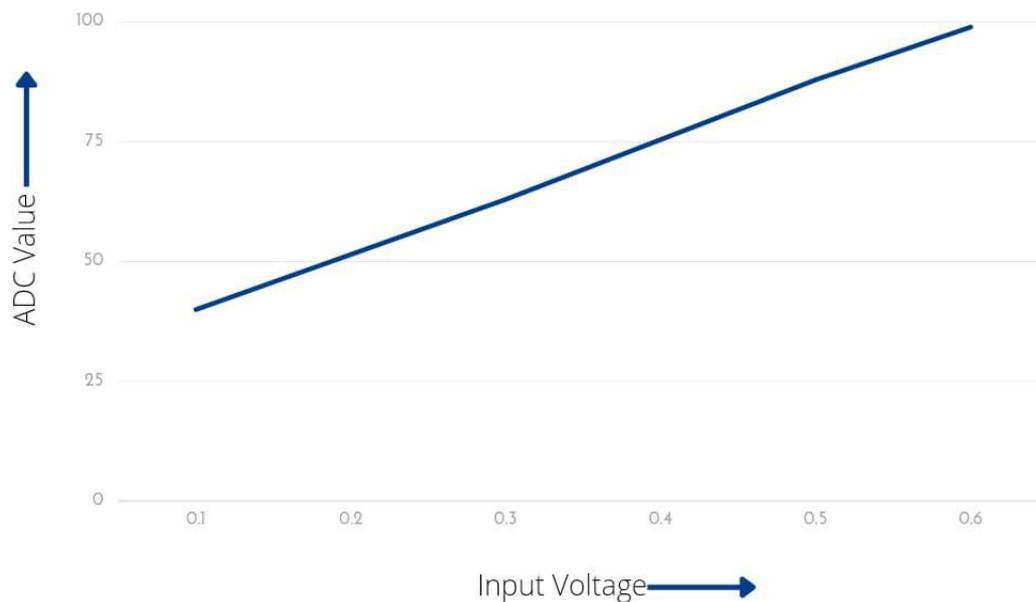
ADC Values

ADC value	Input Voltage
40	0.1955
63	0.3079
88	0.4301
99	0.4839
155	0.7576
177	0.8651

Table 5.2 ADC Value and Input Voltage

ADC vs VOLTAGE

The given graph plotted contains ADC value in Y axis and input voltage in X axis. An analogue to digital converter takes a snapshot of an analogue voltage at one instant in time and produces a digital output code which represents this analogue voltage.



5.7 EXPERIMENTAL RESULT

Practical test has been conducted to evaluate the real time performance of the constructed temperature sensor. The temperature using the constructed digital thermometer is noted. And the difference between actual temperature and using the constructed Digital thermometer is identified. The percentage error is calculated and the average percentage error is found out.

Average Percentage Error = 3.18%

5.8 FUTURE SCOPE OF THE PROPOSED SYSTEM

Thermometers are used in industries, weather studies, medicinal fields and scientific research. Measuring temperature is an important part of many applications. Maintaining precise temperatures in storage rooms, laboratories, incubators, etc. is of high priority.. Now a days, the use of digital thermometers is increasing as they are accurate and safe to use.Digital thermometers can furthermore be advanced into home automations, use in cold rooms, food temperature reserve and so on.Due to its accuracy, preciseness and low cost the proposed system can be used in many applications.

CONCLUSION

From the experimental results we can conclude that the proposed system is highly accurate and nullifies the effect of external parameters. Digital thermometer is a less hazardous instrument used for taking/recording temperature from a specific body. It works just like a liquid or glass thermometer but in a different way because of its accuracy in reading. LM35 sensor is a very handy component for making projects. The low price and accuracy reading make it popular in making projects. With the aid of advancing technology in the past few years, Digital thermometers will be advanced enough to end the error due to parallax reading in liquid in glass thermometers and also comfort the easy access and accurate reading of temperature.

REFERENCES

- [1]Oyebola, B. and Toluwani, O., 2017. LM35 Based digital room temperature meter: a simple demonstration. *Equatorial Journal of Computational and Theoretical Science*, 2(1).
- [2] Changela, B., Parmar, K., Daxini, B., Sanghani, K. and Shah, K., 2016. Digital thermometer: design & implementation using arduino UNO based microcontroller. *IJSRD-International Journal for Scientific Research & Development*, pp.1-2.
- [3] Bajaj, K.A. and Mote, T.S., 2013. Review on intelligent street lightening system. . *International Journal of Science and Research (IJSR)*.
- [4]<https://www.electronicshub.org/arduino-based-digital-thermometer/>
- [5]<https://www.electronicwings.com/sensors-modules/lm35-temperature-sensor>
- [6]<https://www.elprocus.com/digital-thermometers/>
- [7]<https://www.circuitschools.com/build-digital-thermometer-using-lm35-and-arduino/>
- [8]<https://how2electronics.com/digital-thermometer-arduino-lm35-temperature-sensor/>

**SOCIETY AND FEMALE RHETORICS OF DISABILITY: A
FEMINIST DISABILITY STUDIES PERSPECTIVE ON
*ONE LITTLE FINGER AND NO LOOKING BACK***



*Project submitted to St. Teresa's College (Autonomous) in partial fulfilment of
the requirement for the degree of BACHELOR OF ARTS in English Language
and Literature*

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DECLARATION

I hereby declare that this project entitled “Society and Female Rhetorics of Disability: A Feminist Disability Studies Perspective on *One Little Finger* and *No Looking Back*” is the record of bona fide work done by me under the guidance and supervision of Ms. Vinitha John, Assistant Professor, Department of English.

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March 2022

Ernakulam

CERTIFICATE

I hereby declare that this project entitled “Society and Female Rhetorics of Disability: A Feminist Disability Studies Perspective on *One Little Finger* and *No Looking Back*” by Nandita M S is a record of bona fide work carried out by her under my supervision and guidance.

Ms. Vinitha John

Department of English

Ernakulam

St Teresa’s College (Autonomous)

March 2022

Ernakulam

**SOCIETY AND FEMALE RHETORICS OF DISABILITY:
A FEMINIST DISABILITY STUDIES PERSPECTIVE ON
*ONE LITTLE FINGER AND NO LOOKING BACK***

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Register Number: AB19ENG059

2019-2022

Supervising Teacher: Ms. Vinitha John

Disabled people endure several challenges in society. Being a disabled person by itself is a tough experience, in addition to that they are frequently ignored and marginalised. But among them the condition of women is particularly deplorable as they face discrimination both as a woman and as a disabled. The project titled 'Society and Female Rhetorics of Disability: A Feminist Disability Studies Perspective on *One Little Finger* and *No Looking Back*' analyses the lives of two disabled women through the lens of feminist disability theory. The study examines the notion of disability, the challenges they face and the role society plays in all of this. By focusing on the autobiographical books, *One Little Finger* and *No Looking Back* the study explores the myriad challenges society impose on the lives of disabled women and the dilemmas they confront. The study also emphasises the need of understanding disability and disabled people, as well as working together to create an inclusive environment for them.

ACKNOWLEDGEMENT

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Nandita M S

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Introduction

Disability is a mental or physical condition that restricts a person's senses, movements or activities. It is a condition of the body or mind of a person in which he or she finds it difficult to perform certain activities and interact with the outside world.' Disabled' or 'disability' is a term with which we are familiar from an early age. But do we really know what disability is? Other than the minimal knowledge that we had acquired from our school education, do all people really know the various situations and struggles through which a disabled individual goes through?

Disability is not only what we have read in those school books. The situations which a disabled person goes through and the experiences that they have had are way beyond our thoughts. Many things which are trivial for us, which we take for granted, are great and incredible for them. Only by encountering these disabilities can one comprehend their severity. All humans abled or disabled should have a basic idea about disability and disabled people.

Disability is a part of being human. Some people are disabled temporarily, while others are forever. Some are born with it, but sometimes it may be caused due to an accident or due to longstanding conditions. There are many types of disabilities. Some of it affects a person's vision, movement, hearing, communicating, learning, mental health and even social relationships. Sometimes people with disabilities are referred to as a single population, but in an actual sense, they constitute a diverse group of people with different needs and experiences.

Disability is an issue that is widely misunderstood by people. Sometimes in movies and stories, disabled characters are presented as second fiddle to the able-bodied characters. At times they are even presented as negative or evil characters. Disability is disregarded or pushed to the margins in many matters. They are deprived of the pleasure of enjoying a normal life. Nowadays

we call them "differently-abled". This term recognises the talent and value in everybody and treats them equally. Disabled persons confront numerous difficulties and obstacles throughout their lives.

The situation of disabled women and girls is significantly worse among the disabled. Their situation is more critical. They are more vulnerable as a result of their disabilities. They experience "double discrimination", both on the basis of their gender and disability. Western thought brought the notion that femaleness and disability are defective from a valued standard. In a patriarchal society femininity and disability are intertwined. Aristotle defined women as "mutilated males" having "improper form". Iris Marion Young in her book *Throwing Like a Girl and Other Essays in Feminist Philosophy and Social Theory* claims that "women in a sexist society is physically handicapped" (153). There is a supposition that female, disabled, and dark bodies are dependent, incomplete, vulnerable, and incompetent bodies. Femininity and race are categorised as performances of disability. Women and the disabled are portrayed as helpless, dependent, weak, vulnerable, and incapable bodies. Often women, people with disabilities or appearance impairments, ethnic Others, gays and lesbians, and people of color are victims of cruelties like infanticide, selective abortion, hate crimes, mercy killing, assisted suicide, honor killings, neglect, etc. These discriminatory practices are legitimated by systems of representation. They shape the material world by presetting the roles for women. The bodies of disabled women have been subjected relentlessly to what Foucault calls "discipline". They have been imagined as medically abnormal—as the quintessential sick ones.

The project focuses on the lives of two disabled Indian women, Malini and Shivani, who overcame their obstacles and achieved success. Malini Chib and Shivani Gupta are two great Indian women, who have proved to be an inspiration to a lot of people through their lives.

Despite all their odds, they both have proved successful. They showed indomitable willpower in the face of hardships. *One Little Finger* and *No Looking Back* are books that present their stories before us.

Malini Chib is an Indian human rights activist, born in Calcutta, India in July 1966. During the time of her birth she suffered from a loss of oxygen which caused her cerebral palsy. After her birth, her parents moved to England to provide her with better care. There she attended a school which had a great influence on her life. Later the family moved back to India after the birth of her brother Nikhil. In India no school accepted Malini as a student. This resulted in starting 'The Centre for Special Education'. *One Little Finger* is the autobiography of Malini Chib. In this book Malini tells us the story of her heroic battle; the way she fought against the problems, stigmas, prejudices, adversities and stereotypes in the society. Malini completed the book over a period of two years by typing with only the index finger of her left hand.

Shivani Gupta is one of India's best-known access consultants. She is the founder of AccessAbility. In her early twenties, Shivani was just like every girl, enjoying and celebrating her life. It was at the age of 22 that her life changed. She had an accident which caused her spine injury. After the accident, she was paralyzed and then wheelchair-bound. It was after years of pain and struggle, Shivani regained control of her life and her body. Shivani's strong determination helped her to gain acceptance, love and happiness. Then tragedy struck again, newly married Shivani met with another accident. Despite all this Shivani refused to surrender. She had an unconquerable spirit and she always fought for her ambitions. *No Looking Back* is the autobiography of Shivani Gupta. It is a deeply moving and inspiring narrative by Shivani. It is about her struggle to survive the challenges of disability. It also talks about the lack of facilities and problems that she faced as a disabled in India.

The project titled 'Society and Female Rhetorics of Disability: A Feminist Disability Studies Perspective on *One Little Finger* and *No Looking Back*' intends to analyse the lives of disabled people through the lens of feminist disability theory. Four chapters make up the project. Chapter one 'Feminist Disability Studies: An Overview' outlines the theory of Feminist Disability, its evolution and main concepts. The theory aids in a better understanding of the challenges that society imposes on disabled people's lives, as well as how society and societal norms influence them. The chapter discusses the primary claims of the theorist Rosemarie Garland regarding Feminist Disability theory. Chapter two 'Female Experience of Disability in *One Little Finger*' provides an overview and analysis of the book *One Little Finger* by Malini Chib. The chapter delves into how society made Malini feel disabled. As a disabled person, she was treated differently in India and England. She also faced a slew of other difficulties and obstacles. The chapter goes into all of Malini's problems and the part society played in them. Chapter three 'Society's Role in Disablement: Analysis of *No Looking Back*' presents an overview and analysis of Shivani Gupta's book *No Looking Back*. This chapter is concerned with Shivani's difficulties as a disabled person. Shivani also received different responses from India and England. She, too, had to deal with a lot of obstacles. She, too, was disappointed by society's attitude.

Both these women and their lives are a source of great inspiration to all of us. They show us how the ironies of existence can become the fuel for survival. Their lives show us that the crisis in life can become a critical space for further progress. Their lives also make us feel grateful for the various blessings that we have in our lives. Their books also serve as a powerful reminder of our responsibilities towards our fellow beings.

Chapter 1

Feminist Disability Studies: An Overview

According to WHO, 'Disability' is an umbrella term. It covers impairments, activity limitations, and participation restrictions. It is a complex phenomenon. It also considers the interplay between a person's physical characteristics and those of the culture in which he or she lives. There are three main models of disability - the moral, medical and social model. These models provide an external view of how disability is perceived in society. Disability identity theory focuses on the interior personal experience of disability. Disability Studies enhances the understanding of disability. It is an academic discipline which studies various aspects of disability like nature, meaning and its consequences. It incorporates different perspectives. Initially, it focused on impairment, disability, and the distinction between the two. According to this study, disability is a social construct, whereas impairment is mental or physical impairment. Thus came two distinct models of disability - the social and medical. At first, the social model was universally accepted but recently the division between them has been challenged and there is increased interdisciplinary research. Based upon this study, disability is a factor of human experience, not exception.

Critical disability theory is a set of emerging theoretical approaches that analyses disability as a phenomenon that is social, cultural, political, historical and relative. Some call it 'critical disability studies' or 'CDS'. Critical disability theory studies looks at how institutions, cities or societies 'dis-able' people on a systemic and social level. It is a diverse interdisciplinary set of theoretical approaches. It is not a subject-oriented area of study. It scrutinises certain social norms that define certain attributes as impairments. It challenges traditional discourses and assumptions of disability studies. According to critical disability theorists, 'disability' and 'ability'

are fundamentally produced. The theory aims mainly at exposing and analysing ableism. There are many cultural expectations about how human beings should look and act.

Feminism refers to a set of social movements and philosophies aimed at defining and establishing gender equality on political, economic, personal, and social levels. Feminism in some instances lacks in its emphasis on the issues of disabled people. The issue of disability does not appear to be on the feminist agenda as a whole. Many disabled women have mentioned the same. It is at this point that Feminist disability studies becomes more important.

Feminist disability studies encompass more than just study and scholarship on disabled women. While critical disability studies shows how disability is irreducible to bodily impairment, feminist theory shows how gender is irreducible to biological sex. However feminist disability theory cannot be simply understood as a combination of feminism and disability studies. The goal of feminist disability studies is to challenge long-held prejudices about individuals with disabilities. It aims to question our preconceptions about life with a disability. It places the experience of disability in the context of rights and exclusions. Many scholars supported this idea. Rosemarie Garland Thomson and Alison Kafer are two major feminist disability scholars. Through their articles and works, several of these researchers demonstrate how feminist theory and disability studies overlap. The book *Feminist Disability Studies* is an excellent illustration. The book explores and addresses many matters concerning disability and the disabled. In her essay *Integrating Disability, Transforming Feminist Theory*, Rosemarie Garland Thomson has presented them in detail. According to her, feminist disability studies reimagine disability; but to Kim Q hall, "disability studies also reimagine gender" (1). Feminist disability studies do not merely focus on disabled women's experiences in disability studies and feminist theory, but rather transform both. Just like feminist studies, disability studies is now

flourishing in many disciplines like history, literature, religion, theatre and philosophy. Disability studies is also a part of Identity studies. Both disability studies and feminist theory can benefit from each other. They both are comparative and concurrent academic enterprises. Feminist theory examines what we call womanly and the subject position of woman; disability studies examines the identity of the disabled. A feminist disability theory builds on the strength of both. Rosemarie Garland Thomson defines feminist disability studies as an academic field of enquiry. According to her, Integrating disability as a category of analysis and a system of representation deepens, expands and challenges feminist theory.

Feminist disability approach understands the complexities of the cultural history of the body. It goes beyond explicit disability topics such as illness, health, beauty, genetics, eugenics, ageing, reproductive technologies, prosthetics, and access issues by considering the ability/disability system. Feminist disability theory addresses broad feminist concerns like the unity of the category woman, the status of the lived body, the politics of appearance, the medicalization of the body, the privilege of normalcy, multiculturalism, sexuality, the social construction of identity, and the commitment to integration. According to Toni Morrison blackness is an idea that permeates American culture, likewise, disability too, informs our cultural notions of self and other. Like gender, disability also influences different aspects of culture.

As Simi Linton puts it, studying disability is "a prism through which one can gain a broader understanding of society and human experience". It deepens our understanding of gender and sexuality, individualism and equality, minority group definitions, autonomy, wholeness, independence, dependence, health, physical appearance, aesthetics, the integrity of body, community, and ideas of progress

and perfection in every aspect of cultures. A feminist disability theory introduces what Eve Sedgwick has called a “universalizing view” of disability that will replace an often persisting “minoritizing view.” Such a view will cast disability as an “an issue of continuing, determinative importance in the lives of people across the spectrum”. (Garland-Thomson 4)

Disability based on feminist disability studies is not a state of inferiority, inadequacy, excess or misfortune; it is a culturally fabricated narrative of the body. Disability has four aspects: first, as a system that interprets and disciplines bodily variations; second, as a relationship between bodies and their environments; third, as a set of practises that produce both the able-bodied and the disabled; fourth, as a way of describing the inherent instability of the embodied self. Disability is a broad term which includes varied categories as sick, deformed, crazy, ugly, old, maimed, etc. A feminist disability theory denaturalizes disability by challenging the dominant assumption that disability is something that is wrong with someone.

Disabled women are marked and excluded within the larger social class of women. They are often denied many of the privileges of traditional femininity. Cultural stereotypes imagine disabled women as asexual, unfit to reproduce, overly dependent, and unattractive. They are generally removed from the sphere of true womanhood and feminine beauty. Women with disabilities frequently have to fight for recognition of their sexuality and rights to bear children.

Femaleness is not a natural kind of physical or mental deficit or constitutional unruliness, according to feminist theory. Similarly, feminist disability studies challenge our preconceptions that disability is a flaw, a deficiency, or an excess. It takes a social rather than a medical approach in defining disability. It maintains that disability is a cultural interpretation of human

variety, not an intrinsic inferiority, a disease to be cured, or an undesirable quality to be eradicated. To put it another way, it discovers the significance of disability in interactions between bodies and other social and material surroundings.

Chapter 2

Female Experience of Disability in *One Little Finger*

One Little Finger, the autobiography of Malini Chib, tells us the story of her heroic battle, the way she fought against the problems, stigmas, prejudices, adversities and stereotypes in society. The book was published in the year 2011. Malini completed the book over a period of two years by typing with only the index finger of her left hand. In this work, Malini talks about her birth, disability, experiences and thoughts.

Malini has Cerebral Palsy. Cerebral palsy is a term used to describe a set of disorders that affect movement, muscle tone, and posture. Malini explains the reason that led to her having Cerebral Palsy like this:

I was told that my mother was in labour for a lengthy forty- hour period. During the process, the umbilical cord got stuck around my neck, resulting in a lack of oxygen to my brain and a few seconds of that (known by the medical term of anoxia) eventuated in giving me a lifetime of a severe disabling condition (condition not disease!) called Cerebral Palsy. The birth was hugely traumatic, and the paediatrician in charge kept repeating to himself " it was a mistake I should have carried out a caesarean... let's see if she survives... I am not sure if she will survive... at the most 72 hours. (Chib 3)

As a reply to the paediatrician's words, Malini proudly says "I survived" (3). Awareness about disability was uncommon at the time of Malini's birth.

In society, disabled individuals are sometimes mistreated. They, like many other minority groups, are denied equal opportunity in terms of social, political, educational, and physical

opportunities. Many societal conventions and practices intensify their disabilities. Thus society adds substantially to the marginalisation of disabled people. This is evident in Malini's life as well. Malini was influenced by society and its attitudes at various points in her life.

Malini, in *One Little Finger*, talks about the unfavourable experiences she had had in her life being a disabled woman. She discusses her life in both India and England. This demonstrates the disparities in the treatments of disability in India and England. She compares the experiences in both places. She calls her days after coming back to India as "... the darkest period of my life" (Chib 26). Damage to her brain, according to Indian physicians, was irreversible. They even came to the conclusion that there was nothing that could be done in England. She was a vegetable according to them. She was treated as if she was a kid, as if she lacked any capacity of being an abled person ever in her life. During a birthday party, she was left alone as she could not stand or play. The worst thing that can happen to a disabled child, according to Malini, is to be left alone with no one to talk to. When she tried to go out, she was met with blank stares and quiet whispers, all of which made her feel self-conscious. The thought that someone may notice her presence and inquire about her was mortifying to her. One of the basic problems for her while in India, was the lack of accessibility. Even toilets, for people with disabilities, were not accessible. But Malini tried to adjust. In India, she was like a caged bird. She was mostly around older people. She says, "The move back to India was both an end and a beginning. It was the beginning of the Spastics Society but the end of my family"(26). Her parents separated mainly because of the demand of work. They didn't have time for each other and that resulted in divorce. Malini and her brother, Nikhil, remained with their mother. The three struggled a bit. Their father remarried. While sharing this incident, Malini brings up the frequent misconception that disabled children's parents divorce. After returning Malini realised that the situation of ignorance

about disability still continued in India. Malini found difficulties in getting admission to schools, which eventually led to the starting of The Centre for Special Education. Malini calls it the "birth of a movement" (Chib 16). She talked about how her mother and others started Spastics society. Spastics Societies were set up in many places like Bombay, Calcutta, Delhi and Bangalore. Many people came forward to work, to ensure a better education and a life for disabled people. It was because of Malini that her mother thought about such a model. It became a great model which served useful for a large group of people. As a result, Malini became the catalyst for many others' lives to change.

The importance of education cannot be understated. However, disabled persons do not have the same access to education. Malini joined St Xaviers Junior College, Bombay, for her Bachelor's. This was the first time Malini came in contact with a mass of normal students. During this time she faced many challenges. She realised that some people's attitude towards disabled students was not positive. Few even considered disabled students as useless and advised that they should be kept at home. Malini faced difficulties in reaching the classroom. Whenever she passed through a corridor, the Lecturer would stop speaking and the whole class' attention would turn towards her. At first, the professors looked perplexed by hearing her speech. On the first day of college, there was a stunned silence when she entered her classroom. The professor himself looked apprehensive and scared. There were whispers and unsure shuffles. She found it difficult to even say her name. She repeated her name many times. At last, when one of her classmates understood her name and said it loudly in class, Malini was so happy that she had some identity. She was so happy that eighty-eight of her classmates knew her name and that she has a speech problem. All these shows the optimism in her. Later she got some friends. She tried to join her friends in picnics and other small plans. But she was not so successful in it. It is here

she felt being left out. She could not join in dances, gatherings or picnics. Even if she tried she could not become a part of a normal mainstream life because of her disabilities. The process of normalisation was hard for her. She felt bad about her disabilities. Speech was her biggest barrier. She says "anybody not speaking like everyone else would literally be rejected and abandoned" (Chib 54). She realised that she was different and that she was trapped in a dysfunctional body. The social life was so hard that she even thought that her mind was also dysfunctional. She began to doubt herself and her abilities. But she recollected that academically she was treated equally with others. Her mother was a great help to her in education. Malini was not used to the kind of learning practice in India.

Malini discusses her views on special education for disabled children. According to her "being trapped in a special school was detrimental to my education" (25). If she had been at a regular school, she would have observed how her friends interacted and that would have encouraged her to be independent in communication. There is this worldwide debate about whether children with severe disabilities should be exposed to the normal world or not. Some professionals support the special schools for them. But Malini questions this from her own experience. She wonders how the child would develop if he or she is sheltered and kept away from the outside world. According to her, "the disabled child will naturally imitate what he/she sees. I strongly feel that if the child is exposed to a normal environment from a young age, then the child, however severely disabled he/she is, would have a chance to be included and perhaps accepted by his or her peers and would use his/her own intelligence and social networking skills to develop" (25). Being confined in a segregated environment is harmful.

Many people think that disabled persons are sick, defective, and deviant. The general consensus is that such people are unable to participate in or contribute to society and therefore,

need to rely on welfare or charitable organisations. People with disabilities, in the opinion of some, are incapable of doing any major activity in daily life. So many of them are turned down for jobs. After completing her Master's, Malini applied for many jobs and attended many interviews. But the employees were blind to her abilities and instead they concentrated on her disability. This demonstrates how some people feel towards the disabled people and how they behave towards them. Later she met with Professor Armstrong or Felicity, who encouraged her to give lectures about the conditions of a disabled and other matters. Students and academicians were eager to know the inside perspective of a disabled person, from a disabled person. It was a success. Later Malini gets employed as the Senior Events Manager at the Oxford Bookstore in Mumbai. She was very successful in it. She had eminent authors and well-known writers of Bombay responding to her mails, coming to Oxford to talk about their books.

The notions and dreams of love and relationships are restricted to disabled people. Their yearning for love and affection is frequently questioned. They've been ruled out as potential partners. While at Oxford, doing her publishing course there, Malini secretly hoped for a relationship with Zubin, who was once her teacher as well as an active member of the Spastics Society. She enjoyed the different moments with him. But Malini was shocked to hear about his relationship and him being a gay. This impacted her deeply. She was deeply hurt and wept silently. At this point, she explains her desire for a partner. She yearned for all that was normal despite her disabled body. Before also we see her saying,

...I wondered if there would never be a man in my life. Would a man see beyond my body? Would anyone put their arms around me and dance with me? Would anyone kiss me passionately? Would I ever be needed by a man emotionally or

would I always be regarded as a burden for someone to take care of? A silent tear unseen by any human eye trickle-down my face.... (Chib 65)

Malini is seen talking about love and affection in this scene. This is the question she asks the readers- Is it wrong for a disabled individual to desire love?

Disability is considered as a travel constraint. The majority of the time, people with disabilities are not permitted to travel. Even if they do, they are expected to have a carer around. Travelling is something everyone desires. When Malini first started going out on her own, she received a lot of pleasant looks, even if she didn't have a caregiver with her. But there were also instances in which people made her feel uncomfortable. Malini discusses her journey to Goa with her brother, Nikhil. She describes her adventure with zeal and delight. She recounts all of her previous visits in the same manner. This demonstrates her desire to travel and her enthusiasm in doing so.

Malini has also shared some of her views and thoughts. Her little finger was like a powerhouse of strength. Malini discusses a lot about disabilities and disabled women. She says that a disabled woman faces double disadvantage. She also talks about a disabled person being a human being and having the desire and interest like a common man. She says that every disabled person is human and that they also have their own thoughts, desires, feelings, passion and expectations just like any other abled person. She also talks about how different groups of women including women with disabilities are oppressed. She brings up the concept of human interdependence. For the first time, Malini herself accepted her own identity as a disabled woman and was also proud of being one. When she started travelling alone, she felt fantastic.

She met her friends at different places. Malini loved London. She enjoyed her freedom and independence.

She describes ADAPT, including its key goals and progress. ADAPT included both abled and disabled people. They believed that both 'able' and 'disabled' should work together to form an 'inclusive' society where all are welcome and included. They also fought together for the rights of disabled people. She explains some of the incidents showing their might. Malini and ADAPT brought a great change in society and their attitude.

For her, England was a safer place. England provided an atmosphere more friendly than that in India. Malini's father considered England to be superior in medicine and education. Malini calls her early years in England as happy, sunny days, full of love and laughter. After reaching England she received a different approach. Her physical state differed as well. Malini proved herself to be a child having good intelligence. In her IQ test, she even scored one hundred and twenty. She indeed proved the doctors in India wrong. The nurturing, kindness, support and activities that the England schools offered; assisted in the development of Malini. The new approach treated parents differently than they did in India. In England, she had much more acceptance. She could use the roads, shops, buses and other public facilities much more easily compared to India. In England, she also made many great friends. She even got a chance to interact with kids of her own age. According to her, London was the most intellectually stimulating place. Malini loved London. The freedom, independence and acceptance of people like her, made her feel alive. Malini calls London the place where she bloomed, acquired stability and excellent management for the first time since her birth. She considered London as her second home. The special school, "Thomas Delarue" taught Malini to grow up and become an independent person. While being at Delarue, Malini went outside for shopping and for other

needs. With her electric wheelchair, Malini was extremely mobile. She was taught to become assertive about her needs, organise her time and prepare herself for a regular college life. She remembers the day when she got a chance to meet the then Indian Prime Minister, Indira Gandhi.

Chib talks about going to the US for a short visit to the University town of Berkeley in 1988. She was surprised to find it teeming with electric wheelchairs. The traffic came to a halt just to let them cross the road. The accessibility was splendid. She found it a very disabled-friendly place. She felt that the disabled people there experienced a sense of freedom, making one forget that one cannot walk. It was something unbelievable for Malini as she came from a country where most buildings are totally inaccessible with wheelchairs. She talks about how she found it difficult to enter many places in India. In Berkeley, disabled people were welcomed and they argued how every individual is interdependent. Even a normal person would need a carpenter, a plumber or an electrician, perhaps. Similarly, the disabled too are dependent on others. Malini was greatly moved by this idea. She believed that this interdependence will encourage the disabled people to contribute positively to society and that they may not be treated as second-class citizens. This trip to the US was an eye-opener to her.

Malini proudly talks about her family. Malini was fortunate to be born in a privileged and well-educated family. She had a very good and supportive family, who was always beside her. Her mother and father were very caring. The other relatives too loved Malini. They were also concerned for her. Malini talks about many of her relatives who were close to her and took care of her. In her early days when Malini remained passive compared to other children, the family got worried and took her to the hospital. Endless examinations were done by the doctors. Malini was protected from the outside world by her family. They always enveloped her with love and

shut out the hostile and unfriendly world. Both England and her family were like a happy, safe and welcome place to her. She thanks her family.

Malini ends her book by giving an overview. She claims that the art of living is not only about tackling our problems, but also about minimizing them and focusing on the good things in life. She calls herself "... a tough survivor in a family of brave soldiers" (Chib 194). Her early link with the West was critical. It greatly benefited her growth and personality. She talks about some of the stigmas associated with disability believed by society. She emphasizes that disabled adults have their own thoughts, desires, feelings, passions, views and expectations like other 'normal' adults. She criticises some religious beliefs which claim that disabled people look the way they are, as retribution for their past sins committed. She also brings up the subject of attitude. Attitudes are important. It has the ability to make us feel included or excluded. For her, life means freedom. Freedom to think, move, speak, interact with whomsoever and freedom to make choices. Without it, it is not life. One does not live. One only exists. She mentions Foucault's argument about 'Who is normal?' 'Who is disabled?' and 'Who decides normal and abnormal?'.

In one section of the book Malini mentions Abraham Lincoln's words 'The best Steel goes through fire'. She also states that she was not the best steel. On the other hand, this book itself proves it wrong. 'One Little Finger' is a story of Malini's search for identity and independence. Despite all her conditions Malini fights against the odds in her life and emerges successful. Throughout the book her zeal to live a full and meaningful life is visible. This is a book of self realisation. By sharing her life experience through this book, Malini Chib has emerged as a light of hope for everyone.

Chapter 3

Society's Role in Disablement: Analysis of No Looking Back

No Looking Back, the autobiography of Shivani Gupta, chronicles the life of Shivani, who became paralysed and ultimately wheelchair-bound. The book was published in 2014. It begins with her in a hospital bed and follows her fight to live a self-sufficient life. Shivani typed a substantial portion of her life into this book using just one finger. The book is a true portrayal of her arduous struggle to live and survive.

Shivani was not disabled by birth. Shivani's life was deeply altered by an accident that happened when she was twenty-two years old. She became a tetraplegic as a result of this accident and life took a turn she never expected. Huge and unanticipated changes resulted from the accident. She says, after the incident, "Life had come to a standstill for me and my family. We were all groping in the dark" (Gupta 34). Her life lacked direction and hope. Shivani tried to be positive despite the circumstances. "Each new day brought nothing new. Yet, I kept telling myself: 'Tomorrow will be a better Day'. I had to hold on to that hope" (35). The sudden accident was frightening and unexpected for a girl who lived a very joyful and energetic life. Despite this, she battled every challenge she faced after her tragic accident with willpower, courage, wisdom, and dignity. This demonstrates her fighting spirit.

After living a regular life, Shivani found the accident and the abrupt changes it brought, as well as the approach associated with it, distressing. People's actions had a significant impact on Shivani. "It was difficult to fix myself into the picture of a disabled person painted by society" (54). Every day was a struggle, with many ups and downs. Every day felt like a lifetime of learning and discovery. Shivani was unable to perform even the most basic actions after the

accident, such as moving her arms and legs. Her physical appearance changed. Some people did not have a favourable reaction to this. All of this left Shivani feeling depressed and disappointed. Failure seemed to be her only possibility. She describes her first days in the hospital as follows:

I felt as if I had been reduced to just a human body lying on a bed - mindless, thoughtless, emotionless. I had tubes coming out of my nose and bladder, tubes going into my arm, from my head hung bricks, I never changed my position. I was paralyzed shoulder downwards and was suffering the onset of a lung infection that was sure to aggravate into a lung collapse. (Gupta 35)

Shivani changed a lot. Things that were once simpler and trivial, became challenging to her. But still, she decided to move on. However, people and their attitudes had an impact on her. Shivani was offended by the hospital staff's behaviour. She portrays the hospitals' weak and apathetic attitudes, as well as their medical negligence, in great detail. The hospital's circumstances were abysmal and pitiful. Many patients suffered as a result of a lack of sufficient treatment and care. Even AIIMS shocked Shivani. She was laid on a stretcher for hours in a filthy, packed corridor, waiting to be admitted, along with many of the other people. Patients who lacked the strength to sit up were laid on the floor. People's wailings filled her ears. After being admitted, the treatment did not improve. All of the hospital's medical personnel appeared to come up to Shivani and poke her with an oil pin or tickle her with cotton, asking if she could feel it, and Shivani was tired of saying 'no'. Even while fixing a traction in her skull, nobody bothered to inform or prepare her. She says "They continue to discuss me while I stare at them, feeling like an object on display that these young doctors would be learning from and experimenting on" (28). The nurses worked mechanically. When Shivani requested them to keep

her covered with a sheet, as she couldn't lift her hands to do so by herself, the nurses didn't even hear her.

They were careless and rude, unconcerned about another woman's privacy. To me, it felt like a violation of my body; but they seemed blind to this despite being women. It seemed unfair - even if they were doing me a favour by cleaning me when I couldn't do it for myself, as a patient I surely deserved more respect? However, I decided to keep quiet about it - I was dependent on them and didn't want additional trouble for my family. (Gupta 28)

The doctors at the hospital did not help much. They seemed to be waiting for her condition to deteriorate, as if they had concluded that she would not improve even if she lived. Every day, they promised her that they would make her stand. On the other hand, they informed her family that her prognosis was dismal and that she would now be a 'vegetable' for the rest of her life. The doctors didn't even change her lying position. They were always hiding behind an ambiguous prognosis and not doing her any help. It was Dr. Chahal who helped Shivani. Her condition improved just as he approached her. He made the nurses turn her. After this Shivani says that visually her world expanded. Dr. Chahal instilled confidence in Shivani and her family. Shivani was very disappointed by her previous doctors and she says "I had lost one and a half precious months only because of the incompetence of doctors"(39).

After coming out of the hospital Shivani decided to concentrate more on herself. Shivani's attitude on a variety of issues altered as a result of the accident. As a disabled person, she began to see the world in a completely different light. She had never considered disability before the accident, nor had she known anyone who was disabled. Disability meant nothing more

than a social work session at school and a sense of accomplishment from assisting a disabled person in crossing the street. Disabled for her was 'them'. However, it was only after the accident that she realised the true meaning of disability. Shivani says "It is uncanny how, over time, a human being can adjust to and accept his or her changing circumstances. Some time ago the mere mention of a wheelchair had seemed like a step backwards- today, it represented hope of mobility" (Gupta 40). Shivani found it difficult to leave the house after the accident. She felt reliant. She was self-conscious. She had the impression that she needed to relearn how to live. She wished to hide herself and not be noticed by anyone. There was a stark disconnect between who she used to be and who she was in the process of becoming.

Whenever Shivani went out, the reactions that she received from people were disheartening. It was as if society was constantly reminding her of her disability. Many people felt sorry for her. Many gave her recommendations about 'miracle cure' available in some village or the other. For her, these recommendations were very common and predictable; most of the time, it was the auto drivers or the drivers who told her about these cures. "A disabled person is generally viewed as someone needing treatment to become 'normal'" (70). Shivani was enraged by society's condescending attitude towards disabled people, more than by the fact that she was severely disabled. Shivani had always observed charity being delivered to disabled people in different ways. They did not, however, require charity. According to her, charity was the last thing that a disabled person wanted. Charity had such a bitter taste to it that she had no desire to experience it in her life. Shivani recalls an instance in which a local woman offered her a twenty-five rupee coin, mistaking her for a beggar. This reflects the general public's attitude towards disabled individuals. People found it easier to provide disabled people with charity rather than trying and understanding what they really needed. Many even made remarks like

"Chhi chhi! See, such a young and pretty girl in a wheelchair - who will marry her now?"

(Gupta 76). Her physical presence seemed like a burden to them. This thought was something which never crossed her mind before.

Many places in India are inaccessible for disabled people. Therefore, disabled people like Shivani, have to rely on others for many fundamental needs. In the book, she explains how she had to wait outside the store many times while her caregiver purchased the items she needed. Even in theatres, not all of the halls were accessible to disabled people. Shivani recalls an instance in which she was forced to watch a movie alone in a corner, away from her friends. Her grievances were not taken seriously either. She says "Living in India, I was used to having all my complaints ignored" (93). All of this demonstrates the disparity in how the disabled are perceived and treated in societies. She says "As a disabled person, I knew that life was all about adjusting to the society around me and I had been accustomed to foregoing many things just because I did not want to trouble my family any more than what was minimally needed" (84). Disabled people are compelled to adjust, and they suffer more as a result. As part of her training, she travels to the United Kingdom. The country was more welcoming and sensitive to its disabled citizens. Shivani had never experienced anything like this before. She was used to a culture that didn't care for the disabled and left them and their families to fend for themselves. Shivani was impressed by the number of wheelchair users who went out and about, going about their daily lives as usual. These individuals were not all disabled; some were elderly. There it didn't seem unusual to see people with disabilities all over the place. In India, one is not used to seeing disabled people out on the roads. The majority of them are still cooped up in their houses. Salisbury and its people helped Shivani in realising that her disability was only a stumbling block that could be overcome through rehabilitation.

Shivani sometimes felt odd even among her coworkers at times. She couldn't execute many of the tasks because of her disability. She couldn't take part in functions and trips. She mentions a trip in which all her friends enjoyed trekking, but she had to stay back with Vikas. She even realised that none of her friends wanted her to join the trip as she was disabled and was accompanied by a carer. They felt that their fun would be hampered. She was upset when she discovered the hypocrisy of those whom she considered friends. She says "it seemed my disability outweighed me even in the eyes of my colleagues who worked with me to help other disabled people. But it wasn't something I could blame them for- they had merely acted in the manner they had been taught by the society. It was an experience that influenced my future life to a very large extent"(Gupta 100). All she wanted was to try to continue living like anyone else, to be a part of society. But this incident left a mark on her and it taught her the difference between 'good- time' friends and real friends.

Love and relationships were considered as something out of the life of disabled people. Disabled people being in relationships and getting married was thought of as something impossible. An abled person falling in love with a disabled person was also viewed differently. Even Shivani had the same thought, "It was beyond my comprehension - a non-disabled person falling in love with a disabled person!" (79). Before the accident, all she wanted was to be loved by her family, and to find a man with whom she could fall in love and marry. But after the accident, Shivani felt that love and marriage was not meant for disabled people. Clothes and accessories no longer held any attraction for her. "I felt I had no right to be putting on makeup or looking stylish" (59). According to her, she was "a disabled woman who couldn't have any men interested in her romantically. I had accepted that such a thing was just not possible" (105). It was only after she met Vikas that her thoughts changed. But her relationship with Vikas was

initially rejected by his parents. They finally agreed after much persuasion. Love, marriage, family, children, and a happy life are all things that everyone wishes for. This is also true for disabled people. Even disabled women aspire to marry and have children. Shivani's true love for Vikas proves this. She considered their pet dog Ubbu as her own daughter. Her description of Ubbu reflects her motherly affection. Vikas was the best companion for Shivani. He accepted her the way she was. He wanted Shivani to live a regular life. He always stood beside her and taught her to fight for her rights and not accept poor treatment just because she was disabled. Together, they worked towards fighting for the rights of disabled people everywhere. They were even forced to hide their love from the world, but still they remained strong. When people saw no future for our relationship, they stood firm in the face of every adversity.

Shivani made the best decision by joining the rehabilitation and spinal centre. There, she met a number of disabled people who were just like her. Being a peer counsellor, Shivani tried to help and support them. She met a lot of women there, some of them were already married. They were concerned about how they would care for their husbands and families, and others were afraid that their husbands would abandon them. And all the unmarried women hoped to recover soon from their illness and then find a husband. The most difficult task for most of these women was to embrace their new status as a 'care receiver', as opposed to her previous job as a 'care provider,' within the family. In the tears of these women, Shivani seemed to relive her own fears over and over again. However, she was able to rid her mind of all such thoughts. By mentioning this Shivani illustrates the various concerns and tensions that disabled women have in their minds. Shivani also gained a lot of inspiration from the people she met there. The battling spirit of these people, their efforts to survive and their determination to keep going touched her heart.

Each one of them was like a champion to her, because they continued to fight no matter how hopeless their future seemed. This gave her strength and taught her to move forward confidently.

The fifteen days training program in Bangkok was a very invigorating experience for Shivani and Vikas. They got to know more about the non-handicapping environment. It addressed the needs of all kinds of disabilities. They realised the extent of benefits non-handicapping and accessible environments could have on the lives of disabled people. Shivani recognises the significance of having access to many locations. Shivani had previously been denied the use of her wheelchair in numerous places due to inaccessibility and an insensitive policy. The training equipped her to question all such practices.

Shivani and Vikas made the decision to advocate for disabled people's rights. They believed that it was critical to integrate disabled persons into society and to make society and the environment accessible to them. "People with disabilities were excluded from education, employment or even a regular social life, and the biggest culprit in this was in accessible environments. We realised just how India needed to work towards creating an accessible environment across the country" (Gupta 121). They believed that "The impairment of a disabled person was not the reason for his or her exclusion from society; in fact, it was society that posed handicapped in environments, which restrained disabled people from participating in them to the fullest degree"(121). They started the project 'Access for All' aiming to ensure better treatment and rights to disabled people. They set out to change the world. It is not the disabled person's responsibility to blend in and adapt to their surroundings. She resigned from the company that couldn't make any accommodations for its disabled employee. She explained this as a typical example of the kind of discrimination disabled people face every day. "... many companies are unable or unwilling to make any accommodations for retaining a disabled employee. Even

though they may not get another person as qualified, experienced and with a passion for a job, it is easier for them to let the disabled employee go. My abilities were not appreciated; rather, my disability was made an issue"(Gupta 173).

Shivani viewed Vikas' parents' approval of their marriage as a symbol of society accepting her for who she was, with all her shortcomings. Vikas died in an unforeseen accident after only four months of marriage. Shivani was absolutely shattered by this. But she battled back and regained her life. Shivani continued to fight for the disabled. She received many awards. She is one of India's best-known access consultants. She also mentions that some people genuinely wanted to enhance access for everyone; what was lacking was the knowledge of how to do it. Shivani emphasises the need of educating people about disabilities and disabled people by saying this. Shivani spent most of her life working towards improving the accessibility of public spaces to disabled people. She believes that there is nothing more disabling for persons with disabilities than society's failure to accept and include them as a part of the mainstream. Her motto is 'Access = Ability'.

Conclusion

Disability is a mental or physical condition that limits a person's abilities in various ways. It is not an easy state to live in. It is difficult for a disabled person to carry out specific tasks and engage with the outside world. The severity of these disabilities can be understood only when experienced. Everyone, whether able-bodied or disabled, should have a fundamental understanding of disability and disabled persons. Many disabled people exist in today's world. They are denied the joys of living a normal life. Many people are unaware of the plight of disabled individuals. In many cases, disabled people are marginalized. In their daily lives, disabled persons encounter several difficulties and problems.

The lives of women are particularly deplorable among the disabled. Their condition is far direr. It is almost as though they've vanished. Due to their limitations, they become more vulnerable. They endure discrimination as a woman and as a disabled person. Feminist disability studies dispels a slew of long-held stereotypes about people with disabilities. It challenges the preconceived notions about living with a disability and situates the disability experience in the context of rights and exclusions. It aims to improve the lives of disabled people.

The project examines the lives of two disabled Indian women through the framework of feminist disability theory. Malini and Shivani's lives teach us a lot of valuable lessons. Despite their disabilities, both of them managed to live successful and meaningful lives overcoming all obstacles in their lives. They represent thousands of such people. By sharing their life stories, both of them have attempted to address some of the challenges that they all confront in their everyday life. Both, *One Little Finger* and *No Looking Back*; presents the story of these two brave women. Both books teach us a great deal about life. Malini's book questions why the

disabled should be treated differently by society? Throughout her work, she emphasises that if society can overcome its biases against disabled persons, society as a whole will progress.

Shivani's book describes how she overcame two big accidents in her life, beating the odds and making a great contribution to the development of disabled people. Despite their disabilities, Shivani and Malini chose to take on life's obstacles head on. They both lead successful and meaningful lives. They also made significant contributions to society and to the improvement of people like them. Both of their lives serve as a great inspiration as well as a great reminder to us about the things that we, being the privileged lot, can do for our fellow beings.

Both the works also stress how society plays a key role in the marginalisation of disabled people. Is it fair to cast a person aside just because of disability? People should not be so quick to judge and treat others poorly due to something they cannot control. The disabled are subjected to several limitations and discrimination by society. They are often mistreated and are denied equal access in terms of social, political, educational, and physical opportunities. Many societal norms and activities exacerbate their disabilities. They are deemed unfit to perform various tasks and responsibilities. They are thought to be unsuitable for love and relationships. Very few firms hire disabled persons because they are considered as a liability rather than an asset in the workplace. People even have a tendency to address disabled people by their disability. Such practices must be stopped. It is a delusion to think that only physically able people can bring honour to their country and nation. Society's differential attitude greatly influences the lives of the disabled. It limits and restricts their ability to accomplish their goals. Every person deserves equal opportunities to showcase their talents. But being denied of these opportunities, disabled people struggle a lot to lead a happy and satisfying life. It is significant how we treat persons with

disabilities. Disabled people become even more disabled as a result of society's views and responses.

One Little Finger and *No Looking Back* illustrate many instances that made Malini and Shivani feel disabled. Society kept on reminding them about their disability at every stage of their life. Malini and Shivani share the kind of approaches they received at different places. Both of them felt that they received better treatment and acceptance outside India. This emphasizes that we should work to improve disabled people's lives in India. Both of them felt that India's hospitals and other public infrastructure were unfit for disabled people. They faced difficulties in educational institutions and workplaces. People's reactions were disheartening to them. Both stated that love and relationships were seen as something inappropriate for disabled persons. They were constantly reminded of being disabled. Malini and Shivani list all these instances and try to make people realise them.

As fellow humans, it is our responsibility to ensure the well-being of disabled people. We must assist them, focusing on their strengths rather than their flaws. They should be able to enjoy their lives in the same way as we do. We should treat them as equals rather than as someone to be pitied. They should be given the same opportunity to speak up. People should embrace disabled people and lend a helping hand to them. There are numerous things that can be done to ensure disabled people's well-being. The first and most important thing that can be done is to raise awareness about disabilities. Steps should be taken by both society and government to guarantee them equal access to education and work. Rather than special schools, disabled children should be educated in regular schools. This will aid in the development of impaired children's self-esteem as well as teach other children to accept disabled children. Wheelchairs, tactile paving and lifts should be made available and accessible to anybody, anywhere. All public

infrastructure, public transportation, and government buildings should be made accessible to people with disabilities. Everywhere, a concerted effort should be made to create an accessible and inclusive environment.

Works Cited

- Barker, Clare, and Stuart Murray. *The Cambridge Companion to Literature and Disability*. Cambridge University Press, 2017.
- C. Hall, Melinda. "Critical Disability Theory." *Stanford Encyclopedia of Philosophy*, 23 Sept. 2019, plato.stanford.edu/entries/disability-critical/.
- "Cerebral Palsy - Symptoms and Causes." *Mayo Clinic*, 1 Sept. 2021, www.mayoclinic.org/diseases-conditions/cerebral-palsy/symptoms-causes/syc-20353999.
- Chib, Malini. *One Little Finger*. SAGE Publishing India, 2011.
- "Disability and Health Disability Barriers." *Centers for Disease Control and Prevention*, 4 Sept. 2019, www.cdc.gov/ncbddd/disabilityandhealth/disability-barriers.html.
- Garland-Thomson, Rosemarie. "Integrating Disability, Transforming Feminist Theory." *NWSA Journal*, no. 3, Oct. 2002, pp. 1–32. *ResearchGate*, doi:10.1353/nwsa.2003.0005
- Gupta, Shivani. *No Looking Back*. Rupa Publications, 2014.
- Hall, Kim Q. *Feminist Disability Studies*. Indiana University Press, 2011.
- Khetarpal, Abha. "Love And Dating For Women With Disabilities." *Feminism In India*, 28 Nov. 2017, feminisminindia.com/2017/11/29/love-dating-women-with-disabilities/.
- Linton, Simi, et al. "Disability Studies: Expanding the Parameters of Diversity." *The Radical Teacher*, no. 47, pp. 4–10. *JSTOR*, doi:10.2307/20709848.

Piepmeyer, Alison. "Disability Is a Feminist Issue: Bringing Together Women's and Gender Studies and Disability Studies." *Disability Studies Quarterly*, vol. 34, no. 2, 2019, dsq-sds.org/article/view/4252/3592.

Sedgwick, Eve Kosofsky. *Epistemology of the Closet*. Univ of California Press, 1990.

Silvers, Anita. "Feminist Perspectives on Disability." *Stanford Encyclopedia of Philosophy*, 4 May. 2009, plato.stanford.edu/entries/feminism-disability/.

Simplican, Stacy Clifford. "Feminist Disability Studies as Methodology: Life-Writing and the Able/Disabled Binary." *SpringerLink*, 25 May. 2017, link.springer.com/article/10.1057/s41305-017-0039-x

Wendell, Susan. *The Rejected Body*. Routledge, 1996.

"Women and Disability: Feminist Disability Studies." *The Center on Human Policy – Syracuse University*, thechp.syr.edu/women-and-disability-feminist-disability-studies/.

Writer, Guest. "6 Books By Indian Women With Disabilities On The Unequal Society." *Feminism In India*, 2 Dec. 2019, feminisminindia.com/2019/12/03/6-books-indian-women-with-disabilities-unequal-society/.

Young, Iris Marion. *Throwing Like a Girl and Other Essays in Feminist Philosophy and Social Theory*. Indiana University Press, 1990.

**“A COMPARITIVE STUDY ON EFFECTS OF THERMAL AND
NON-THERMAL PROCESSING METHODS ON NUTRITIONAL
AND ORGAMOLEPTIC ASPECTS OF SPIRULINA BASED
SNACK PRODUCTS”**

Submitted By,

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Naseera Basheer	(Reg no.VB19FPT024)
Pavithra A R	(Reg no.VB19FPT026)
Shibina Xavier	(Reg no.VB19FPT031)

Under the Guidance of,

**Ms. Cynthia Miriam Jacob, M.Tech
Assistant Professor**

*In partial fulfillment of requirements for the award of degree of
Bachelor of Vocational studies*

B Voc FOOD PROCESSING TECHNOLOGY



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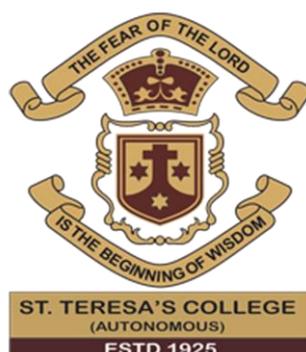
**Evaluation of foliar micromorphology, Phytochemical screening
and Elemental analysis of *Chromolaena odorata* (L.) subjected to
abiotic elicitation in the industrial area of Eloor, Ernakulam
district of Kerala**

DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF DEGREE OF
“BACHELOR OF SCIENCE” IN

BOTANY

By

NASLA SALAM (AB19BOT042)



**DEPARTMENT OF BOTANY
ST. TERESA'S COLLEGE (AUTONOMOUS)
ERNAKULAM**

CERTIFICATE

This is to certify that the dissertation entitled "Evaluation of foliar micromorphology, Phytochemical screening and Elemental analysis of *Chromolaena odorata* (L.) subjected to abiotic elicitation in the industrial area of Eloor, Ernakulam district of Kerala" submitted by Miss. Nasla Salam as a part of the B.Sc degree course for the year 2021-2022 has been carried out under the supervision and guidance of Dr. Asha D., Department of Botany, St. Teresa's College, Ernakulam.



Dr. Asha.D
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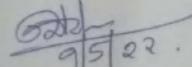


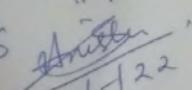
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Examiner: Anila N  9/5/22.

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Nasla Salam



Place: Emakulam

Date: 9/5/22

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INTRODUCTION

Herbal plants are known to be rich sources of phytochemical ingredients that contribute to healthcare management. Thereby, the demand for plant-based medicinal treatment using natural herbal plants has been shown to rise worldwide. At the beginning of the 21st century, more than half of all the drugs used in clinical applications contained natural products in their medication treatment. Furthermore, various herbal drugs from natural products such as plants, animals, microorganisms, and fungi have been approved in medical treatments. Besides, natural products also serve as an essential source for developing new drug products (Kumar Shakya & Arvind,2016).

In recent decades, people are more attracted to drugs from plant origin as they are highly biocompatible and produce lesser side effects than synthetic drugs. However, productivity and quality of these natural products are not satisfactory due to the slow rate of multiplication, overexploitation, and habitat degradation that is a drawback in meeting the ever-increasing market demand.

Most of the medicinal plant parts are used as raw drugs and they possess varied medicinal properties (Mahesh and Satish 2008). Medicinal plants are easily available, less expensive and also have no side effects (Cathrine et al., 2011). Medicinal plants represent a rich source of the antimicrobial agent (Mahesh et al., 2008).

Environment can be defined as a sum total of all the living and non-living elements and their effects that influence human life. While all living or biotic elements are animals, plants, forests, fisheries, and birds, non-living or abiotic elements include water, land, sunlight, rocks, and air. Environmental science is an interdisciplinary academic field that integrates physical, biological, and geography (including ecology, biology, physics, chemistry, plant science, zoology, mineralogy, oceanography, limnology, soil science, geology and physical geography, and atmospheric science) to the study of the environment, and the solution of environmental problems. Environmental science emerged from the fields of natural history and medicine during the Enlightenment. Today it provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems.

Nature is a synthesis of the five elements air, water, soil, fire and earth and man has been living in balanced harmony with nature since time immemorial. But the changes which man has brought about in his environment were largely determined by his necessities, his knowledge and his value. These are undoubtedly being polluted by the dust, smoke, sewage, sullage, industrial discharge and city refuse.

As a result of rain, dew or fog, leaves and other aerial organs of plants often become wet. In most species, the turgidity of leaves is restored from the wilted condition after immersion of water for 24 hour or less. Water largely entered through the epidermal cells, through hairs and specialized epidermal cells can provide for such entry in some cases. On prolonged immersion the leaves of many species show opening of stomata and some time also the injection the intercellular spaces with liquid water under certain condition, leaves and other aerial parts are capable of absorbing water from the air, it has been reported that pine seedlings *pinus ponderosa* in dry soil can absorb water vapour from the near saturated or unsaturated atmosphere.

Human population size has grown enormously over the last hundred years. This means an increase in demand for food, water, home, electricity, roads, automobiles and numerous other commodities. These demands are exerting tremendous pressure on our natural resources and are also contributing to pollution of air, water and soil. The need of the hour is to check the degradation and depletion of our precious natural resources and pollution without halting the process of development.

Macronutrients and Micronutrients in Plants

The essential elements can be divided into macronutrients and micronutrients. Nutrients that plants require in larger amounts are called macronutrients. About half of the essential elements are considered macronutrients: carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, and sulphur. The next-most-abundant element in plant cells is nitrogen (N); it is part of proteins and nucleic acids. Nitrogen is also used in the synthesis of some vitamins. Hydrogen and oxygen are macronutrients that are part of many organic compounds and also form water. Oxygen is necessary for cellular respiration; plants use oxygen to store energy in the form of ATP. Phosphorus (P), another macromolecule, is

necessary to synthesise nucleic acids and phospholipids. As part of ATP, phosphorus enables food energy to be converted into chemical energy through oxidative phosphorylation. Light energy is converted into chemical energy during photophosphorylation in photosynthesis; and into chemical energy to be extracted during respiration. Sulphur is part of certain amino acids, such as cysteine and methionine, and is present in several coenzymes. Sulphur also plays a role in photosynthesis as part of the electron transport chain where hydrogen gradients are key in the conversion of light energy into ATP. Potassium (K) is important because of its role in regulating stomatal opening and closing. As the openings for gas exchange, stomata help maintain a healthy water balance; a potassium ion pump supports this process.

Magnesium (Mg) and calcium (Ca) are also important macronutrients. The role of calcium is twofold: to regulate nutrient transport and to support many enzyme functions. Magnesium is important to the photosynthetic process. These minerals, along with the micronutrients, also contribute to the plant's ionic balance.

Deficiencies in any of these nutrients, particularly the macronutrients, can adversely affect plant growth. Depending on the specific nutrient, a lack can cause stunted growth, slow growth, or chlorosis. Extreme deficiencies may result in leaves showing signs of cell death.

Medicinal plant selected for the study

Chromolaena odorata Linn (L.) King and Robinson is formerly known as *Eupatorium odoratum* L. belongs to the family Asteraceae (Aster family), genus *Chromolaena* (Thoroughwort), and species *Chromolaena odorata* L. (Vijayaraghavan et. al., 2017). The family Asteraceae or Compositae (known as the aster, daisy, or sunflower family) is the largest family of flowering plants represented by about 950 genera and 20,000 species over the globe (Mahbubur, 2013). *C. odorata* plants are distributed all over the world in almost all habitats (Rahman et., 2008). The common names for these plants are Siam weed, devil weed, Eupatorium, Jack in the bush, Jack-in-the-bush, kingweed, paraffin bush, and paraffin weed (Vijayaraghavan et al., 2018). *C. odorata* has been commonly and widely used in traditional medicine because of its property that can give therapeutic effects on the body.

C. odorata has been introduced extensively to tropical Asia, West Africa and some parts of Australia (Zahara, 2019). In general, this plant is able to grow in a wide range of soil pH

(Mandal & Joshi, 2014). However, it seems to grow best at acidic soil areas that contain a high amount of potassium and phosphorus.

Distribution of *Chromolaena odorata*

This plant is native to North America and is widely spread from the southern USA to northern Argentina, including Central America and the Caribbean. Besides, *C. odorata* plant has also been extensively introduced to tropical Asia, West Africa and some parts of Australia (Paterson & Zachariades, 2013), pacific region (Ghori, 2011) and subsequently distributed to Asian country including Indonesia, Malaysia, China, Thailand, Taiwan, Laos, Sri Lanka, Bangladesh, Cambodia and India (Vaisakh & Pandey, 2012).

It was grown as medical herbs and ornamental plant and it is also a serious weed in plantation crops globally as it is highly allelopathic and suppresses the vegetation of the neighbouring plants (Zahara, 2019). Collectively, the most suitable habitat for *C. odorata* to grow well includes the moist, humid, warm, cold, and abandoned areas. These features provide a suitable and favourable area for *C. odorata* plants to grow in a wide range of habitats (Mandal & Joshi, 2014).

Locality of Sample Collection

Eloor is a suburb of Kochi and a municipality in Paravur Taluk, Ernakulam District in the Indian state of Kerala, India. It is an industrial area situated around 13 kilometres (8.1 miles) north of the city centre. It is an island of 14.21 km² formed between two distributaries of river Periyar and is the largest industrial belt in Kerala. The neighbouring places of Eloor are Kalamassery industrial hub, Aluva, Cheranalloor and Paravur. There are various companies of different kinds along the industrial belt including Fertilisers and Chemicals Travancore (FACT), Indian Rare Earths Limited, Hindustan Insecticides Limited and many others manufacturing a range of products like chemical-petrochemical products, rare-earth elements, rubber-processing chemicals, fertilizers, zinc/chromium compounds and leather products. The industrial belt of Eloor in Kerala is one of the world's 'top toxic hot spots', according to international environment group Greenpeace. Greenpeace holds the Hindustan Insecticides Ltd that has been manufacturing pesticides at its Eloor plant responsible for making the industrial village a toxic hotspot.

The aim of the study was to conduct phytochemical, micromorphological and elemental analysis of *C. odorata* growing in an industrial area.

OBJECTIVES

- To analyse the micromorphological characters of *Chromolaena odorata* growing in an industrial area.
- To detect the phytochemical constituents present in the ethanol extract of *Chromolaena odorata* by qualitative phytochemical analysis.
- To analyse the elemental composition of *Chromolaena odorata* growing in a locality experiencing industrial pollution using SEM-EDX.

REVIEW OF LITERATURE

- The leaf extracts of *C. odorata* has been shown to possess antioxidant, anti-inflammatory, analgesic, antimicrobial, cytoprotective and many other medicinally significant properties (Vaisakh & Pandey, 2012).
- Jyoti et al., (2008) analysed the amount of Pb, Cd, Cr, and Ni in soil and plant samples of *Abutilon indicum*, *Calotropis procera*, *Euphorbia hirta*, *Peristrophe bycaliculata*, and *Tinospora cordifolia* collected from 3 environmentally different sites.
- It has been shown that *C. odorata* plants not only invade soil that contains potassium and phosphorus, but it can also increase the nutrient contents in the soil, namely potassium, phosphorus, calcium, nitrogen, and magnesium (Ojeniyi et. al., 2012).
- Another study also revealed a significant increase in soil nutrients such as nitrogen and soil organic matter (SOM) from all invaded sites (Mandal & Joshi, 2014). The rise of the amount of nitrogen and soil organic solvent (within the 10 cm layer) of the soil showed that *C. odorata* plants have the potential to invade all fallow areas (Tondoh et. al., 2013).
- The *C. odorata* leaves extracts from ethanol, methanol, and hexane extraction have been reported to exhibit strong inhibitory effects against both Gram-positive (*Bacillus cereus*, *Enterococcus faecalis*, *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Propionibacterium acnes*) and gram-negative (*Proteus vulgaris*) bacterial strains (Hanphanphoom & Krajangsang, 2016).
- Besides, it has been reported these extracts exhibited good antibacterial activity against the gram-positive bacteria *Staphylococcus S. aureus*, *S. pyogenes* and *Staphylococcus epidermidis* and the gram-negative bacteria *P. vulgaris*. The results obtained suggested

that the ethanolic, methanolic and hexane leaves extracts of *C. odorata* are promising to be further developed in treating bacterial skin infections ((Hanphanphoom & Krajangsang, 2016).

- A recent study by Udayaprakash et al. (2019), demonstrated that acetone extract of *C. odorata* exhibited high inhibitory activity against *S. aureus* and *P. aeruginosa*. Meanwhile, ethyl acetate extract of *C. odorata* recorded the maximum zone of inhibition against *Bacillus*.
- The *C. odorata* plants also have been shown to exhibit anti-inflammatory property. It was reported that the aqueous and ethanolic extracts of *C. odorata* could retard the inflammatory reaction. The anti-inflammatory activities exhibited by *C. odorata* may be due to the presence of phenolic compounds in these extracts (Omokhua et al., 2016).
- The natural antioxidants present in the *C. odorata* plants such as polyphenols play an important role in preventing the body from oxidative damage. This is because the ideal chemical structure of polyphenols compound makes the plants more effective as an antioxidant against a free radical-scavenging activity as compared to any other compounds such as ascorbate and tocopherols (Srinivasa et al., 2010).
- Substances that relieve pain can be defined as analgesics (painkillers). Analgesics works through various mechanisms and function either centrally (opioids receptor agonism) or peripherally. In recent years, there has been an impetus on the use of traditional medicinal plants with analgesic effects worldwide due to its natural origin and lesser side effects (Rauf et al., 2017).
- Substances that relieve pain can be defined as analgesics (painkillers). Analgesics works through various mechanisms and function either centrally (opioids receptor agonism) or peripherally. In recent years, there has been an impetus on the use of traditional medicinal plants with analgesic effects worldwide due to its natural origin and lesser side effects effects (Rauf et al., 2017).

- It was reported that the stem extract of *C. odorata* plants has been demonstrated to be effective for the treatment of skin infections, particularly caused by the *Propionibacterium acnes* (Pandurangan et al., 2015).
- The extract from the leaves of *C. odorata* has also been widely used in countries such as Vietnam and other tropical countries to treat skin infections and rashes (Wang et al., 2014). Besides, in other countries such as Thailand and India, this plant has been extensively used as a traditional herb to treat skin infection (Vijayaraghavan et al., 2017).
- The species of *C. odorata* plants, found in the West of Africa and Asia were also found to be useful in reducing stomach-ache (Omokhua et al., 2016).
- An elevated level of phosphorus, potassium, magnesium, soil organic matter, and nitrogen as well as acidic soil encourages further invasion of *C. odorata* (Ghori, 2011); (Ojeniyi et. al., 2012).
- Tanhan et al., (2007) analyzed the concentrations of Pb, Cd and Zn in *C. odorata* (L) and their results confirm that *C. odorata* is a hyperaccumulator which grows rapidly, has substantial biomass, wide distribution and has a potential for the phytoremediation of metal contaminated soils.
- Anyasi (2012) studied the ability of *Chromolaena odorata* propagated by stem cuttings and grown for six weeks in the greenhouse to thrive in soil containing different concentrations of PCB congeners found in Aroclor and transformer oil.
- Ikhajiagbe (2016) Investigated the changes in morphological and crude protein content of *Chromolaena odorata* to heavy metal-induced stress.

MATERIALS AND METHODS

Plant selected for the study

Chromolaena odorata is a tropical and subtropical species of flowering shrub from the sunflower family (Asteraceae).

Scientific Name

Chromolaena odorata (L.)

Synonyms

- *Eupatorium clematitidis* DC.
- *Eupatorium conyzoides* Mill.
- *Eupatorium dichotomum* Sch.Bip.
- *Eupatorium divergens* Less.
- *Osmia atriplicifolia* (Vahl) Sch.Bip.
- *Osmia clematitidis* (DC.) Sch.Bip.
- *Osmia divergens* (Less.) Sch.Bip.
- *Osmia odorata* (L.) Sch.Bip.

Systematic Position

- Kingdom: Plantae
- Division : Phanerogamae
- Class: Dicotyledons
- Subclass : Gamopetalae
- Series : Bicarpellatae
- Order: Asterales
- Family: Asteraceae
- Genus: *Chromolaena*
- Species : *Chromolaena odorata* (L)

Common names: Siam weed, Christmas bush, Devil weed, Jack-in-the-bush, Kingweed, Paraffinbush, and Paraffinweed

Malayalam Name: Communist Pacha

Plant collection

The fresh mature leaves of *Chromolaena odorata* (L.) used for the investigation was obtained from Eloor industrial area, Ernakulam, Kerala (Figure1). The plant specimen was authenticated using the Flora of presidency of Madras. Fresh plant material was washed under running tap water, then air dried and powdered.

Leaves preparation

Fresh mature leaves were cleaned. The leaf portion between midrib and margin from the middle region was cut into small pieces (10 x 10 mm²). Tissues were disintegrated by poaching leaf samples in 10% hydrochloric acid under low heat for 1 hr. When bleaching was completed, leaf samples were washed with water and then cleared by gently warming with chloral hydrate solution (4 g of chloral hydrate / 1 ml of water) until it was transparent. After rinsing with water, the leaf sample was mounted with glycerin and observed under a light microscope for the determination of leaf constants.

1] Microscopic analysis

Microscopic evaluation of leaf constants such as stomatal number, stomatal index, epidermal cell number and trichome number were examined.

1.1. Determination of stomatal number and stomatal index

Stomatal number is an average number of stomata per square millimeter (mm²) of epidermis of the leaf. Stomatal index (SI) is a percentage of stomata from the total number of epidermal cells in a same unit area of leaf, which can be calculated as:

$$\text{SI} = \left(\frac{S}{E+S} \right) \times 100$$

Where, S = number of stomata per mm² in a given area of leaf

E = number of epidermal cells per mm² in the same area of leaf

1.2. Determination of epidermal cell number

Epidermal cell number is an average number of epidermal cell per mm² of leaf surface. The number of epidermal cell on the upper and lower surface of leaf in 1 mm² in each field were counted.

1.3. Determination of trichome number

Trichome number is an average number of trichome per mm² of epidermis of leaf surface. The number of trichome on the upper and lower surface of leaf in 1 mm² in each field were counted.

Data analysis

All leaf constant parameters were determined at least in five fields of plant sample. The results expressed as mean \pm standard deviation (SD), minimum and maximum values.

Extraction

The plant powder was extracted with ethanol using cold extraction. Totally 30 g of dried plant powder was extracted in 250 ml of ethanol for 24 hours in occasional shaking at room temperature. The supernatant was collected and evaporated to make the final volume one-fifth of the original volume. It was stored at 4°C in airtight bottles for further studies.

2] Phytochemical analysis

The ethanolic extract of *Chromolaena odorata* was subjected to preliminary phytochemical screening for their presence or absence of active constituents utilizing a standard method of analysis.

1. Test for Alkaloids

Mayer's Test: 2 ml test sample was treated with few drops of Mayer's reagent along sides of the test tube and the formation of white or creamy precipitate indicated the presence of alkaloids.

(Mayer's Reagent- 1.358g of HgCl₂ was dissolved in 60ml of water and poured into a solution of 5g of potassium iodide in 10ml of distilled water and made upto 100 ml of reagent).

Dragendorff's Test: Test sample was treated with 1-2 ml of Dragendorff's reagent and the formation of prominent reddish brown precipitate indicated the presence of alkaloids.

(Dragendorff's Stock reagent- Solution (A): 0.85g basic bismuth nitrate dissolved in 10ml glacial acetic acid and 40 ml water under heating. Solution (B): 8g potassium iodide dissolved in 30 ml water. Stock solution: A and B mixed in 1:1 ratio).

Wagner's Test: Test sample was treated with few drops of Wagner's reagent along sides and the formation of reddish brown precipitate indicated the presence of alkaloids.

(Wagner's reagent - 2 g Iodine and 6 g potassium Iodide dissolved in 5 ml distilled water and made upto 100 ml.)

2. Test for Flavonoids

Sulphuric acid test: A fraction of the extract was treated with concentrated H₂SO₄ and observed for the formation of orange colour.

NaOH test: A small amount of extract was treated with aqueous NaOH and HCl, observed for the formation of yellow orange colour.

3. Test for Amino acids

Ninhydrin Test: Extract solution was treated with Ninhydrin (Triketohydrindene hydrate) at the pH range of 4 - 8. Development of purple colour indicated the positive response for amino acids.

4. Test for Reducing sugars

Fehling's test for free reducing sugar: About 0.5 g of extract was dissolved in distilled water and filtered. The filtrate was heated with 5 ml of equal volumes of Fehling's solution A and B. Formation of a red precipitate of cuprous oxide was an indication of the presence of reducing sugars.

Benedict's Test: To 5 ml of the extract solution, 5 ml of Benedict's solution was added in a test tube and boiled for a few minutes. Development of brick red precipitate confirmed the presence of reducing sugars.

5. Test for Anthraquinones

Modified Borntrager's Test: 5 ml of extract solution was hydrolyzed with dilute sulphuric acid and extracted with benzene. 1 ml of dilute ammonia was added to it. Rose pink coloration suggested the positive response for anthraquinones.

6. Test for Saponins

Foam Test: A small amount of extract was shaken with water and looked for the formation of persistent foam.

7. Test for Sterols

Liebermann-Burchard test: One ml extract was treated with chloroform, acetic anhydride and added drops of H₂SO₄ and observed for the formation of dark pink or red colour.

Sulphuric acid test: The fraction of extract was treated with ethanol and H₂SO₄ and observed for the formation of violet blue or green colour.

8. Test for Tannins

FeCl₃ Test: 5 ml of extract solution was allowed to react with 1 ml of 5% ferric chloride solution. Greenish black colouration indicated the presence of tannins.

Potassium Dichromate Test: 5 ml of the extract was treated with 1 ml of 10% aqueous potassium dichromate solution. Formation of yellowish brown precipitate suggested the presence of tannins.

Lead acetate Test: 5 ml of the extract was treated with 1 ml of 10% lead acetate solution in water. Yellow colour precipitation gave the test for tannins.

9. Test for Phenols

Ferric chloride test: A fraction of extract was treated with 5% ferric chloride, formation of deep blue colour confirms the presence of phenol

Liebermann's test: The extract was heated with sodium nitrite, add H₂SO₄ solution diluted with water and add excess of dilute NaOH and observed for the formation of deep red or green or blue colour.

10. Test for Glycosides

Legal's test: Dissolved the extract (0.1 g) in pyridine, added sodium nitroprusside reagent and made alkaline with NaOH solution. Pink to red colour solution indicates the presence of glycosides.

Borntrager's test: The extract is hydrolyzed with concentrated HCl for 2 hours on a water bath and filtered and few ml of above filtrate was shaken with chloroform, chloroform layer was separated and added 10 % ammonia, formation of pink colour indicates the presence of glycosides

11. Test for Gums

Molisch's Test: 2 ml of concentrated sulphuric acid was added to 2 ml of extract solution. Then it was treated with 15% α -naphthol in ethanol (Molisch's reagent). Formation of a red violet ring at the junction of two layers indicated the positive test for gums.

12. Test for Terpenoids

Chloroform test: The plant extract was taken in a test tube with few ml of chloroform and add concentrated sulphuric acid carefully to form a layer and observed for presence of reddish brown colour.

Liebermann-Burchard test: 1 ml extracts was treated with chloroform, acetic anhydride and added drops of H₂SO₄ and observed for the formation of dark green colour.

Scanning Electron Microscopy (SEM) with Energy Dispersive X-Ray Analysis (EDX)

The ethanol extract derived from plant sample of *Chromolaena odorata* (L.) was subjected to the elemental analysis using Scanning Electron Microscope (SEM) with an energy

dispersive x-ray spectrometer (EDX). For doing the elemental analysis, Scanning Electron Microscope (with EDX) was used with a model number Jeol 6390LV having accelerating voltage: 0.5 kV to 30 kV and resolution at 4 nm (30 kV) which provides images at magnification: 300,000. SEM provides detailed high resolution images of the sample by rastering a focussed electron beam across the surface and detecting secondary or backscattered electron signal. An Energy Dispersive X-Ray Analyzer (EDX or EDA) is also used to provide elemental identification and quantitative compositional information. SEM provides images with magnifications up to ~X50,000 allowing sub micron-scale features to be seen i.e. well beyond the range of optical microscopes. It is very rapid, high resolution imaging with identification of elements present in the plant samples.

RESULTS

Determination of Leaf constants

Microscopic leaf constant values are possibly used to distinguish between some closely related species of which cannot clearly be characterized by general microscopy. Microscopic evaluation is the first step for drug authentication and identifying the correct species. The results of leaf constant numbers consisting of stomatal number, stomatal index, epidermal cell number and trichome number were shown in Table 1.

Phytochemical screening of plant materials

The phytochemical screening of *Chromolaena odorata* (L.) is displayed in Table 2. Preliminary phytochemical screening of twelve secondary metabolites were done in the ethanol extract of *Chromolaena odorata*. The ethanol extract showed the presence of the maximum number of secondary metabolites in the plant.

SEM with Energy Dispersive X-Ray Analysis (EDX)

Table 2 shows the results of the elemental composition of *Chromolaena odorata* (L.) using SEM and EDX technique. The SEM - EDX spectra of the ethanol extract of the *Chromolaena odorata* (L.) is shown in figure 2.

The topography of elements was confirmed through SEM images which is displayed in figure 3. Oxygen, Magnesium, Silicon, Chloride, Potassium and Calcium were present in the sample. Many standards were used like CaCO₃, SiO₂, KCL, MAD, Ca wollastonites. In all these elements, Carbon and Oxygen were present as high concentrations while all other elements were present only in trace quantities. Trace elements are estimated by determining the percentage abundance (%) of elements in the sample.



Fig. 1: Medicinal plant *Chromolaena odorata* (L.) collected from Industrial area, Eloor

Leaf constant values	Upper epidermis		Lower epidermis	
	min-max	mean \pm SD	min-max	mean \pm SD
Stomatal number	72 - 108	87.07 \pm 9.95	240 - 408	348.53 \pm 44.67
Stomatal index	5.40 - 8.22	6.43 \pm 0.65	-	-
Epidermal cell number	1084 - 1424	1263.33 \pm 89.28	-	-
Trichome number	4 - 7	5.17 \pm 1.12	43 - 51	47.40 \pm 3.04

Table 1: Microscopic leaf constant numbers of *Chromolaena odorata*

Plant Constituents	Test/ Reagent	<i>Chromolaena odorata</i> (L.)
Alkaloids	Mayer's Test	+
	Dragendorff's Test	+
	Wagner's Test	
Phenols	Ferric chloride test	+
	Liebermann's test	+
Tannins	FeCl₃ Test	+
	Potassium Dichromate Test	+
	Lead acetate Test	+
Flavonoids	Sulphuric acid test	-
	NaOH test	-
Anthraquinones	Modified Borntrager's Test	+
Saponins	Foam Test	+
Steroids	Liebermann-Burchard test	+
	Sulphuric acid test	+
Terpenoids	Chloroform test	-
	Liebermann-Burchard test	-
Glycosides	Legal's test	-
	Borntrager's test	-
Reducing sugars	Benedict's Test	-
	Fehling's test for free reducing sugar	-
Amino acids	Ninhydrin Test	-
Gums	Molisch's Test	-

Presence: +, Absence: -

Table 2: Phytochemical screening of leaf extract of *Chromolaena odorata* (L.)

Element	Line Type	Weight %	Atomic %
C	K series	61.65	68.99
O	K series	35.71	30
Mg	K series	0.28	0.15
Si	K series	0.14	0.07
S	K series	0.2	0.08
Cl	K series	0.45	0.17
K	K series	0.74	0.26
Ca	K series	0.83	0.28
Total:		100	100

Table 3: The percentage of trace elements present in ethanol leaf extract of *Chromolaena odorata* (L)

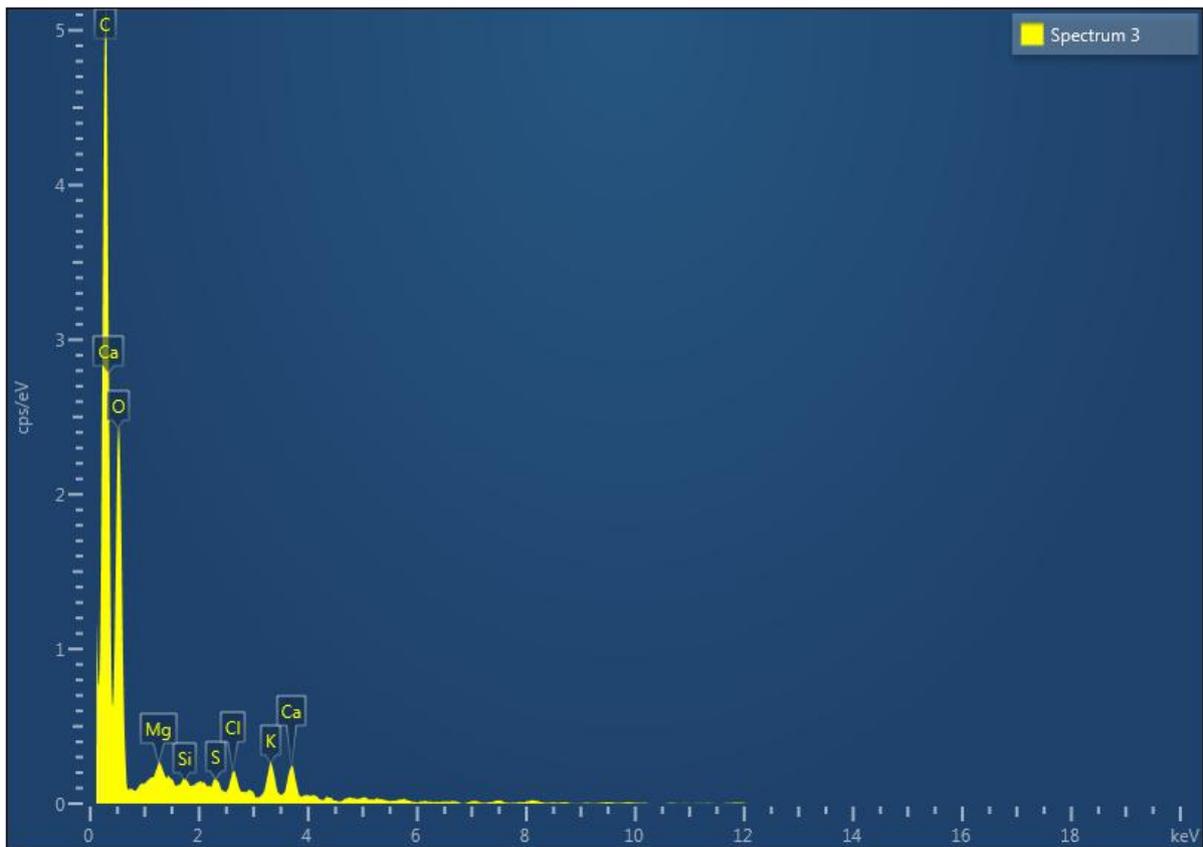


Fig. 2: The SEM EDX spectra of ethanol leaf extract of *Chromolaena odorata* (L.)

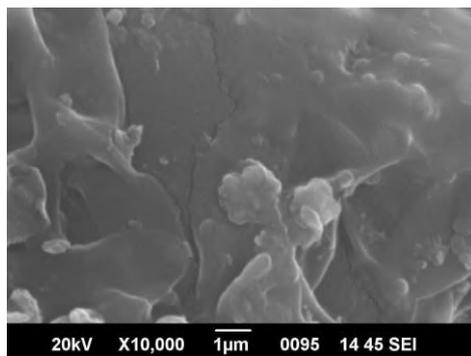
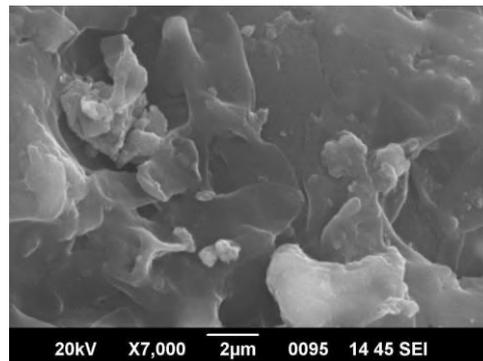
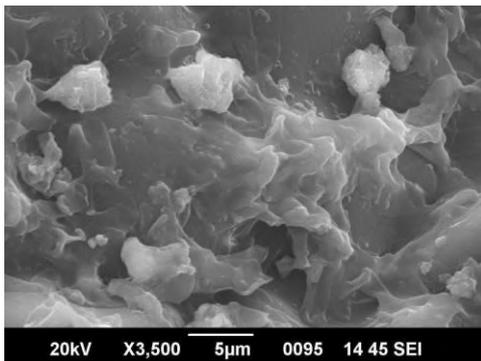
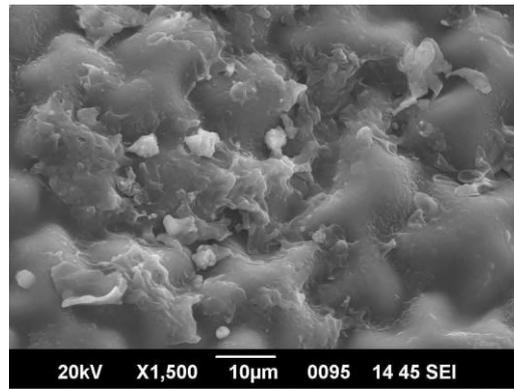
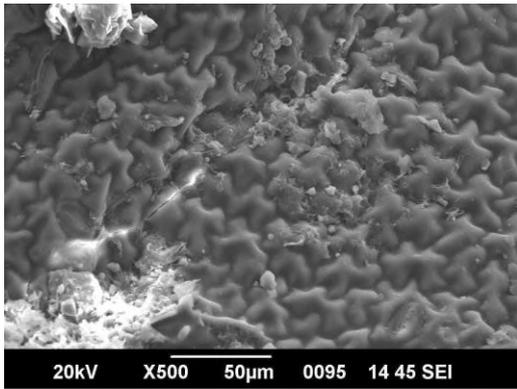


Fig. 3: The SEM EDX images of ethanol leaf extract of *Chromolaena odorata* (L.)

DISCUSSION

Determination of Leaf constants

The microscopic examination is one of the quality control process for herbal material to determine the characteristics, identity and degree of purity of medicinal plant materials, and should be carried out before any further tests are undertaken (WHO, 2011).⁷ Microscopic leaf constant numbers are frequently used to identify between some closely related species. It has great value for a quality of the medicinal plants based on these specific characters (Eames & Mac, 1974).

The stomatal number and stomatal index are very specific criteria for identification and characterization of herbal crude drug (Rabinarayan et al., 2018). Although the stomatal number varies greatly with the age of the leaf, the stomatal index remains highly consistent. The one of microscopic evaluation which can distinguish plant species is stomatal type by their form and arrangement in the surrounding cells. The different types of stoma are often available for matured leaves that are distinguished by their form and arrangement in the surrounding cells. In recent study, the stomata type of *C. odorata* was classified as anomocytic or ranunculacious type of stomata. The stomata is surrounded by varying number of cells, which are generally not different from those of the epidermis which supported in characteristics of *C. odorata* (WHO, 2011). The stomata were found on both upper epidermis and lower epidermis which called amphistomatic leaf as distribution of stomata. The previous studies also reported that the stomata type of *C. odorata* were anomocytic type (Sorabh et al., 2014; Adedeji & Jewoola, 2008).

Trichomes are epidermal protuberances located on aerial parts of plant, that protect plant from excess transpiration, high temperature, ultraviolet light, and herbivore attack. Trichome number has been used for identification of some plants that have trichomes covering their leaves (Wagner et al., 2004). The results showed that there were multicellular uniseriate trichomes on both upper and lower epidermis of *C. odorata*. The trichome number on the upper epidermis was found to be 5.17 ± 1.12 , which was less than that of the lower epidermis (47.40 ± 3.04). The result of this study is in accordance with the previous researches reported that *C. odorata* leaf had many long multicellular uniseriate unbranched trichomes (Sorabh et al., 2014). In this study, the glandular trichomes were found on only lower epidermis of *C. odorata*.

Trichomes are epidermal protuberances located on aerial parts of plant, that protect plant from excess transpiration, high temperature, ultraviolet light, and herbivore attack. Trichome number has been used for identification of some plants that have trichomes covering their leaves ((Wagner et al., 2004).). The results showed that there were multicellular uniseriate trichomes.

Phytochemical analysis

Phytochemical screening is of paramount importance in identifying new source of therapeutically and industrially valuable compound having medicinal significance, to make the best and judicious use of available natural wealth (Ambasta et al., 1986; Kokate et al., 1998).

Phytochemical investigation of the ethanolic extracts of *Chromolaena odorata* (L.) revealed the presence of various phytochemicals such as alkaloids, phenols, tannins, flavonoids, anthraquinones, saponins, steroids & terpenoids. The presence of alkaloids in *Chromolaena odorata* (L.) may be associated with their use by traditional medicines for the treatment of different diseases. Phenolic compounds present in it have attracted a great attention in relation to their potential for beneficial effects on health (Narayana et al., 2001). phytochemical analysis of plants for the presence of saponins are widely well known to have expectorant and antitissue activity (Rao et. al., 1984; Sharama et al., 1984). Nevertheless, among the variety of plant species available worldwide, only a few plants have been studied for its phytochemical constituents and biological activity that may serve as potential alternative sources of therapeutic agents (Vaisakh & Pandey, 2012).

The phytochemical components of *C. odorata* include alkaloids, flavonoids, flavanone, essential oils, phenolics, saponins, tannins, and terpenoids. The other essential constituents of this plant are chromomoric acid, quercetagenin, and quercetin, all of which contribute to its medicinal properties (Sirinthipaporn & Jiraungkoorskul, 2017).

For instance, it has been reported in several studies that these phytochemicals are able to exhibit a wide spectrum of pharmacological activities including antioxidant activity, hypoglycaemic and hypocholesterolemic effects in animals (Rahman et., 2008). As well as modulation in wound healing stages (Vijayaraghavan et al., 2018).

The presence of the phenolic compound in the *C. odorata* leaf extracts works as an antioxidant, which helps increase the efficacy of *C. odorata* in wound healing. This antioxidant property works by increasing the efficiency of preserving the growth of keratinocytes and fibroblasts on the wounds (Sirinthipaporn & Jiraungkoorskul, 2017).

The presence of several active phytochemical compounds possesses a synergistic wound healing activity. It has been proven that the active constituents from the *C. odorata* extract are able to enhance and improve wound healing in laboratory animals including rats (Vijayaraghavan et al., 2017).

The phenolic compound in *C. odorata* leaves extract has been shown to prevent internal bleeding from diathesis and stomach ulcers. Equally important, is that this compound also preserved the keratinocytes from being damaged and reduces the internal bleeding from the stomach ulcer (Paul et al., 2018).

In the present study, results of EDX showed the presence of trace elements such as Mg, Si, Cl, S, K and Ca in *Chromolaena odorata* (L.). Deficiency of these trace elements in human subjects can occur under the most practical dietary conditions and in much diseased status (Udayakumar & Begum, 2004). Trace elements play both curative and preventive role in combating diseases. Magnesium is important cofactor for the conversion of blood glucose into energy (Bahadur et al., 2011). Calcium is needed in the development of bone and teeth and it regulate heart rhythm, help in normal blood clotting, maintain proper nerve and muscle functions and lower blood pressure (Bibi et al., 2006). Potassium is essential for the transport of nutrients inside the cell. Without potassium, nutrients could not able enter into the cell that lead cell death. Silicon is also another important element to prevent the hardening of veins and arteries. Chloride works with sodium and potassium carry an electrical charge when dissolved body fluids and to regulate the pH in the body. Chloride is also important for digest the food properly and absorb many elements. The presence of these trace elements in *Chromolaena odorata* (L.) marks its use in therapeutic purpose.

SUMMARY & CONCLUSION

Plant based drugs have been used worldwide in traditional medicines for treatment of various diseases. Phytochemical studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques. These techniques played a significant role in the search for additional resources of raw material for the pharmaceutical industry (Alston & Turner,1963).

The analysis of literature on *Chromolaena odorata* (L.) showed that the plant species are invasive to a wide range of habitats including the grasslands, at the roadsides, agricultural lands, forest margins, polluted areas as well as in the disturbed forests. Despite its invasive properties, this plant is useful as a medicinal herb. So, the main objective of the study was to do the phytochemical evaluation, assessment of leaf micromorphology and elemental analysis through EDX analysis of *Chromolaena odorata* (L.), growing in an industrial area.

The plant showed the presence of many phytochemicals which are responsible for the various pharmacological medicinal properties. The results obtained from the present study revealed that, the ethanol extracts of *Chromolaena odorata* (L.) showed the presence of most of the secondary metabolites like alkaloids, phenols, tannins, flavonoids, anthraquinones, saponins, steroids & terpenoids in the leaves. The SEM-EDX study of the ethanol extract showed the presence of trace elements. However, the species was devoid of any heavy metals eventhough they were collected from an industrial area. The foliar micromorphology revealed the stomatal type, index and trichome numbers of this species which can be used for the identification and authentication of this plant. The intensive study on the out coming active constituents of *Chromolaena odorata* (L.) can lead to the discovery of a new botanical - drug.

The present study also revealed that locally available non-economical weed plant *Chromolaena odorata* (L.) commonly found in waste lands has a great pharmaceutical potential. Based on the result of this study it can be said that *Chromolaena odorata* (L.) has a leading capacity for the development of new good efficacy drugs in future and can be an

effective source to treat and control many diseases due to the presence of phytochemicals. The uses of *C. odorata* in traditional practice give rise to many research studies that are currently ongoing to further validate its medicinal properties.

Thus, it may conclude that the present study will add some specific criteria for the authentication of *Chromolaena odorata* and will be helpful to increase the economic potentiality of this plant.

REFERENCES

1. Adedeji O, Jewoola OA. Importance of Leaf Epidermal Characters in the Asteraceae Family. *Not Bot Horti Agrobot Cluj Napoca*. 2008;36(2):7-16.
2. Anyasi, Raymond Oriebe. Bioremediation of polychlorinated biphenyls (PCBs)-contaminated soil by phytoremediation with *Chromolaena odorata* (L) R.M. King and Robinson, University of South Africa, Pretoria. 2012
3. Eames AJ, Mac Daniels LH. An introduction to Plant Anatomy. New York: McGraw-Hill. 1974.
4. Ghori VP, Gatecha HN, Desai TR, Pandya DJ. Pharmacognostic study of leaves of *Cordia rothii* Linn. *Pharmacogn J*. 2011;3(22):35–8.
5. Hanphanphoom S, Krajangsang S. Antimicrobial Activity of *Chromolaena odorata* Extracts against Bacterial Human Skin Infections. *Mod Appl Sci*. 2016;10(2):159.
6. Ikhajiagbe B. “Possible Adaptive Growth Responses of *Chromolaena odorata* during Heavy Metal Remediation.” *Ife Journal of Science*. 2016;18(2):403–11.
7. Jyoti Barthwal, Smitha Nair, Poonam Kakkar. Heavy Metal Accumulation in Medicinal Plants Collected from Environmentally Different Sites, *Biomedical and Environmental Sciences*. 2008;21(4):319-324
8. Kumar Shakya A, Arvind Kumar Shakya C. Medicinal plants: Future source of new drugs. *Int J Herb Med*. 2016; 4(4):59–64.
9. Mahbubur Rahman AHM. Systematic Studies on Asteraceae in the Northern Region of Bangladesh. *Am J Life Sci*. 2013;1(4):155.
10. Mandal G, Joshi SP. Invasion establishment and habitat suitability of *Chromolaena odorata* (L.) King and Robinson over time and space in the western Himalayan forests of India. *J Asia-Pacific Biodivers*. 2014; 7(4):391–400.
11. Ojeniyi SO, Odedina SA, Agbede TM. Soil productivity improving attributes of Mexican sunflower (*Tithonia diversifolia*) and siam weed (*Chromolaena odorata*). *Emirates J Food Agric*. 2012;24(3):243–7.
12. Omokhua AG, McGaw LJ, Finnie JF, Van Staden J. *Chromolaena odorata* (L.) R.M. King & H. Rob. (Asteraceae) in sub-Saharan Africa: A synthesis and review of its medicinal potential. *J Ethnopharmacol*. 2016;183:112–22.
13. P. Tanhan, M. Kruatrachue, P. Pokethitiyook, R. Chaiyarat. Uptake and accumulation of cadmium, lead and zinc by Siam weed [*Chromolaena odorata* (L.) King & Robinson]. *Chemosphere*. 2007;68(2):323-329

14. Pandurangan A, Kavita R, Apoorva S. Evaluation of antimicrobial and anthelmintic activity of leaves of *Chromolaena odorata*. International Bulletin of Drug Research. 2015; 5:64-71.
15. Paterson ID, Zachariades C. ISSRs indicate that *Chromolaena odorata* invading southern Africa originates in Jamaica or Cuba. Biol Control. 2013;66(2):132–9.
16. Paul TS, Das BB, Ingale SP, Killedar N, Apte KG. Oral intake of polyphenols of *Chromolaena odorata*: A perspective in peptic ulcer, thrombocytopenia, and heparin-induced bleeding diathesis in rodent model. Pharmacognosy Res. 2018;10(4):426–31.
17. Rabinarayan A, Switu J, Rudrappa C, Vinay S. Pharmacognostical and Phytochemical Analysis on Leaves of *Homalium ceylanicum* (Gardn.) Benth. Pharmacogn J. 2018;10(2):272-7.
18. Rahman A, Alam MS, Khan S, Ahmed F, Islam A, Rahman M. Taxonomic Studies on the Family Asteraceae (Compositae) of the Rajshahi Division. Research Journal of Agriculture and Biological Sciences. 2008; 4, 134-140.
19. Rauf A, Jehan N, Ahmad Z, Mubarak MS. Analgesic potential of extracts and derived natural products from medicinal plants in Maldonado, C. (Ed.). Pain Relief From Analgesics to Alternative Therapies. IntechOpen. 2017; 24:339-351.
20. Sirinthipaporn A, Jiraungkoorskul W. Wound healing property review of Siam weed, *Chromolaena odorata*. Pharmacognosy reviews. 2017; 11(21):35-38.
21. Sorabh KA, Venkatachalam K, Parthiban P, Ramraj N. Pharmacognostic and Phyto-physiochemical investigation of the Leaves of Siam weed- *Chromolaena odorata* (L) King and Robinson. Drug Invention Today. 2014;6(2):96-101.
22. Srinivasa Rao K, Chaudhury PK, Pradhan A. Evaluation of antioxidant activities and total phenolic content of *Chromolaena odorata*. Food Chem Toxicol. 2010 Feb;48(2):729–32.
23. Tondoh JE, Koné AW, N'Dri JK, Tamene L, Brunet D. Changes in soil quality after subsequent establishment of *Chromolaena odorata* fallows in humid savannahs, Ivory Coast. Catena. 2013; 10: 99–107.
24. Udayaprakash NK, Sriraman V, Devika V, Peneena V, Sripriya N, Bhuvaneshwari S, Sampathkumar B. Comparative studies on phytochemistry, antioxidant and antibacterial activity of direct and sequential extracts of *Chromolaena odorata* leaves. International Journal of Research in Pharmaceutical Sciences. 2019; 10(2): 914-921.
25. Vaisakh MN, Pandey A. The invasive weed with healing properties: A review on *Chromolaena odorata*. Int J Pharm Sci. 2012;3(1):80–3.

26. Vijayaraghavan K, Rajkumar J, Bukhari SNA, Al-Sayed B, Seyed MA. *Chromolaena odorata*: A neglected weed with a wide spectrum of pharmacological activities (Review). Mol Med Rep. 2017;15(3):1007–16.
27. Vijayaraghavan K, Rajkumar J, Seyed MA. Phytochemical screening, free radical scavenging and antimicrobial potential of *Chromolaena odorata* leaf extracts against pathogenic bacterium in wound infections—a multispectrum perspective. Biocatalysis and Agricultural Biotechnology. 2018; 15:103-112.
28. Wagner GJ, Wang E, Shepherd RW. New approaches for studying and exploiting an old protuberance, the plant trichome. Ann Bot. 2004;93(1):3-11.
29. Wang L, Waltenberger B, Pferschy-Wenzig EM, Blunder M, Liu X, Malainer C, et al. Natural product agonists of peroxisome proliferator-activated receptor gamma (PPAR γ): A review. Biochem Pharmacol. 2014;92(1):73–89.
30. World Health Organization. Quality control methods for medicinal plant materials. Geneva: WHO Press. 2011.
31. Zahara M. Description of *Chromolaena odorata* L. R.M King and H. Robinson as medicinal plant: A Review. IOP Conf Ser Mater Sci Eng. 2019; 506(1).

A STUDY ON DIGITAL PAYMENT- A GROWING TREND IN THE MODERN MARKET

Project Report

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Under the guidance of

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In partial fulfilment of requirements for award of the degree of

Bachelor of Commerce



ST.TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM
COLLEGE WITH POTENTIAL FOR EXCELLENCE

Nationally Re-Accredited at 'A++' Level (Fourth Cycle)

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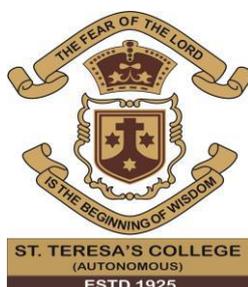
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CERTIFICATE

This is to certify that the project report titled '**A STUDY ON DIGITAL PAYMENT- A GROWING TREND IN THE MODERN MARKET**' submitted by **NAYANA VARGHESE, NEESHMA ANTONY, RADHIKA SURESH** towards partial fulfilment of the requirements for the award of degree of **Bachelor of Commerce** is a record of bonafide work carried out by them during the academic year 2021-22.

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Place: Ernakulam

Date:

DECLARATION

We, Nayana Varghese, Neeshma Antony, Radhika Suresh, do hereby declare that this dissertation entitled, '**A STUDY ON DIGITAL PAYMENT - A GROWING TREND IN THE MODERN MARKET**' has been prepared by us under the guidance of **Dr. Mary Sruthy Melbin**, Assistant Professor, Department of Commerce, St Teresa's College, Ernakulam.

We also declare that this dissertation has not been submitted by us fully or partly for the award of any Degree, Diploma, Title or Recognition before.

Place: Ernakulam

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CHAPTER 1
INTRODUCTION

1.1. Introduction

A digital transaction is a seamless system involving one or more participants, where transactions are effected without the need for cash. The digital transaction involves a constantly evolving way of doing things. The smooth, simple and secure payment processes involved in digital payments have helped bring about behavioural changes and faster adoption of digital payment methods. Where financial technology (fintech) companies collaborate with various sectors of the economy for the purpose of meeting the increasingly sophisticated demands of the growing tech- savvy users. The Government of India has been undertaking several measures to promote and encourage digital payments in the country.

As part of the 'Digital India' campaign, the government has an aim to create a digitally empowered economy that is 'Faceless, Paperless and Cashless'. There are various types and methods of digital payments are available. As a part of promoting cashless transactions and converting India into less cash society, various modes of digital payments are available. These modes are: banking cards, USSD, AEPS, UPI, Mobile Wallet, banks pre-paid cards, point of sale, internet banking, mobile banking and Micro-ATM's. According to a report in ET, in India, 66.6 billion transactions worth \$270.7 billion are expected to shift from cash to cards and digital payments by 2023.

1.2 Significance of the Study

Digital payment is the way of the future. With digital payments, you can do more than just buy and sell products and services. Digital payments play a vital role in Indian economy. Digital payments have their own advantages like instant and seamless transactions, increased security, and eco- friendly. They improve budget discipline and track records of money spent and received. It also reduces corruption In the last few years there has been a rapid change in the economy and digital payment methods witnessed a healthy growth. It witnessed a greater penetration in the pandemic period. According to the Reserve Bank of India as of September 2018, the number of debit and credit cards has gone up significantly to 990 million and 44 million, respectively, showing a preference for cashless transactions. Low value transactions below Rs 200 form a large chunk of payments made in cash which shows the adoption of digital payments in the daily use habits of people.

The use of digital cash will also make sure that any loophole in the country's public systems are plugged and the beneficiaries would be able to avail those benefits of cashless transactions. The advancement of technology made digital payment widespread and accessible. There are a lot of indirect benefits that have a greater significance. One of the benefits of using electronic cash is the fast pace with which money gets circulated. A study is required to understand the attitude of students towards digital payment methods and their perception of the dangers and opportunities involved in digital payment transactions. Due to the tremendous growth of digital payment systems in India, a study of digital payments is relevant.

1.3 Statement of the Problem

Digital payments are bound to have security issues which might hinder the growth of digital payments. Handling and dealing in cash is a cumbersome and tedious task, Along with the risk of losing money, there is the hassle of carrying cash everywhere you go and keeping it safe. With digital payments, one can keep their funds secured in online format effortlessly.

The main objective of the study is to present the current status of India in usage of digital currency and find the challenges and opportunities which are associated with cashless transactions in India.

This study is focused on understanding various users' perception towards digital payment methods. The study is conducted to analyse the satisfaction level of users of various digital payment modes. This study will also attempt to understand the relevance of digital payment methods in our day to day life.

1.4 Objectives

1. To discover the significance and need for digital payments.
2. To measure the growth of digital payments.
3. To measure the safety and security of digital payments.
4. To understand the consequences of digital payment system.

1.5 Research Methodology and Data Collection

Research Methodology

- **Research design**

The study is descriptive and analytical in nature. It is analytical in the sense that it focuses on various factors affecting digital payments such as frequency of usage and customer satisfaction, safety and security, online banking services, effects on financial life etc.

Collection of data

Primary data and secondary data will be used for this study.

- **Primary data**

Data was collected by means of Google form. 110 responses were received.

- **Secondary Data**

Secondary data was collected with the help of online resources such as articles, journals and information published in major websites of government and Google scholar.

- **Sampling Design**

A convenient sampling technique was adopted to analyse the results.

- **Population**

The population considered under study is limited to the people residing in Ernakulam district.

- **Sample size**

A sample size was taken as 100 for the survey.

Summarized Information regarding methodology adopted

Source of Data	Primary and Secondary Data
Universe	People residing in EKM
Sampling Procedure	Convenient sampling method
Source of primary data	Questionnaire
Procedure of collection of data	Google Forms
Source of secondary date	Online articles, websites etc.
Instrument of data analysis	Percentages. Ratio, ranking etc.
Tools of analysis	Tabular and graphical presentation used
Sample size	100 respondents

1.6 Scope of Study

The scope of the study is to identify the extent of the use of digital payment methods in our society. It is limited to the people in Ernakulam. People are more aware about various methods of digital payments. The study will be based on the convenient sampling of 60 students.

The study will try to measure the growth of digital payments and safety and security of these payment methods. The study will also try to understand the consequences considered by the students regarding usage of digital payment modes.

1.7 Limitations of the Study

- Time Bound- Our project had time limitations.
- Online data collection: Due to the pandemic, data collection was limited to online mode. Face to face interaction with respondents was not possible.
- Data collection was done from people in the Ernakulam district.

1.8 Keywords

- **USSD**- Unstructured Supplementary Service Data, This service allows mobile banking transactions using basic feature mobile phone, there is no need to have mobile internet data facility for using USSD based mobile banking
- **UPI**- Unified Payment Interface is a system that powers multiple bank accounts into a single mobile application merging several banking features, seamless fund routing and merchant payments into one whole.
- **PoS**- A Point of Sale is the place where sales are made. It is also known as Point of Purchase.
- **Micro- ATM**- Micro ATM is meant to be a device that is used by a million business correspondents to deliver basic banking services.

1.9 Chapterisation

Chapter 1- Introduction

This chapter gives a brief introduction about the topic, its significance in the research area, problem statement, methodology adopted, objectives to be achieved and limitations of the study

Chapter 2- Literature review

This chapter deals with the literature relating to the topic under study. It also includes analysis of secondary data relating to topic under study.

Chapter 3 – Theoretical framework

This chapter introduces the theory of the research topic.

Chapter 4- Data analysis and interpretation

It includes analysis and interpretation of primary data collected based on variables related to the study.

Chapter 5- Summary, findings and conclusions

It deals with a brief summary of what the researcher has found out from the study and the final conclusion and recommendations.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Introduction

India is a country which has population of 1.25 billion, approximately 660 million debit cards and 25 million credit cards. In India, digital payments have increased from 1459.02 crore in FY 2017-18 to 4371.18 crore in FY 2020-21 due to sustained efforts towards digitalization. In fact, among the reasons justifying the demonetization move, which was principally to weed out black money and destroy the parallel shadow market, is now a transition sought towards a cashless economy. This policy direction by the government highlights the tremendous growth possibilities for the digital payments sector that is only just started to establish itself. Demonetization has also in a way dismantled some of the traditional barriers preventing Indians from adopting digital payment solutions such as the habit of using cash, complexity and unfamiliarity of digital payment systems, lack of compelling value proposition, and anxiety over fraud and network security. The emergence of new technology and need for a global business made the digital payments more popular.

2.2 Review of Literature

1. **Demonetization in India an era for digital payments, Ravi Kumar Goriparthi, Pankaj Tiwari(2017) :** The government's shocking announcement on November 8, 2016 demonetizing the high-value currencies of 500 and 1000 that account for 86 percent of India's cash in circulation, has indirectly boosted the country's emerging digital payments market. This policy direction by the government highlights the tremendous growth possibilities for the digital payments sector that is only just started to establish itself. Demonetization has also in a way dismantled some of the traditional barriers preventing Indians from adopting digital payment solutions such as the habit of using cash, complexity and unfamiliarity of digital payment systems, lack of compelling value proposition, and anxiety over fraud and network security.
2. **A review on electronic payments security, Md Arif Hassan, Zarina Shukur, Mohammad Kamrul Hasan, Ahmed Salih Al-Khaleefa (2020):** Modern technology is turning into an essential element in the financial trade. We focus the emphasis of this review on the research on the E-wallet and online payment, which is an element of an electric payment system, to get the pattern of using this service. This research presents a review of 131 research articles published on electronic payment between 2010 and 2020 that uses a qualitative method of answering the

research questions “What are the major security issues regarding using electronic payments”? And “What security properties need to comply for secure electronic payments?”

With the systematic literature review approach, the results show that interest in E-wallet and online payment has grown significantly during this period, and it was found that for the increasing uses of electronic payments, researchers are more focused on security issues. The results show that, to conquer the key gaps, electronic payment must have some protection properties, namely, availability, authorization, integrity, non-repudiation, authentication, and confidentiality. Nowadays, security problems in electronic payment are usually more demanding than the present security problems on the web. These findings can enable electric transaction providers to strengthen their security methods by boosting their security gaps, as required for relevant services.

3. A CASE STUDY ON PERCEPTION TOWARDS ONLINE PAYMENT SYSTEMS AMONG URBAN AND RURAL CUSTOMERS, Dr. C. Mallesha

(1/1/2021): The study examines the perception of urban and rural customers adopting of online payment system and effect of online payments effects on customers of the Indian banking. The result put together gives us an important that rural people needed more awareness and training on usage to fill the gap between the rural and urban. The results indicate from the data that rural and urban customers are using online payment for their cash transactions, shopping, and bills payment. The majority are using online payments is increasing but the concern is security, cyber frauds, hackers etc. have to be controlled so that more use of online payments can be seen from both urban as well as rural. The study gives emphasis to the percentage of awareness on maximum utilization of technology. Banks should take effective measures in creating awareness towards the effective usage of technology and security while using online payment systems.

4. Digital payments and consumer experience in India: a survey based empirical study, Sudiksha Shree, Bhanu Pratap, Rajas Saroy & Sarat Dhal,(20/1/2021):

While studying data gives a broad idea of digital payment methods, data at individual level gives insight into how certain factors influence the

choices/decisions made by consumers regarding the mode of payment. Studies reveal that the choice of payment method is impacted by a number of consumer-specific and technological factors. Transaction size has a significant impact on what mode of payment people choose. It was also found that better education and higher income lead to lower cash use compared to digital methods. Certain categories of age show a stronger preference for digital payments as well. Safety is also a huge factor that has considerable impact. Trust in the payment system is shown to have a positive effect on the usage of digital modes of payment.

Convenience is an important factor that encourages use of digital payment methods. After studying the results from the survey conducted, in general, the results point out that more affluent and privileged groups are more likely to go digital, compared to disadvantaged groups. Digital payments were not only driven by a positive outlook on digital payments but also a negative outlook on cash. Customers were seen to be willing to risk online fraud experience in the face of higher convenience offered by digital payment modes.

- 5. A Study on Consumer Perception of Digital Payment Methods in times of Covid Pandemic by K M, SIBY, Assistant professor, St Paul's college (1 March,2021):** The digitalization drive in payment methods since demonetization has made remarkable progress even in times of Covid pandemic. The present study analysed primary data collected from 107 respondents from Ernakulum district of Kerala to study the consumer perception of digital payment methods on the basis of demographic characteristics such as gender, age, education, profession, and employment. Correlation and ANOVA were used to analyse the data and found that there was no significant variance in consumer perception of digital payment methods even in times of Covid pandemic based on the key demographic Characteristic. The study based on the sample data concludes that irrespective of various demographic factors such as gender, age, education, profession, and monthly income, people tend to use digital payment methods in times of Covid pandemic. These factors have not inserted any dampening effect on the use of digital payment methods in times of Covid pandemic. The high digital literacy prevailing in Kerala with deep mobile penetration and easy accessibility of the Internet has indeed played a significant role in the digital revolution of payment methods even in times of Covid pandemic.

6. **Study conducted by RBI, (April 26, 2021):** Retail payment system in India has undergone radical transformation due to rapid technological changes and innovations in recent years. Studies conducted in advanced countries suggest that a broader adoption of digital payments significantly helps financial inclusion of the disadvantaged sections. Retail digital payments accounted for over 99 per cent in total digital payments and 97 per cent or above in total payments as well as in total retail payments during the period from January 2020 to March 2020. The survey conducted by the study revealed that most participants were aware of digital payments. Participants cited 'convenience' as the most important reason for use of digital payments. Participants also mentioned their use of cash for small value transactions (with amounts up to ₹500) but indicated a change of preference towards digital mode for payments for amounts above that. The awareness towards digital payment methods were almost the same among male and female participants. Awareness also had a tendency to increase with educational qualifications of participants. The study found that the most important purposes for use of digital payments by the survey participants were 'shopping', 'money transfer', 'payment of bills' and 'mobile/ TV recharges. It found that levels of education, levels of income and having bank accounts play an important role in awareness about digital payments. The survey also indicated that 'debit or credit card' are the most popular instruments for making digital payments followed by 'net banking', 'mobile banking' and 'BHIM UPI. However, cash remained the most preferred mode of payment and for receiving money for regular expenses up to rs 500.
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8. **Exploring the security risks and safety measures of mobile payments in fintech environment in India Anupam Saxena, Dr Shalini Nath Tripathi, 2021:** The current Covid-19 pandemic has benefited digital payment platforms. This digitalization resulted in ease of doing transactions and protection from virus and germs but while increasing usage of digital payments. This has led to questions of safety. The study's findings revealed that digital payment transactions involved various factors and it is crucial for app developers to take into cognizance the following: develop a sense of trust among the app users and security provisions by deploying novel technology interventions for maintaining data privacy.
9. **Attitude of the Community towards Digital payments Usage in Thrissur District-with special reference to Digital-Economy District initiative PR JEYALAKSHMI, AS LAKSHMI RANI,(2021)** The Findings of this study indicates that perceived usefulness, relative advantage, convenience, privacy and safety have indirectly and directly affected the studied community's attitude towards Digital payment usage. The other main significant factor is confidence in the payment system. It is also evident that who had trust in service providers and regulators seem to have a greater likelihood of paying digitally. Digital usage attitudes are mainly affected by perceived relative advantage. It is found that there is significant differences between users and non-users concerning their attitudes towards Digital transactions. And the Gender, Age and education level are found to be major determinants of attitude patterns.

10. Cashless Payment Policy and Its Effects on Economic Growth of India: An

Exploratory Study: This study explores the use of cashless payment policy to telegraphic transfers, card payments, check use, and E-money in India. The paper revealed that the trust determinations of online payment advancing but not E-payments. The massive expansion of cashless payment transactions is powered by the development of IT and new technological innovation in mobile technology. In the near future, technology such as television, radio frequency identification, and near-field communication will control the innovation in cashless payment systems. The alteration of current payment techniques to an entirely cashless system may not be possible in the future, but constantly innovation in technology and sponsored payment structure will certainly expand society's accessibility. To cashless transactions in India. However, the use of one kind of E-payment system will impact on another type of E-transaction system in the short term. The significance of using a cashless payment system on economic development can be suggestively observed in the long term. Hence, Any kind of cashless policy that encourages a cashless payment system will not affect economic growth immediately.

11. Moving from Cash to Cashless Economy: Toward Digital India,

AGGARWAL, MALIK, MISHRA, PAUL,: In the past years after demonetization, mobile payment services' popularity has significantly increased. Two types of amenities have been trending over the years. These are wallet-based and UPIbased platforms. The online pattern is generally stronger in metro cities, but the Indian government is focusing on extending the rural implementation to the urban environment. Modi's government focus is toward greater use of technology and consequent reduction in cash usage, which will lead to a decrease in corruption. The new system will not only reduce the flow of 'black money', but will also be efficient for tracking taxable entries over time. The electronic wallet stores money in digital format for immediate transactions, while UPI makes the use of interbank connections in which payment gets directly debited from the account of the consumer. The government has also faced various public criticism in the past following new initiatives, such as GST and demonetization. The study conclude that the recent trends in technology and supportive Indian government are driving India toward a cashless economy.

CHAPTER 3
THEORETICAL FRAMEWORK

3.1 Introduction

India's journey of creating a digital financial infrastructure has been characterized by collaboration between the government, the regulator, banks, and fintech. This has helped to advance the country's goal of enabling financial inclusion and also provided rapid payment digitization for citizens. The pandemic has further accelerated the adoption of digital payments with many first-time users adopting digital payments and significant uplift by merchants.

3.2 History

Throughout history, economical transactions and payment methods have not seen any drastic changes. Only a handful of major changes have occurred. Around 1200 BC, most economical interactions were done via bartering that is, the exchange of one commodity for another. Later on, around 1100 BC with the Chinese civilization, circular objects appeared as part of a new monetary system: coins. About 5 centuries later, these coins evolved into the current form of currency. The arrival of digital payments occurred recently with emergence of modern technology.

First, the credit card was introduced in the late 1960s by Barclays. This new mode of payment was gradually adopted by other financial institutions and gradually improved until 2002, at which date, the chip and pin technologies surfaced, further revolutionizing digital payments. After the millennium, the democratization of internet and the e-commerce revolution boosted the use of online payments. With the advent of smartphone services, an increasing amount of transactions is taking place through mobile platforms. Multiple new technologies could arise as new modes of payment are broadly used by customers.

3.3 Advantages:

- Instant Payments
- Different options
- Better customer convenience
- Transparent
- Physical distancing
- Increased security

- Seamless transaction
- Eco friendly
- Budget discipline
- Track record of money spend
- Offers and discounts
- Convenience during travel
- Reduce corruption

3.4 Disadvantages:

- Safety issues
- Privacy issues
- Lack of infrastructure
- Lack of awareness
- Reluctance to change payments from cash to cashless
- Technical literacy is required
- High service charges
- Forgery
- Network issues
- Limited access to resources
- Customer service is a hassle

3.4 Security Properties of Electronic Payments

Protection may be the major issue with electronic payment methods because without safe information exchange and secure electronic monetary transactions through networks, no one will believe it is safe to use. Electronic payment on the web is a simple target for stealing personal information and money. Users require confidentiality, authentication, data integrity etc. as essential needs for making safe and secure settlements over the internet.

3.4.1 Authorization

Electronic payment should be available only for authorized customers. The details required for the payment should only cover the authorized topics. The system must verify that it allows the user to make the requested transaction securely. The assets involved must be able to verify that everyone involved in the transaction, once verified, may make the transaction. If authorization on information is not suitably offered to

payment system, hackers can conveniently intercept the payment information of customers without mutual verification and additionally, they can control the information which puts the customer at risk.

3.4.2 Confidentiality

Confidentiality is extremely essential in the e-commerce world as there is a possibility that hackers might get people's sensitive details. In electronic payment, a client must be allowed to use the electronic banking account after effective verification only. Confidentiality is an assurance that information is shared solely among authorized individuals or companies. Only an authorized receiver should be able to acquire the encrypted message so that others cannot view its contents. It must protect confidential information from any unauthorized person, process, or device.

3.4.3 Integration

This is connected to the believability of information resources. Data integrity will keep all the specifics confidential during the electric transaction. The information and devices have not been changed and corrupted by external parties. Valid user credentials will usually be acknowledged.

3.4.4 Authentication and Non-Repudiation

Authentication is the procedure of confirming the identity of a procedure or maybe device, usually as a precondition for enabling use of materials on a product. The process of authentication is important for enabling individuals to go into their credentials, and if they match with the existing one, then the individual is a validated user and is permitted to login to the system, otherwise, they are not. Non-repudiation is a mechanism to ensure that the user can be sure that they are connecting with the authentic server, such that neither of the communicating parties can later on incorrectly refute that the purchase happened. Pertaining to electronic security of monetary transactions, the application of non-repudiation supposes a solution that provides evidence of the stability as well as origin of information, and a verification tool that with high guarantee can be insisted to be genuine.

3.4.5 Supporting Transaction

Support cash transaction is the one of basic attributes of customer satisfaction with electronic payment. The application for payment should support a mechanism allowing money to be exchanged over the Internet, and the merchant or provider is liable for the payment-method application (app) to disable it. The app does not conflict with other mobile systems or non-payment functions. In electronic payments, the principal problem is to be more secure for payment systems and disputation between online merchants and

customers. Electronic payment systems are not successful without the acceptance of users. Problems are not readily recognized due to a lack of protection in the growing market ecosystem.

3.4.6 Availability

In electronic payment, the service must have the availability, which pleases both security needs of subjects taking part in purchases and customer comfort. It requires having the accessibility, in which it can complete the purchase whenever the user demands. Availability defines the access of information sources, ensuring a started transaction can be timely and completely executed. In order for an electronic payment service to be securely provided, it must have confidentiality, authentication, authorization, integrity, non-repudiation, robustness, efficiency, supporting transaction, and availability, as mentioned above.

3.4.7 Robustness and Efficiency

As the electronic payments are transforming, there is a need to change and develop. In competing situations, time-to-market robustness is crucial for measuring the success of a system. Security measures for electronic payment solutions must be tested under the supervision of the danger monitoring function to ensure their robustness and effectiveness. The rise in Fintech has grown rapidly in the banking sector worldwide. To stay affordable, banks are introducing internet banking with the motive to achieve greater productivity as well as efficiency. Effort needs to be made to verify the input information to ensure the integrity of the system.

3.5 Types of Digital Methods:

3.5.1 NEFT/RTGS

RTGS is an electronic payment system that allows one person or an individual to transfer amount between two banks. And NEFT allows individuals as well as firms and companies to transfer funds from one bank account to another bank account. There is no mandate of minimum amount transfer in NEFT but for RTGS minimum amount is 2lacs.

3.5.2 Debit and Credit Cards

A debit card is a plastic card that is issued to an account holder by banks designed for electronic access to her/his bank account. Through card one can withdraw money and make purchases using money in the bank account. Bank gives the credit card to its account holder on the basis of a line of credit. And overdraft facility is provided to credit cardholders

3.5.3 UPI (Unified Payment Interface)

UPI is a versatile instalment framework which facilitates you to do different monetary exchanges on your cell phone. UPI enables you to send or get cash utilizing virtual instalment address without entering bank data.

3.5.4 AEPS (Aadhar Enabled Payment System)

AEPS is one of the best digital payment strategies. Through AEPS one can carry out various financial transactions such as transferring money, withdrawing money, depositing cash, making enquiry about bank balance, etc. on a micro ATM or Point of Sale(PoS) just by using his Aadhar number which is verified through fingerprint or iris scan.

3.5.5 USSD

The innovative payment service *99# works on Unstructured Supplementary Service Data (USSD) channel. This service allows mobile banking transactions using basic feature mobile phone, there is no need to have mobile internet data facility for using USSD based mobile banking. It is envisioned to provide financial deepening and inclusion of underbanked society in the mainstream banking services.

3.5.6 IMPS (Immediate Payment Service)

IMPS facilitates you to make interbank electronic money transfer anywhere and anytime i.e. 24*7 using your mobile phones. It is a very innovative tool to transfer money instantly within banks anywhere across India through mobile and internet.

3.5.7 Digital Wallets

This method is very helpful for regular online shoppers. It offers a secure, convenient, and manageable tool for online shopping. It stores user's information, both personal and financial such as credit cards details, passwords and Pins to facilitate the order process.

CHAPTER 4
DATA ANALYSIS AND INTERPRETATION

DATA INTERPRETATION

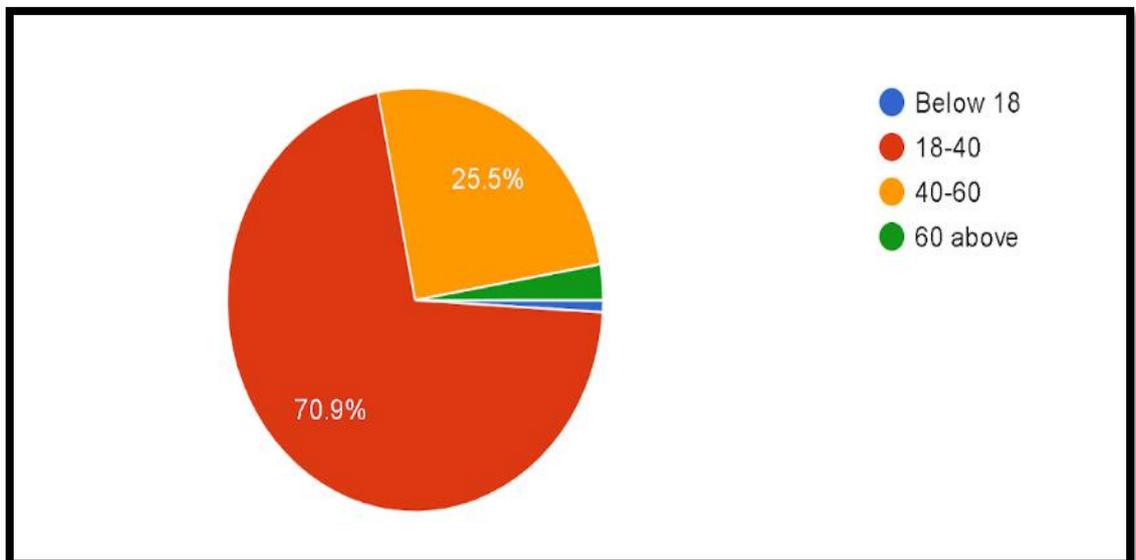
4.1 Age

Table 4.1

AGE GROUP	FREQUENCY	PERCENTAGE (%)
Below 18	1	0.9%
18-40	78	71%
40-60	28	25.4%
60 above	3	2.7%
Total	110	100

Source: Primary Data

Figure 4.1: Age



Interpretation: The above table No: 4.1 reveals that, out of 110 responses, demographic classification of 78 responses belonged to the age group of 18-40 (71%). People belonging to this category used digital payments frequently. The next highest category is age group of 40-60 (25.4 %). Like the former category they were also aware about digital payments. Below 18 amounted to 0.9% with one response and 60 above category aggregated 2.7%

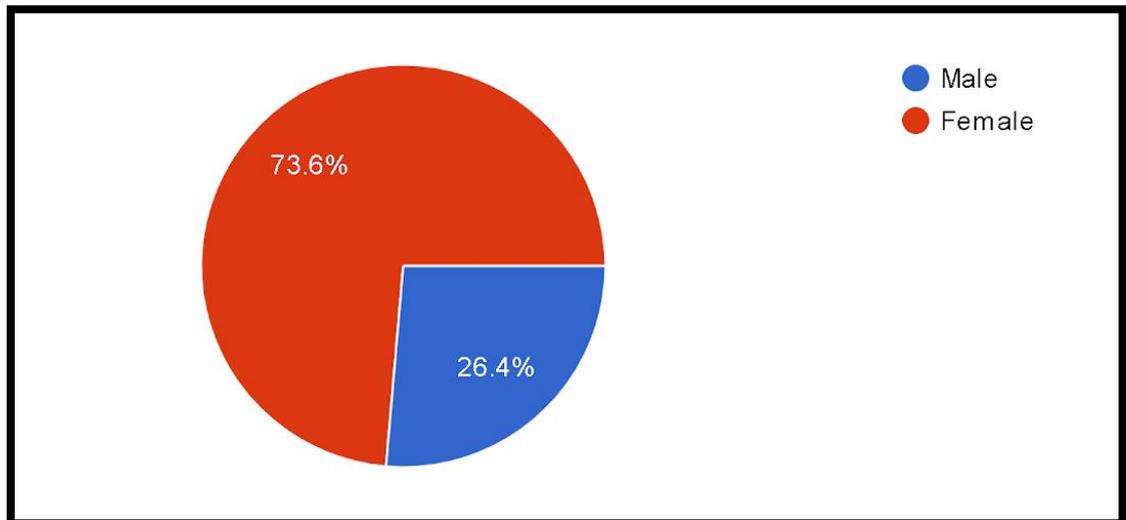
4.2 Gender

Table 4.2

GENDER	FREQUENCY	PERCENTAGE
Male	29	26.36
Female	81	73.64
Other	0	0
Total	110	100

Source Primary Data

Figure 4.2: Gender



Interpretation: Table No: 4.2 shows that female responses outnumbered male responses. Female responses being 73.64% and male responses being 26.36%. The Other category was nil.

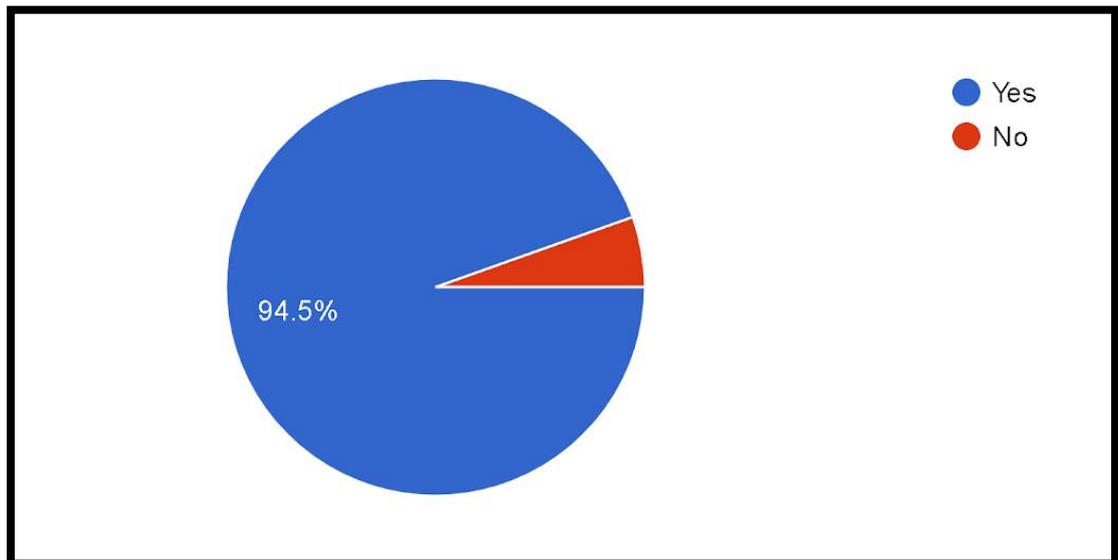
4.3 Usage of Digital Payments.

Table 4.3

RESPONSE	FREQUENCY	PERCENTAGE
Yes	104	95%
No	6	5%
Total	110	100

Source: Primary Data

Figure 4.3: Usage of Digital Payments



Interpretation: The above table 4.3 reveals that Majority of people are users of Digital payments (95%). Only 5% of people only used cash payments.

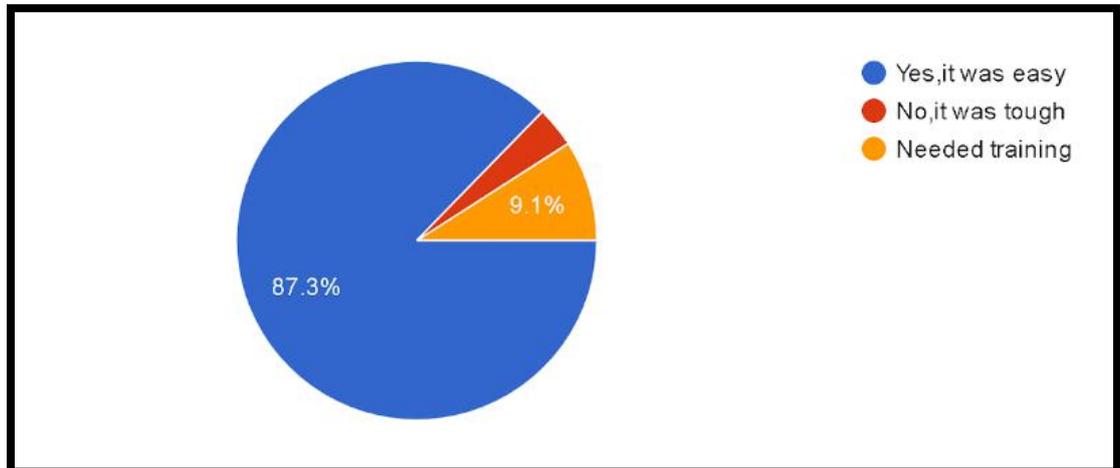
4.4 Transition to digital payments

Table 4.4

RESPONSE	FREQUENCY	PERCENTAGE
Yes, it was easy	96	87%
Needed training	10	9%
No, it was tough	4	4%
Total	110	100

Source: Primary Data

Figure 4.4: Transition to digital payments



Interpretation: The data shows that only 87% people were able to easily switch over to digital payments. The remaining respondents found it really hard to adapt to changes and required training.

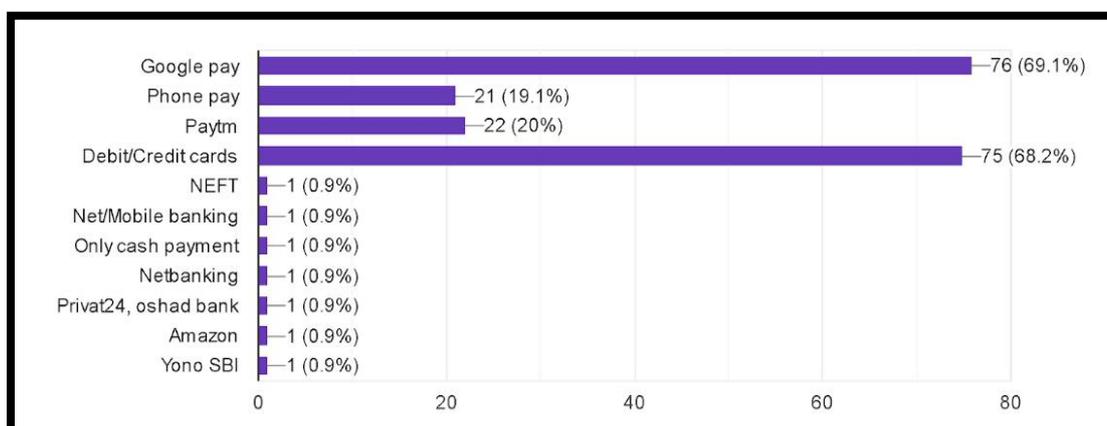
4.5 Frequently used Digital Payment services.

Table 4.5

Digital Payment	Frequency	Rank
Google Pay	76	1
Phone Pay	21	4
Paytm	22	3
Debit/Credit Cards	75	2
Others	7	5

Source: Primary Data

Figure 4.5: Frequently used Digital Payment services



Interpretation: Google Pay is the most frequently used digital payment system. It is followed by debit card/credit card and Paytm. Phone Pay is ranked 4th Position. Other category is occupying last position. It includes Net Banking, NEFT, Yono SEBI, Private24, Amazon, etc. There are also people only making cash payments in other category (0.9%).

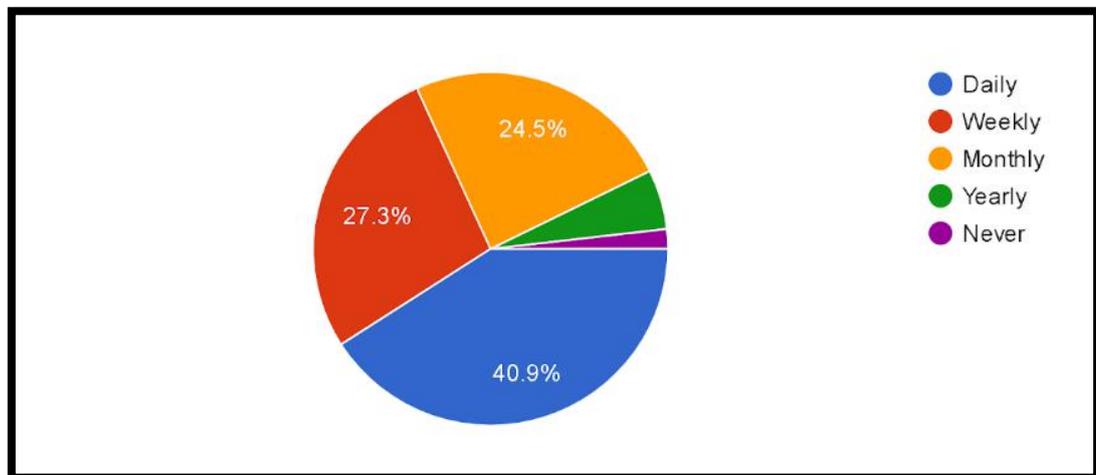
4.6 Frequency of usage of digital payments.

Table 4.6

CATEGORY	FREQUENCY	PERCENTAGE
Daily	45	41%
Weekly	30	27%
Monthly	27	24.5%
Yearly	6	5.5%
Never	2	2%
Total	110	100

Source: Primary Data

Figure 4.6: Frequency of usage of digital payments



Interpretation: According to the data collected, 41% of people used digital payments on daily basis. Whereas 2% of people never used digital payments. There were people who made digital transactions on weekly, monthly and yearly basis only. It shows that frequent digital users were less than 50%.

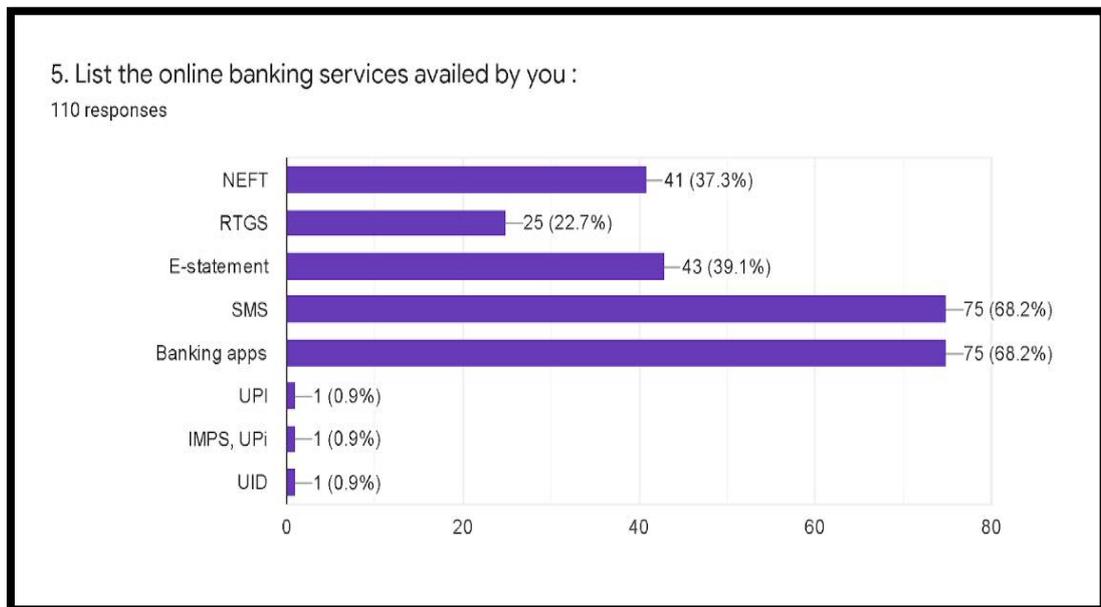
4.7 Online banking services availed by respondents.

Table 4.7

Category	Frequency	Percentage	Rank
NEFT	41	37.3%	3
RTG's	25	22.7%	4
E-statement	43	39.1%	2
SMS	75	68.2%	1
Banking Apps	75	68.2%	1
Others	3	2.7%	5

Source: Primary Data

Figure 4.7: Online banking services availed by respondents



Interpretation: In the above table no 4.7, the preference of customers are ranked according to the frequency of usage. SMS and Banking apps are the most widely availed online banking services (68.2%). Second most popular online banking service is E-statement (39%). Less than 50% of people used NEFT and RTG's. 2.7% of people use other services such as UID, UPI, and IMPS.

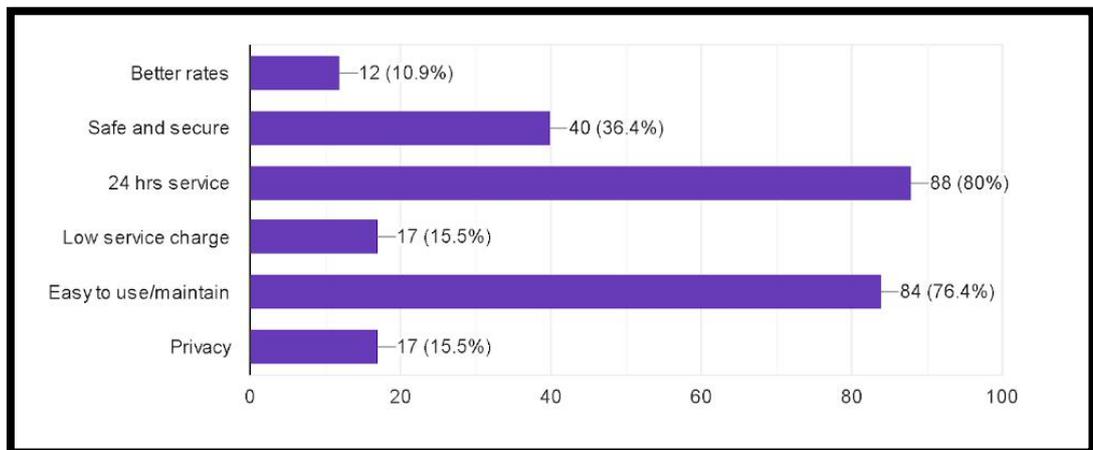
4.8 Reasons for choosing online banking services.

Table 4.8

Category	Frequency	Percentage	Rank
Better Rates	12	11%	5
Safe & Secure	40	36.4%	3
24 hrs service	88	80%	1
Low service charge	17	15.5%	4
Easy to use/ maintain	84	76.4%	2
Privacy	17	15.5%	4

Source: Primary Data

Figure 4.8: Reasons for choosing online banking services



Interpretation: In the table no 4.8, the most attractive features of online banking are revealed. 24 hrs services and easy use features are the most attractive features of online banking. People also agree that online banking is safe and secure. Low service charges and privacy features also attract people. Apart from this they also offer better rates which boosts customers satisfaction.

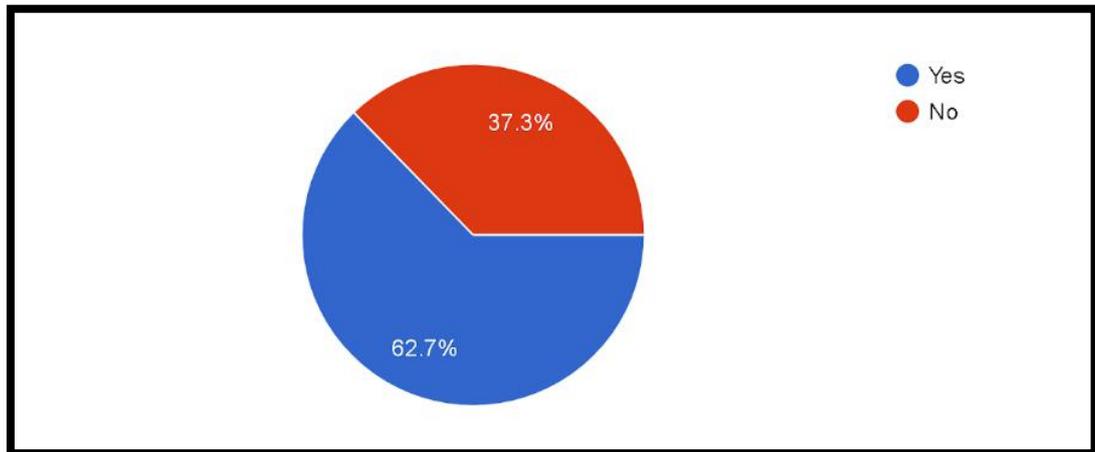
4.9 Network/ technical issues while using digital payment.

Table 4.9

Category	Frequency	Percentage
Yes	69	62.7%
No	41	37.3%
Total	110	100

Source: Primary Data

Figure 4.9: Network/ technical issues while using digital payment.



Interpretation: According to the data collected, majority of people (62.7%) complain that they face network issues while making digital payments. Less than 50% of people are able to make digital payments without facing any technical issues. This shows that lack of connectivity poses a major barrier to digital payments.

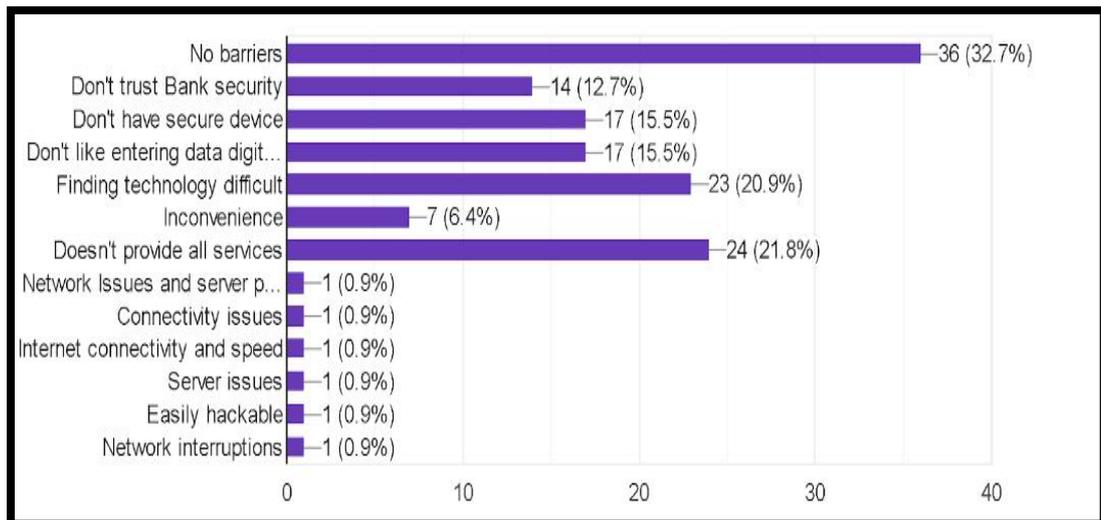
4.10 Major barriers of online banking.

Table 4.10

Barriers	Frequency	Percentage
No Barriers	36	32.7%
Don't trust bank's online security	14	12.7%
Don't have secure device	17	15.5%
Don't like entering data digitally	17	15.5%
Finding technology difficult	23	20.9%
Inconvenience	7	6.4%
Doesn't provide all services	24	21.3%
Network issues and others	6	5.4%
Total	110	100

Source: Primary Data

Figure 4.10: Major barriers of online banking.



Interpretation: It can be interpreted that around 33% of people are completely satisfied with online banking. The most discussed barrier of online banking is that it does not provide all services, like cash deposit. Also people do not trust banks in terms of private data shared digitally. 21% people find it difficult to adopt new technology.

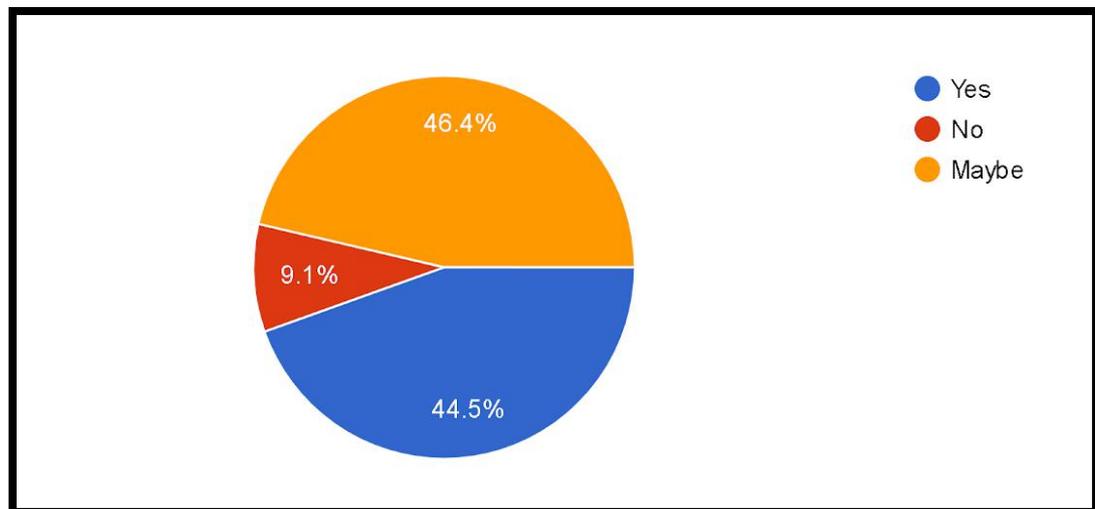
4.11 Safety and security of digital payments.

Table 4.11

Category	Frequency	Percentage
Yes	49	44.5%
No	10	9.19%
Maybe	51	46.4%
Total	110	100%

Source: Primary Data

Figure 4.11: Safety and security of digital payments



Interpretation: According to table no 4.11, most people distrust the safety and security of digital payments system. Only a small percentage of people have a hassle free and secure feeling with digital payments. Many have concerns about sharing data via the internet. This means that more safety and security features are required to increase confidence of the public.

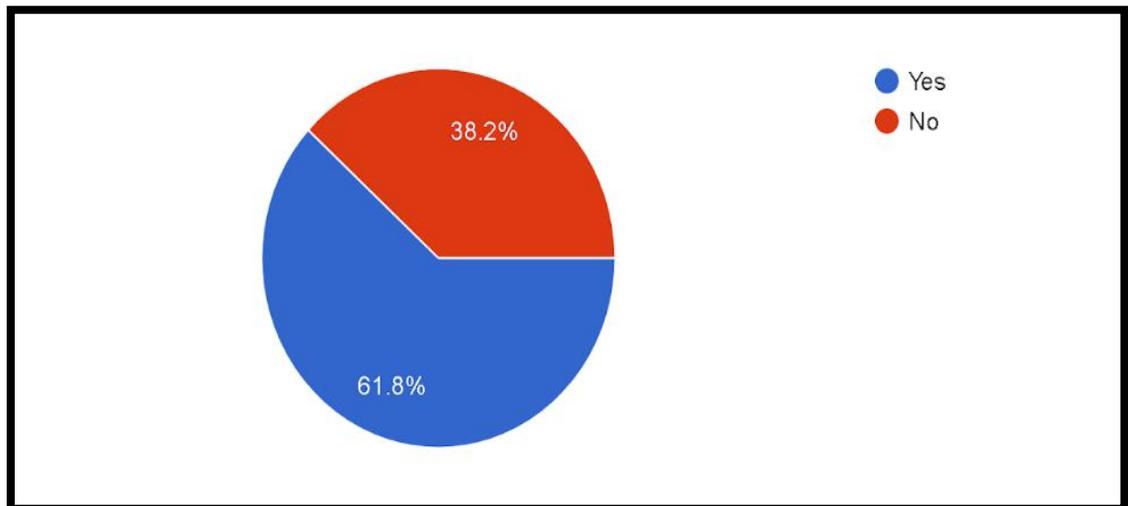
4.12 Security protection installed on PC/Laptop/ Mobile.

Table 4.12

Category	Frequency	Percentage
Yes	68	61.8%
No	42	38.2%
Total	110	100%

Source: Primary Data

Figure 4.12: Security protection installed on PC/Laptop/ Mobile



Interpretation: The table 4.12 reveals that majority of people are aware of frauds and they have taken a step towards safety and security. However, around 38% of people are still at risk during a digital transaction. They are in financial risk of losing money, spam, hacking and other fraud.

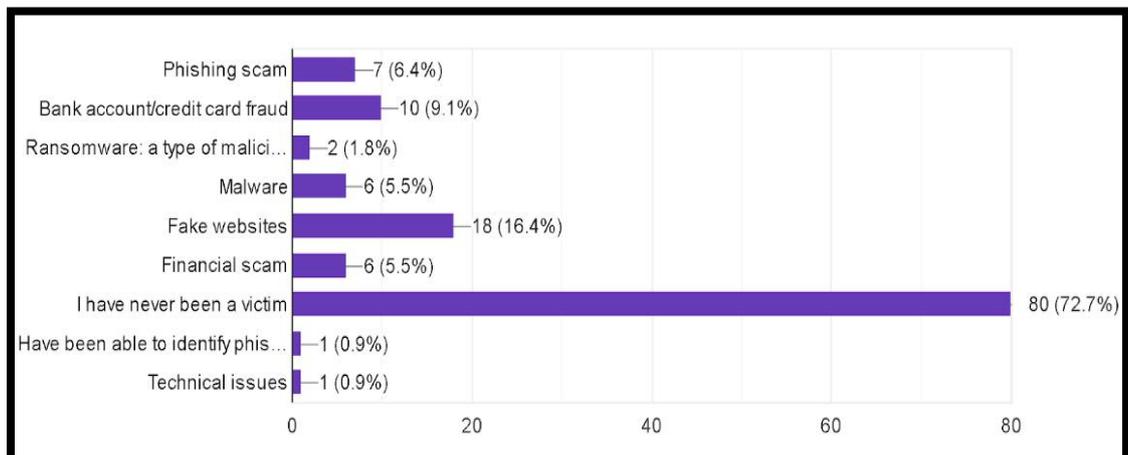
4.13 Security threats experienced while using digital payments.

Table 4.13

Security Threat	Frequency	Percentage	Rank
Phishing Scam	7	6.4%	4
Bank a/c / Credit card fraud	10	9.1%	3
Ransomware	2	1.8%	6
Malware	6	5.5%	5
Fake websites	18	16.4%	2
Financial Scam	6	5.5%	5
I have never been a victim	80	72.7%	1
Others	2	1.8%	6

Source: Primary Data

Figure 4.13: Security threats experienced while using digital payments



Interpretation: The data reveals that Almost 73% of people have never been a victim of frauds and have not lost any money. 16% people visited fake sites and 9% have been a victim of credit card fraud. 6% of people experienced phishing scam and the rest were victims of ransomware, malware, financial scam and technical issues. These types of frauds are very common in digital platforms. One must be very careful with these risks.

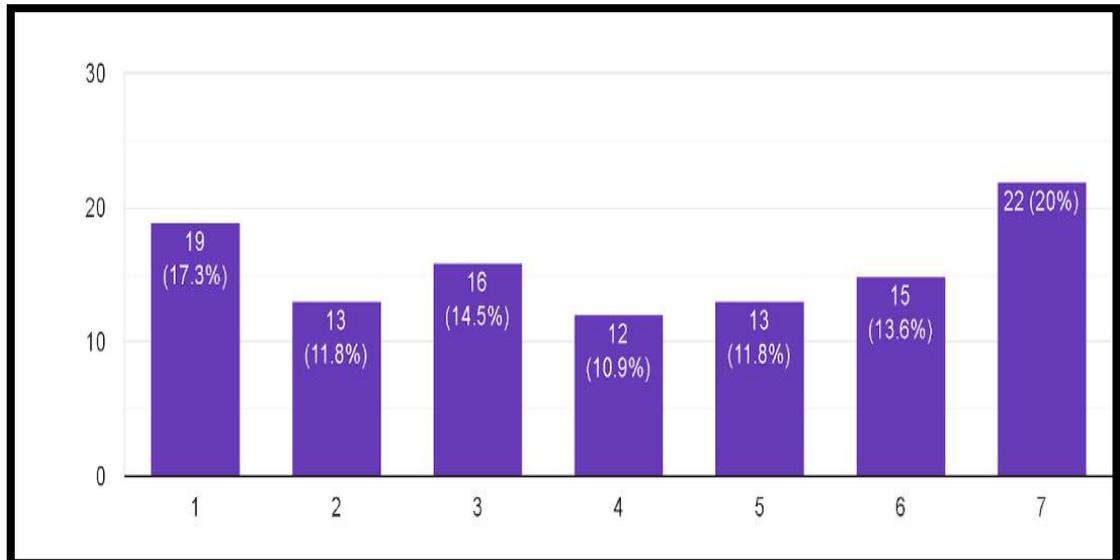
4.14 Usage of digital payments in Pre- Covid Scenario

Table 4.14

Category	Frequency	Percentage
1-3, Never to rarely	48	43.6%
4, Neutral	12	11%
5-7, More frequently	50	45.4%
Total	110	100

Source: Primary Data

Figure 4.14: Usage of digital payments in Pre- Covid Scenario



Interpretation: From the data we can see that, during the pre-covid scenario, 45% of people were more frequently using digital payments whereas 44% of people used digital payments rarely. 11% people made both cash payments and digital payments simultaneously.

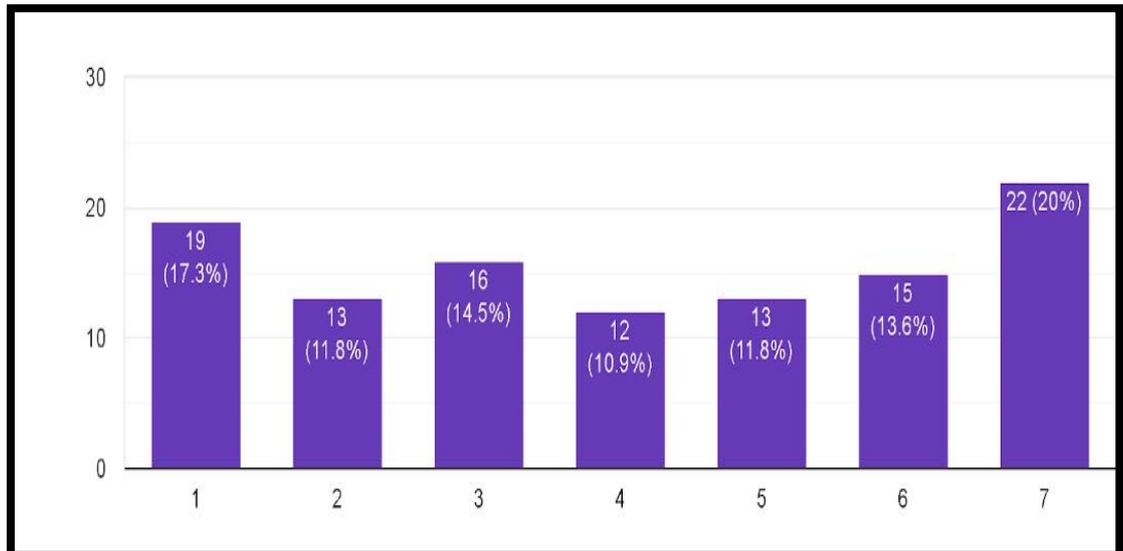
4.15 Usage of digital payments in Post-Covid scenario

Table 4.15

Category	Frequency	Percentage
1-3, Never to rarely	20	18%
4 Neutral	5	5%
5-7, more frequently	85	77%
Total	110	100

Source: Primary Data

Figure 4.15: Usage of digital payments in Post-Covid scenario



Interpretation: From the above table 4.15, it is visible that more people started using digital payments in post covid scenario (77%). 5% people simultaneously used both cash and digital payments system. 18% people still rarely use digital payments. Digital payments saw a huge increase in use during the pandemic.

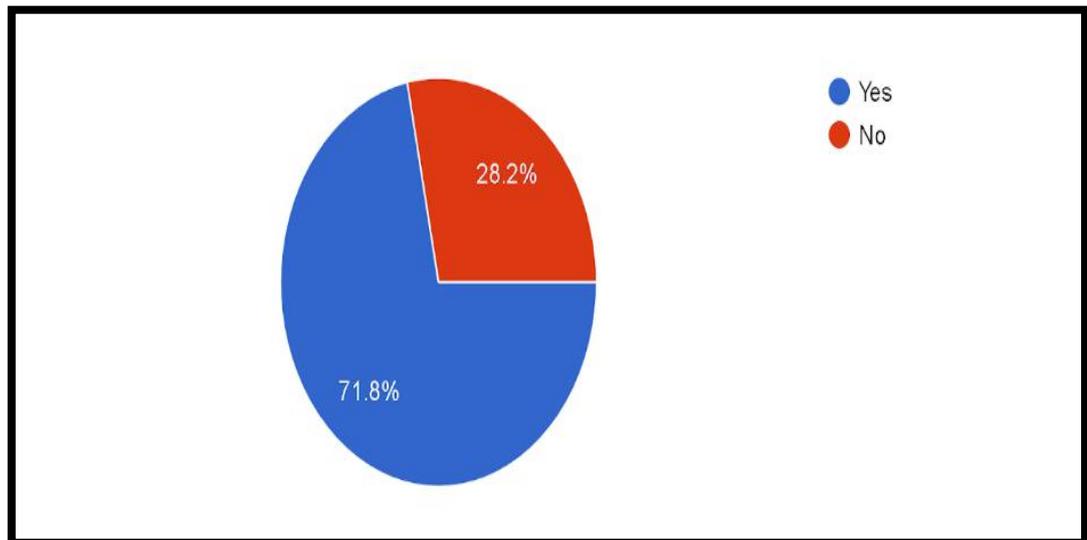
4.16 Concerns regarding sharing personal data digitally.

Table 4.16

Category	Frequency	Percentage
Yes	79	71.8%
No	31	28.2%
Total	110	100

Source: Primary Data

Figure 4.16: Concerns regarding sharing personal data digitally



Interpretation: As per the data collected, 72% of people express their concern for sharing their details regarding their bank account digitally. However, 28% are not worried about sharing their details. People are still overall concerned regarding privacy and security and so, are hesitant in using digital payments.

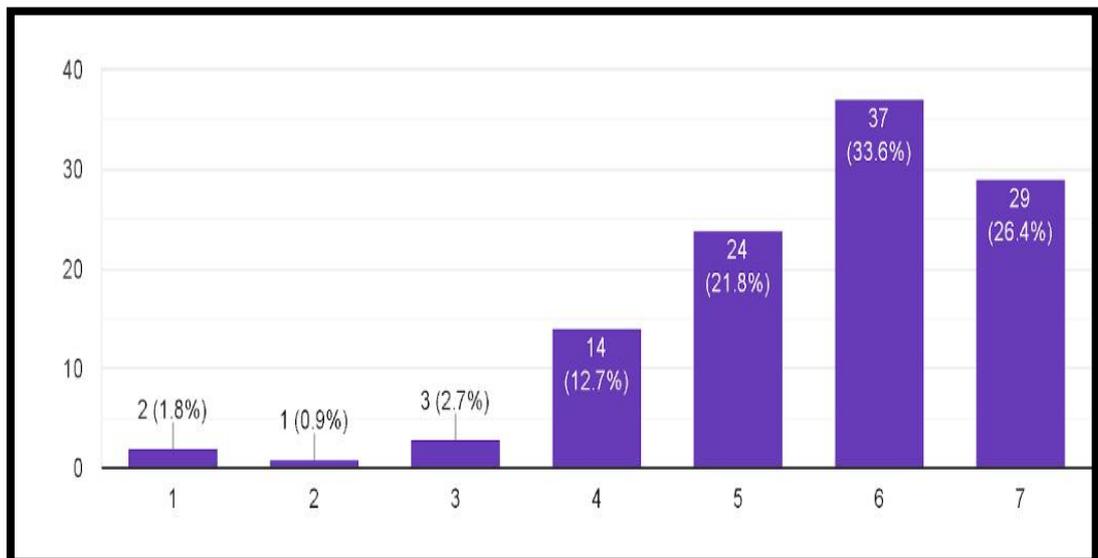
4.17 Degree of satisfaction while using digital payments

Table 4.17

Category	Frequency	Percentage
1	2	1.8%
2	1	0.9%
3	3	2.7%
4	14	12.7%
5	24	21.8%
6	37	33.6%
7	29	26.4%
Total	110	100

Source: Primary Data

Figure 4.17: Degree of satisfaction while using digital payments



Interpretation: The table 4.17 shows that only 26% of the users are highly satisfied with digital payments systems. Digital payments systems can be made more advanced and customised to meet the demands of its customers, thereby increasing satisfaction.

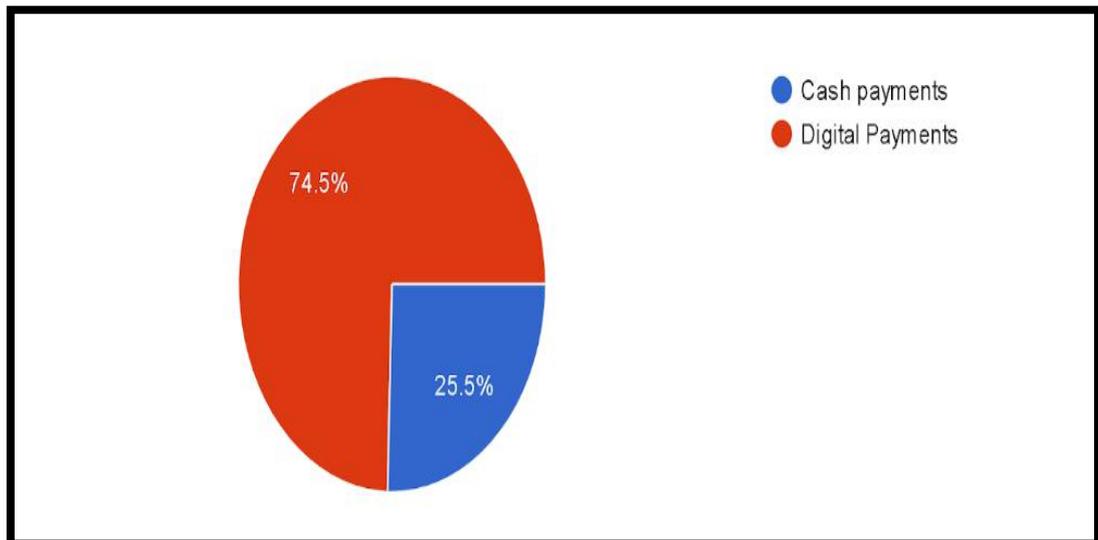
4.18 Preferred mode of payment.

Table 4.18

Category	Frequency	Percentage
Cash Payments	28	25.5%
Digital Payments	82	74.5%
Total	110	100

Source: Primary Data

Figure 4.18: Preferred mode of payment



Interpretation: The table 4.18 shows very clearly that 75% people agree that digital payment is better than cash payments. The remaining respondents are satisfied with cash payments.

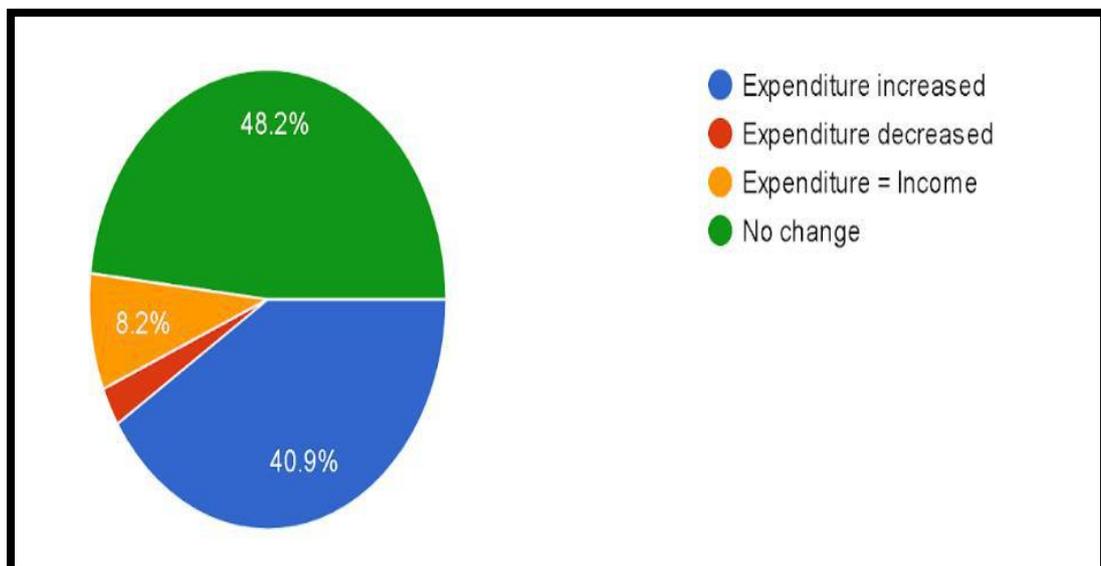
4.19 Changes brought to financial life by digital payments.

Table 4.19

Category	Frequency	Percentage
Expenditure increase	45	40.9%
Expenditure decrease	13	2.7%
Expenditure = Income	9	8.2%
No change	53	48.2%
Total	110	100

Source: Primary Data

Figure 4.19: Changes brought to financial life by digital payments



Interpretation: The table 4.19 reveals that 48% of respondents had no change in expenditure while 41% people agree their expenditure increased using digital payment methods. Only 2.70% claims that their expenditure has decreased over time.

CHAPTER 5
SUMMARY, FINDINGS, RECOMMENDATIONS
AND CONCLUSION

5.1 Summary

The study was conducted on the topic, 'Digital Payments in Cashless India'. 110 responses were collected from people residing in Ernakulam district.

Our study emphasised on the safety and security of online payments, services provided online and changes made in financial life by digital payments. It shows the navigation from cash transactions to cashless transactions.

Major part of our respondents belonged to the age group 18-40. It shows that digital payments are more popular among this age group of people. The study reveals the easy adaptability of digital payments. However some required training to switch to new technology. Also preference of payment methods between cash and digital payments was evaluated. The survey revealed that majority of respondents are satisfied using digital payments. We also did a comparative study of digital payments usage in the pre-covid and post covid scenario.

The study indicates that digital payments have emerged as a new trend in the modern market.

5.2 Findings

The data collected from different people of different age groups with the structured questionnaire was analysed to find out the answers for the research questions. The following are the findings/ observations from the responses that was collected.

Findings based on objectives:

Objective 1: To discover the significance and need for digital payments.

- Majority of people are users of digital payments. About 95% respondents use digital payments while 5% use only cash payments.
- Over the past 2 years, due to the pandemic, almost 87% people switched to digital payments.
- Many people availed banking services online. SMS and Banking apps were the most widely used.

Objective 2: To measure the growth of digital payments.

- It was found that almost 41% of people used digital payments on a daily basis.
- Around 32% of people are completely satisfied using digital payments.
- It was found that pre-covid, 41% of respondents were using digital payments frequently. Now, post covid, 77% of people are using digital payments.
- The data showed that 75% of people agreed that they are satisfied by using digital payments.

Objective 3: To measure safety and security

- 44.5% of people distrust the safety and security of digital payments systems.
- 38% of people shared that they felt they are at risk during a transaction,
- 61.8% of people are aware of frauds and hacks.
- The study revealed that 73% of respondents have not been victims of frauds.
- 9% of respondents have been victims of online fraud.
- The study reveals that 9% of the respondents needed training to use digital payments and 4% faced difficulties. On the other hand 16% of respondents visited fake payment websites and got cheated.
- 28% of respondents answered that they are not concerned about sharing personal data. 72% people expressed concern. This shows that only a few people trust digital payment system.
- 75% of users prefer digital payments over cash payments.

Objective 4: To understand the consequences of digital payments

- It is understood that Google pay is the most widely used digital payment system. It is ranked 1 amongst 5 payment systems.
- 62.7% respondents complain that they face network issues while making online payments. 22% of people complained that online banking services do not provide all the services a bank does.
- The study conveys that more people started using digital payments post covid. But due to security and technical issues, 18% still rarely use digital payments.

5.3 Recommendations

- Access to stable internet connection needs to be increased and made better
- People in remote areas, elderly people, students etc. can be made aware of digital payment methods and can be taught how to use them.
- Banks can increase the level of security and privacy during online transactions.
- Fraudsters and scammers must be identified and punished
- The digital payment system can be upgraded and improved to completely eliminate online frauds and hacking of personal data.
- There should be an effort to promote digital literacy and digitalised financial inclusion nationwide.

5.4 Conclusion

The study was conducted to measure the usage of digital payment systems. It also sought to find the degree of customer satisfaction when using them. Safety and privacy features are offered by digital payment systems. Online banking services are protected and kept highly confidential. But small percentage of risk still remains with regard to frauds and hacking. In banking institutions, majority of data are stored in secure servers. These servers may crash or get some technical issues. Sometimes data can be lost, security breaches may occur. Taking these factors into consideration digital payments may not be the best choice for some.

Nevertheless, digital payments also have merits such as prompt payment, 24 hrs service, convenience etc. one major advantage of digital payments is it creates corruption free environment. If this system is installed seamlessly and securely into the financial system of the nation, it can eradicate corruption and black money in society.

As the transactions are channelized by commercial banks, every single rupee income earned will have an identifiable source. This prevents tax evasion. Digital payments could be the future of all financial transactions in India.

BIBLIOGRAPHY

Journals:

Goriparthi, Ravi Kumar, Tiwari, Pankaj, Demonetisation in India an era for digital payments, Splint International Journal of Professionals, Jan 2017

Md Arif Hassan, Zarina Shukur, Mohammad Kamrul Hassan and Ahmed Salih al Khaleefa, A review on electronic payments Security, National University Malaysia, 2020

KM Siby, A study of consumer perception of digital payment methods in times of covid pandemic, International Journal of Scientific Research in Engineering and Management, 2021

KK Aggarwal, Malik, Mishra, Paul, Moving from cash to cashless economy, toward digital India, Journal of Asian Finance, Economics and Business, 2021

Dr C Mallesha, A case study on perception towards online payment systems among urban and rural customers, International Journal of Advanced Research in Commerce, Management and Social Science, 2021

Sudiksha Sree, Bhanu Pratap, Rajas Saroy and Sarat Dhal, Digital payments and consumer experience in India: a survey based empirical study, Journal of Banking and Financial Technology, 2021

Sophie Mützel, Unlocking the payment experience: Future imaginaries in the case of digital payments, SAGE Journals, 2021

Dr Anupam Saxena, Dr Shalini Nath Tripathi, Exploring the security risks and safety measures of mobile payments in fintech environment in India, Jaipuria Institute of Management, 2021

P.R Jeyalakshmi, A.S.Lakshmi Rani, Attitude of the Community towards Digital payments Usage in Thrissur District - with special reference to Digital- Economy District initiative, Palarch's Journal of Archaeology of Egypt/Egyptology, 2021

Nenavath Sreenu, Cashless Payment Policy and Its Effects on Economic Growth of India: An Exploratory Study, ACM Transactions on Management Information Systems, 2020

Online Articles:

- <https://sciendo.com/pdf/10.2478/njms-2019-0008>
- https://link.springer.com/chapter/10.1007/978-3-642-55032-4_5
- <https://www.thehindubusinessline.com/news/digital-payments-in-india-to-grow-to-717-of-all-payment-transactions-by-2025-report/article34204827.ece>
- <https://customerthink.com/7-benefits-of-electronic-payments/>
- <https://link.springer.com/article/10.1007/s42786-020-00024-z>
- https://en.m.wikipedia.org/wiki/Mobile_payments_in_India

Reports:

- Digital Payments, Cashless India, Government of India, 2021
- Retail Payment habits in India, RBI Bulletin, Reserve Bank of India, 2021

Websites:

- <http://cashlessindia.gov.in/>
- <https://scholar.google.com/>
- <https://en.everybodywiki.com/>
- <https://en.m.wikipedia.org/>

APPENDIX

QUESTIONNAIRE

QUESTIONNAIRE

A STUDY ON DIGITAL PAYMENTS - A GROWING TREND IN THE MODERN MARKET

I. Name

II. Age

- Below 18
- 18-40
- 40-60
- 60 above

III. Gender

- Male
- Female
- Other

1. Do you use digital payments systems?

- Yes
- No

2. Were you able to easily switch over to digital payments?

- Yes, it was easy
- No, it was tough
- Needed training

3. Which digital payment methods do you use frequently?

- Google Pay
- Phone Pay
- Paytm
- Debit/Credit cards
- Others- specify

4. How often do you use digital payments?

- Daily
- Weekly
- Monthly
- Yearly
- Never

5. List the online banking services availed by you:

- NEFT
- RTGS
- E-statement
- SMS
- Banking Apps
- Other- specify

6. What are your reasons for choosing online banking services?

- Better rates
- Safe and secure
- 24 hrs service
- Low service charge
- Easy to use/maintain
- Privacy

7. Do you face network/technical issues while using digital payments?

- Yes
- No

8. What do you think is the major barrier of online banking?

- No barriers
- Don't trust Bank security
- Don't have secure device
- Don't like entering data digitally
- Finding technology difficult

- Inconvenience
- Doesn't provide all services
- Other- specify

9. Do you feel digital payments are safe?

- Yes
- No
- Maybe

10. Do you have security protection installed in your PC/Laptop/Mobile?

- Yes
- No

11. Which of these security threats have you been a victim of?

- Phishing scam
- Bank account/credit card fraud
- Ransomware
- Malware
- Fake websites
- Financial scam
- I have never been a victim
- Other- specify

12. Usage of digital payments in pre-covid scenario

	1	2	3	4	5	6	7	
Never	<input type="radio"/>	More frequently						

13. Usage of digital payments in post-covid scenario

	1	2	3	4	5	6	7	
Never	<input type="radio"/>	More frequently						

14. Do you have any concern for sharing your personal data digitally?

- Yes
- No

15. Degree of satisfaction while using digital payments.

	1	2	3	4	5	6	7	
Never	<input type="radio"/>	More frequently						

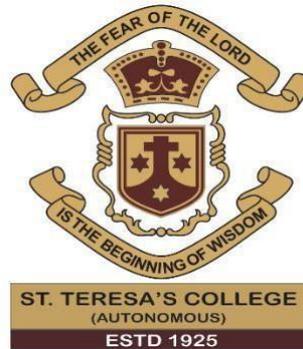
16. According to you, which mode of payment is better?

- Cash payments
- Digital Payments

17. How do you think digital payments have changed your financial life?

- Expenditure increased
- Expenditure decreased
- Expenditure = Income
- No change

DIALOGICAL ANALYSIS OF WESTERN MOVIES



Project submitted to St. Teresa's College (Autonomous) in partial fulfilment of the requirement for the degree of BACHELOR OF ARTS in English Language and Literature

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DECLARATION

I hereby declare that this project entitled “Dialogical Analysis of Western Movies” is the record of bona fide work done by me under the guidance and supervision of Dr. Jisha John, Assistant Professor, Department of English.

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CERTIFICATE

I hereby declare that this project entitled “Dialogical Analysis of Western Movies” by Nayanathara S is a record of bona fide work carried out by her under my supervision and guidance.

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Dialogical Analysis of Western Movies

**By
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**BA English Language and
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**Register Number: AB19ENG015 (2019-
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Films are a part of human culture and communication that in addition, function as medium of critical study. The project attempts to understand how Individual utterances and group dialogues play a significant role in the development of a film and in the interpretation of its characters. Dialogical interaction analysis, refers to a method of analyzing human communication which is based on the theory of dialogism. The major proponents of the theory include George Mead and Mikhail Bakhtin, and the approach has been developed based on their theoretical works.

The work is divided into two chapters. The opening Chapter is titled, 'A Theoretical Approach' and it entails a detailed study of the theories. Chapter one is titled, 'Western movie through the lens of Bakhtinian theories'. The section looks into the analysis of a 1996 Neo western mystery thriller, 'Lone Star' and tries to establish a relationship between the conversations of the community as a whole and as different racial groups. In spoken language analysis, an utterance is the smallest unit of speech that is continuous, beginning and ending with a clear pause. As Flanagan (2009) defines, the films may be used "to symbolize values of domination as well as entertainment and as a field of communication is richly multivalent, speaking with a voice often contradictory that deserves a sensitive audience".

The third chapter titled, 'Theoretical Analysis of Shutter Island' dissects the mystery thriller 'Shutter Island' and attempts to bring out the significance of dialogism in the movie. Underlying emotions of the characters like confusion, alienation, repressed anger, pity is displayed through verbal dialogues and conversations. The conclusion chapter effectively summarizes and reflects on the thesis.

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Nayanathara S

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INTRODUCTION

Western movies can simply be defined in three basic terms- Unique American Narrative form. It is deeply ingrained as to constitute a national myth. As it migrated across geographical boundaries, it is evident to notice its direct alignment with national ideology and history. Keeping in mind the famous philosopher Mikhail Bakhtin and his crucial concept of Dialogism, polyphony and historically situated utterances, these theories has been a major foundation upon which western movie has been thrust upon. Unlike other Formalist, Bakhtin looked at language as a social phenomenon.

Bakhtin focused primarily on novels, compared novels of two eminent Russian authors, Dostoevsky (1821-1881) and Tolstoy (1828-1910). Bakhtin felt that Dostoevsky's novels are 'Dialogic' and that of Tolstoy's are 'monologic'. Bakhtin introduced the concept of Dialogism in his work, " Problems of Dostoevsky's Poetics" (1929). Bakhtin in his study, revealed that a Novel has one or two characters, there exist an interaction or dialogue between these characters. Dialogue is a reciprocal relationship between two or more entities or people. The answer to a supposed question being asked is an inherent part of the question. Polyphony is inherent in all words or forms. Being a polyphonic literary work, It does not mean that the author's worldview is absent, but this worldview does not define, limit, qualify the other voices. Polyphony in literature is a feature of narrative, which includes a diversity of simultaneous points of view and voices. Polyphony is the collective quality of an Individual utterance; capacity of an utterance to embody someone else's utterance, creating a Dialogic relationship between two voices.

Bakhtin's theory has no room for the concept of the performative because 'all speech acts' are 'social acts', not just performative ones. All utterances are 'speech acts' that engage a 'social obligation'. According to Bakhtin, sentences do not indicate a change of speech

subject, the sentence as a language unit is grammatical in nature, while an utterance is “ethical”. In a spoken language analysis, an utterance is the smallest unit of speech that is continuous, beginning and ending with a clear pause.

The movies taken are best examples of Dialogic historical literary work. It is Dialogic in the sense that there is a presence of such multiple voices in which various accents, languages and thoughts are continuously interacting and negotiating. Further analysis of the movie in the light of Bakhtin's Theory, another term that can come across is 'Polyphonic Dialogue'. Both are interrelated concepts. There is dialogue happening between many voices, and one gets to see the world from the perspective of several people or characters. Different characters have their own sound, presence, thoughts, opinions and the like. The viewer receives the same from the characters. At the same time, the presence of the script writer, is also significant as the story plot and dialogues have to be linked by the movie writer without destroying the Identity of the characters. Movies, short films, series play an important part in everyone's life. It is the reliable source of entertainment, and intellectual development. Surprisingly, western films are neither exclusively about the past nor a reflection of contemporary contexts and concerns. And this statement needs more substantial facts and comparative analysis with films from Japan, Brazil, and India. The function Western movies play is vast and diverse. For some people, Western is a style and an identification. For others, it can be a genre that celebrates genocide and a fitting tool of condemnation. A historical reflective approach would prove useful in the analysis of the Western movies. Social Interaction has been identified as a preventive factor for negative psychological confinement effects. Consequently, this project undertakes a dialogic approach that draws attention to how meaning is created by viewer responses to social texts.

Chapter 1

A THEORETICAL APPROACH

Michael Bakhtin is without doubt an original and idiosyncratic thinker who has proved his caliber in a wide range of disciplines- linguistics, philosophy, music, arts, sculpture and the main, literary theory. Re-evaluating the Bakhtinian concept on Hollywood action films and animated movies can give a concrete idea about different perspectives of narrative analysis.

The various theories of Mikhail Bakhtin like Dialogism, Cinematic Chronotype, Polyphony and Heteroglossia. Dialogism refers to the process by which meaning is evolved out of interactions among the author, the work and the reader or listener. These elements are also affected by the contexts in which they are placed, namely by social and political forces. They can be ambivalent or contradictory but they exist.

According to Bakhtin, a monologically understood world is an objectified world; world consisting of a single and unified authorial consciousness. Bakhtin does not restrict the concept of Dialogic interaction to the characters in a novel. It can vary as to how one work influences another literary work. He also applies to the social context and also to the relationship between literary works. For instance, an idea or situation mentioned in a particular work makes the Individual reconsider the idea the person previously came to know in a different work. Both works influence each other. The Dialogic work carries on a continual dialogue with other works of literature.

Movies are an important tie to reality. They show us the world in a way that other art forms can't. The acknowledgement of a movie lies in its presentation of sights and sounds and how that presentation makes it importantly unique. Movie can be used to symbolize values of domination as well as entertainment. What I've understood is that there are a few

shortcomings in analysing a movie. One, a movie is said to be a cinematic Realism. But it isn't really one. The various film technicians like semioticians and imaginative engagement theorist are held responsible for making the movie a true cinematic experience. They create the communicative ability and interactive space. When these film technicians fail to create the right communicative sphere , the movie fails to show it's Cinematic realism. It is mandatory to give complete justice to a movie's different layers of meaning perceptual, communicative, representational and epistemic linkings.

It showcases reality and they provide natural cues of meaning- analysing in finer detail the background scenery, weather, time, and the expression and facial gestures of the artists.

Bakhtin largely concerned himself with novels, and while these featured grotesque monsters and improbable events, they told stories contemporary rulers were not keen to hear. Since then, Bakhtin's ideas have largely been applied to texts, particularly those that display carnivalesque properties, commented Martin Flanagan in his book, 'Bakhtin and the movies: New ways of understanding Hollywood film'.

How films work? And the continuation to this question: what work does one perform in watching the film? The answer to this this is found in the extrapolation of The Bakhtinian Concepts especially dealt in this study.

Polyphony is usually used to denote certain pieces of music, in which different melodic lines are sung or played simultaneously. They are played parallel to each other and this achieves a kind of harmony. This is usually known as a polyphony. Bakhtin in his study of 'Dostoevsky's Poetics' which was published as 'Problems of Dostoevsky's Art' borrowed this term from the world of music and used it to signify what he considered to be a unique feature that characterized Dostoevsky's novels.

In his author's preface Bakhtin writes in his “Problems of Dostoevsky's Poetics” (1963)- “We consider Dostoevsky as one of the greatest innovators in the realm of artistic

form. He created in our opinion, a completely new type of artistic thinking which we have provisionally called polyphonic.”

Bakhtin in a more elaborate sense explains what he meant by the use of polyphony in Dostoevsky's novels. “A plurality of Independent and unmerged voices and consciousnesses, a genuine polyphony of fully valid voices is in fact the chief characteristic of Dostoevsky's novels. What unfolds in his works is not a multitude of characters and fates in a single objective world, illuminated by a single authorial consciousness; rather a plurality of consciousnesses, with equal rights and each with its own world, combine but are not merged in the unity of the event. Dostoevsky's major heroes are, by the very nature of his creative design, not only objects of authorial discourse but also subjects of their own directly signifying discourse.” (Discourse in the Novel".1941)

Polyphony is here defined in terms of plurality; this plurality is referred to as the plurality of " independent and unmerged voices as well as consciousnesses". The qualifiers independent and unmerged are as important as the notion of plurality. Polyphony is contrasted with the unity of a "single authorial consciousness". In the movie that is being analysed, there are a number of characters and each of these characters speak their different lines. This is a kind of plurality of voices, but according to Bakhtin this does not automatically mean that the movie can be categorized as a polyphonic artwork. In other words, plurality of voices does not lead to genuine polyphony. It is because, according to Bakhtin, many movies and novels are written or directed in a way that conveys just the single consciousnesses, the world view of its creator, and the numerous characters that one might encounter, act merely, as so many mouthpieces of that single authorial consciousness. There are plurality of speeches, but not a plurality of ways in which the world is being looked at and is being engaged with.

This uniformity is not only found in movies or novels but may also be encountered

in other literary genres, in a drama for instance. Compared to novels, In Drama and Movies, the plurality might be even more intense as we physically encounter different characters speaking their own different lines while acting out the character role. Even though the author might not be visible, the lines that all the characters speak might just be so many echoes of the single authorial consciousness. So this underlying unity and sameness in a novel and by extension any other literary form is what Bakhtin describes as Monologism. Monologism, an important term, would literally mean a single discourse or a single utterance.

Each of these characters that we encounter in a novel has a unique consciousness, he or she has a unique way of interpreting the World around him or her, and that person also has a unique way of engaging with the world. And this translates into what Bakhtin calls the plurality of Independent and unmerged voices which forms the essence of genuine polyphony. So whereas the assertion of the single authorial consciousness results in monologism, the presence of a genuine polyphony creates what Bakhtin calls Dialogism.

Moreover, we need to understand that a literary work like a novel, movie or even a drama might have dialogues without being Dialogic in nature. Even a monologic literary work might have what is conventionally regarded as dialogues or lines uttered by different characters. But if these lines are all pervaded by the single consciousness of the author then the literary piece will not count as Dialogic in Bakhtin's scheme of things. "Dialogic relationships are a much broader phenomenon than mere rejoinders in a dialogue, laid out compositionally in the text; they are an almost universal phenomenon, permeating all human speech and all relationships and manifestations of human life, everything that has meaning and significance." (Problems of Dostoevsky's Poetics)

Bakhtin's assertion that Dialogism is not something unique to certain kinds of literature, but rather, "Dialogism is an almost universal phenomenon, permeating all human speech and all relationships and manifestations of human life, (and) everything that has

meaning and significance." – "Problems of Dostoevsky's Poetics". (1963)

Bakhtin further writes in his later essay, "Discourse in the Novel", (1941), about Dialogism as a universal characteristic of human discourse. Bakhtin argues that whenever we direct our utterances towards an object, object being a physical object or an idea, or a concept, our words enter into a dialogue with other utterances. In our daily life, instances like discussing a movie with a family member, deciding which place serves the best food, or conversing with a friend about the nature of romanticism in a poem. In all these examples, one can notice that one's utterances are directed towards different objects, either material or abstract.

None of these utterances are spoken in vacuum. All of these objects have already been spoken about by others and also by the people that we were at that point of time communicating with. The speaker's words are articulated within a space which is already marked by all these previous utterances that have been spoken by others. An Individual or speakers' utterance is always in a dialogue with these previous utterances and it is precisely by being in a dialogue that any particular utterance gains any meaning.

Any concrete language used is automatically Dialogic because utterances can only be meaningful once it enters the tension filled environment of other words, which are articulated by other people with consciousnesses that are independent and unmerged from my own. An example of a concrete language used like a novel, for instance, cannot, but be dialogical. In some other works, the author's monologic tendency might be observable where there is an attempt by the author to assert a single viewpoint. Even in the later kind of texts, it is possible to hear the echo of alien words, of other independent consciousnesses which creates the field of signification and meaning making. Even if the author's tendency is monologic, it is possible for a text to be read dialogically.

What is this Chronotype? Chronotype can be defined as the textual site of the

Interaction of time and space. It is the device for analyzing the representation of time and space in the novel. 'Film is the medium where, at a particular place and specific time, a visual representation of spatial reality unfolds at around twenty-four frames per second, projected onto a screen with definite spatial parameters'. (Reference: Bakhtin, 'Forms of Time and of the Chronotype in the Novel').

An instance we can take here is Blockbuster Hollywood movies like The Star Wars, James Bond series, The Indiana Jones. These are action packed movies that were texts before being series of films. The main point is these films were shot in which textual time keeps no relation with the Human time outside the frame. The main character or protagonist has not aged over the course of many years and releases, although the ages of the actors chosen to play that particular actor has varied considerably. The internal logic of the action movie or genre as manifested in the representation of time and space can be seen to exploit the dialogical traces of other films that attend our viewing. From this we can infer that applying Bakhtinian theories while closely looking at a movie we can restore the socio-cultural inflections to textual analysis.

The theory of Dialogism is arguably one of the prime Bakhtinian thought. In a movie all discourses exist in the form of dialogues between the characters. The utterance is semantically implied around the anticipated response of an addressed. Each word uttered in a single dialogue has a new usage and is malleable. Dialogism operates within these exchanges of words. Bakhtin extrapolates the theory of Dialogism to a consideration of how the relationship between the literary text and the reader or viewer enters into the internal construction of the discourse. This feature recurs in the reception of filmic texts where the passage of meaning of text to the spectator can be interpreted as a dialogical process. The Theory of Dialogism can open up this rigid formulation to identify the nature of role that the viewer plays in the textual process. The role of the spectator in film may be more crucial than

that of the reader in the novel, the medium that Bakhtin chooses as his model of textual Dialogism. That is why it is proven that Films are much more flexible than novels as there wouldn't be much outcry if alterations or additions were employed in a film.

The theory of polyphony is evident in Hollywood movies. The acclaimed director, David Mamet explores how utterances, verbal performances and dialogues drive the power of games to characterize human interactions. His celebrated movie, 'House of Games', represents the territory of examination for Bakhtinian polyphony. Polyphony can be construed as a manifestation of dialogic principle of text. Although his films feature many colourful clear and string voices, and their verbal battles moulded around spectacular narratives, he is criticised for his excessive textual control and problematic representation of women. Heteroglossia on the other hand, in simpler words means every word or expression will have different layers of meanings or varieties of language inside it. All these theories have been re-analysed so as to prove if these Hollywood movies have been taken with the framework of Bakhtinian concepts.

CHAPTER – 2

Western Movie through the lens of Bakhtinian Theories

When it comes to American Cinema, it's easy to forget that behind the glitz and glamour of Hollywood, there has always been an alternative Independent Industry operating in the shadows of the big studios.

'Lone Star' exposes the tensions of race relations in a small Texas bordered town in a series of interpersonal relationships that brings complex problems on a microlevel scale to imply macrolevel possibilities in America. The 1996 neo-western film, 'Lone Star', by John Sayles, seamlessly intertwines various timeless and complex relationships to expert the long history of racial tensions between the Whites, Blacks and Mexican Americans in the town. Individual narrative of each person is highlighted in the movie and shows how they all come together through a series of familial and communal relationships. Problems related to race and power dynamics can be noticed. The film is primarily explored through the lens of three different racial groups and certain families and occupations that embody each one. The White Man is represented significantly as the Sheriff in town, the moral compass of the community. Sheriff Sam Deeds is the main protagonist of the movie trying to solve the mystery of another former Sheriff, Charlie Wade. The Blacks Family consists of Otis, a Black Club Owner who was killed. The Cruz family embodying the Mexican American racial group, explores the relationship between Pilar, a school teacher who is involved with Sam Deeds and Pilar's Mother, Mercedes Cruz, a restaurant owner with strong views. The film also involves race relations between non-familiar characters as well, like through the para-dynamic tensions between Charlie Wade and Otis Payne. These character driven narratives all address the problems and tensions of Race in America, but they also play possibility, as well as putting aside differences to help those in need.

Language is a complex term and should not be understood as arbitrary, in a verbal

and vocal manner, but, also through the thoughts , movements, and actions of the nuanced characters. In addition and with the background story of the movie, 'Lone Star', language should be understood as a way cultural groups interpret and communicate to one another through traditions, customs and practices. It helps in deciphering the meaning of the complex text. Here, in the film too, it acts as a tool for the storytelling process at the same time also being a tool of oppression.

'Lone Star' portrays a different more nuanced perspective on a country usually known for its big spectacle and happy endings, but if there was one filmmaker who could act as the best representative of this underappreciated strain of American moviemaking and one film that best displayed his craft, it would be director, Jonathan Sayles and his 1996 masterpiece 'Lone Star'. The director is bent on showing us, the viewers, the complete picture in this multi-layered narrative of the present and past of this disjointed community, from multiple points of view.

The Story follows Sam Deeds, the Sheriff of Rio County Texas played by the actor Chris Cooper who upon discovering the skeleton of former corrupt sheriff Charlie Wade from the same county 40 years previously, begins an Investigation into the legacy of his father Buddy Deeds, the man who replaced Wade after his mysterious disappearance. Sam Deeds suspects the murder may have been committed by his own father, Buddy Deeds. As he explores the mysteries of the past, he begins to fall in love all over again with the woman he loved when they were teenagers.

Sam's journey forces him to face the public legacy of his beloved Father uncovering a truth that has long since been buried by the local townspeople, a truth which causes Sam to confront his own feelings towards the local popular hero and whether or not his father was a murderer. For those unfamiliar with Jonathan Sayle's work 'The Lone Star' acts as one of his best and most accessible films to date.

The way in which his screenplay moves backwards and forwards through time gives the world of Rio County, a rich sense of history as we see the elderly townspeople go back in their youthful prime under the tyranny of Sheriff Charlie Wade. The transitions between the many narrative strands and between the past and present are seamlessly executed through expert editing and uncomplicated cinematography. These transitions are made beautifully with the camera, turning a friendly bar scene into a nightmarish crucible as we drift back into time, into the memory of the past. A simple pan, track or tilt, and the viewer is transported back and forth in time. Form never gets into the content of the film. Form in *Lone Star* is dictated by the social diversity of the local town; the complex structure that oscillates between past and present, official word and conjecture, and different racial positions is motivated by Sayle's intention that all viewpoints involved in the events around Charles Wade's death and Buddy's term as Sheriff should have equal access to the narrative means.

The sense of community that the film builds works hand in hand with Sayle's presentation of the town's bloodied history, making the audience appreciate how interconnected the lives and deceits of the population truly are over two generations. Tapping into the history of Texas as a state and the relationship Americans and Hispanics have with their own sense of History.

Kris Kristofferson is terrifying as the Brutal Sheriff presented symbolically as the devil in many of his scenes. But the real standout performance belongs to Chris Cooper who walks the tightrope of a conflicted son and lovelorn Idol to the townspeople of Frontera. Sam's struggle with the constant worship of his father whom he despised and his search for the truth, both in terms of the murder and the relationship he had as a teenager with his first love constantly pulls him back to a past he yearns to understand. Wishing to bury what was left of his Father's memory back into the desert whilst rebuilding what he once had as a young man, *Lone Star* acts as both a Western Romantic Drama and Mystery thriller combining genres to create a world unique in American film making.

Sayle's ingenious weaving between what the past means to some and how others prefer lies rather than the truth is a metaphor for how real communities are built across the world, forcing us, as the viewer to appreciate that nation borders and communities are never that different from one another and no matter how buried the past might be, Truth always has a nasty habit of being uncovered.

Pilar, a widow of two teenagers, is a teacher in the town. A Heated school board meeting about which interpretation of regional history Pilar relays to students, points up the rigid conservative biases of the townspeople. "It's tearing everything down. Tearing down our heritage, tearing down the memory of people who fought and died for this land...". To this Pilar attempts to make them understand: " I've only been trying to get across part of the complexity of our situation down here. Cultures coming together in both negative and positive ways. "

We can also notice how the dialogic conversation between Sam and Hollis, his father's deputy, talks about the truth. (1:24:08)

Sam: " You thought any more about our murder? "

Hollis: " I wish I could tell you that I remembered something new, but I can't. "

Sam: I think Buddy put a bullet in him....and never looked back..I'm gonna find out one way or the other. "

Hollis: " I don't think the rangers are likely to find out anymore than they already know. As for me, it's just one of your unsolved mysteries. "

This conversation is very significant and even the pauses between the words give deeper meaning to hide the absolute truth. It's like a puzzle that has to be solved by the viewer. The real truth is Hollis shot the Sheriff with Otis and Buddy as witnesses. "People liked the story we told, better than anything the truth might have been. It's your call Sam. "

Hollis replies. Satisfied that it would serve no purpose to charge Hollis with Wade's murder, and leaving his Father's reputation intact, Sam returns to Pilar, breaking to her the news that they are in fact half-brother and sister. The film ends with the couple apparently deciding to pursue their relationship.

Loose ends tied up in the objective story, a mystery pertinent to Sam's main character through line is solved. Buddy and Mercedes has had a love affair of their own resulting in Pilar, which is why his father had been adamantly opposed to Sam and Pilar's relationship. Pilar: "So that's it? You're not going to want to be with me anymore? No longer defined by his father, Sam replies: " If I met you for the first time today, I'd still want to be with you".

As Bakhtin says of national linguistic cultures, the 'verbal-ideological decentering ' facilitated by Heteroglossia can occur only when a culture 'loses its sealed-off and self-sufficient character, when it becomes conscious of itself as only one among other cultures and languages'. Lone Star deals with the process of 'decentering' in terms of both language and genre, by engaging with the classical Western's legacy, and mounting a critical appraisal of the sealed-off, hidden past that appears in its fictions. The past is not written in stone, but eternally transformable through memory, or in this case, in the movie, the exercise of forgetting, echoes Bakhtin:

“It is impossible to change the factual, thing-like side of the past, but the meaningful, expressive, speaking side can be changed, for it is unfinalized and does not coincide with itself. The role of memory in this eternal transformation of the past”(From 'Zametki', quoted in Morson and Emerson, 1990 pg. 230)

Generic Memory is central and manifested in the movie with Human Memory. The film covers racial disharmony, spatialization of time, threatened masculinity, and workings of

History. Racism can be traced in many instances in the movie, manifested in irrational behavior that ranges from petty to homicidal. Wade humiliates black bartender, Otis by forcing him to spill his drink and then insisting that he clean it up and shoots Eladio Cruz in cold blood for running illegal immigrants over the border.

Genre is defined by the activity of chronotypes. The uniqueness of a genre lies in the narrative shapes it order itself into. Time and space are not dead inside these chronotropic images. They retain the ability to radiate new meanings, to alter the 'emotions and value with which they are coloured. Formal rules can thus be re-accentuated and given fresh relevance through the adoption of a new context within the framework of generic memory. This is the approach taken by 'Lone Star' that exploits aspects of its own temporal and industrial outsidersness to impart a fresh perspective to the Western genre.

Conflict is one of the forms that speech takes, and a powerful one as Bakhtin makes it very clear. It is when speakers of language believe that language operations somehow hold the exchange of values in temporary suspension that they are most dangerously prone to the sudden withdrawal of unintended power to their words. As, Ilkka Joki proposes that the nature of dialogic transactions can conceal a treacherous underside. His words are: "Mutual responsive understanding, so much valued by Bakhtin, can also involve danger for the one who has more of his or her personality at stake, if both parties are not completely honest with each other: this can be called deceptive dialogicality."

Bakhtin reassures that the authoritarian word is easily spotted in its demand for total affirmation or rejection. In the scene, where Sam is confronting Hollis about the real truth behind Wade's murder, Sam believes himself to be in full dialogic interaction with him, gives the symbol of his personal notion of 'truth'. The idea that somebody's 'words can represent their personal integrity and moral standpoint indicates that he is naive in matters of communication.

The critique of psychoanalysis, like many other themes in this text, is related to matters of narrative. It is often equated, in its uncertainty, to illusionistic narrative practices such as Cinema. Film is often said to represent the unconscious. Hollywood is known as "The Dream Factory". The movie delineates psychoanalysis as an investigative system bearing little value in the 'real world'.

CHAPTER THREE

THEORETICAL ANALYSIS OF SECOND MOVIE- SHUTTER ISLAND

Shutter Island is a 2010 American Psychological thriller film directed by Martin Scorsese based on Dennis Lehane's 2003 Novel 'Shutter Island'. It tells the story of US Marshall Edward Teddy Daniels and his new partner Chuck who has been put on the case of investigating a disappearance of a patient at a mental facility at Shutter Island. In the end, Teddy wakes up to the reality that he himself, is the missing patient and the entire investigation has been a set-up from the facilities side all along in the hope that Teddy would acknowledge his trauma and losing both his wife and kids. The opening scene presents the first encounter between Teddy and his partner Chuck while they head towards Shutter Island. One primary focus that one can notice is the distinction between reality and flashbacks and the use of camera turns as, as spectators into believing the reality that Teddy Daniels creates. They travel to Achecliff Hospital for the criminally insane on Shutter Island in the Boston Harbor. They are there to investigate the disappearance of patient Rachel Solando, she was incarcerated for drowning her three children. The only clue is a note found hidden in Solando's room. It read the 'The Law of 4 Who is 67?'. As the men investigate the crime, a massive storm rolls in and prevents their return to the mainland. Things are suspicious from the start. When they talk to the staff, it's confrontational. Solando's doctor left the Island on vacation immediately after she disappeared preventing them from interrogating him. There are parts of the Hospital that are off limits, they are not allowed to search, like ward C. As they talk to some patients, one writes the word 'Run' in Teddy's notepad. Teddy seems to have a migraine headache that triggers visions of his experiences as a soldier during the liberation of Dacouth. He has disturbing dreams of his wife Dolores who was killed in a fire set by an Arsenes known as Andrew Laeddis. A vision of Dolores tells Teddy that Solando is

still on the Island as is her killer Laeddis. Teddy later explains to Chuck that locating Laeddis was his ulterior motive for taking the case. All the workers at the Asylum say that Laeddis is not there nor was he ever there. Apparently, the ending of the movie reveals that Edward Daniels is indeed Andrew Laeddis, the 67th patient at Achecliffe Mental Institution who has been under treatment there for approximately two years. Dr. Cawley, the masterbrain of the whole plan fueled the conspiracy theory to a point where Edward expected human experiments being conducted inside the lighthouse.

Dr. Cawley reads out the intake form that Edward avoided.” The patient is highly intelligent, highly delusional decorated Army veteran. Known proclivity for violence. Shows no remorse for his crime because he denies the crime ever took place. Highly developed and fantastical narratives, which prelude facing the truth of his actions.”

Dr. Cawley explains to deranged Edward that Dolores Chanal and Rachel Solando are anagrams, and similarly Edward Daniels and Andrew Laeddis.

The climax of the movie sees Dr. Sheehan approach Andrew Laeddis and talk to him as his partner Chuck to see if the whole role-play actually worked. They were disappointed. Andrew says, “We gotta get off this rock, Chuck. Whatever the hell’s going on here, it’s bad”. Dr. Sheehan after hearing this dialogue gives a disapproving look at Dr. Cawley. This shows that Andrew has regressed again. The staff approach to take away Andrew for the lobotomy. Just then, Andrew tells Dr. Sheehan – “You know, this place makes me wonder...Which would be worse? To live as a monster or to die as a good man?”

This final dialogue spoken by the protagonist is highly significant and the entire story plot of the movie comes to this ending scene. This dialogue conveys the meaning that Andrew has not regressed back. It’s only his acting. He’s acting like he has regressed back into his character of Edward Daniels, the US Marshal. In reality, he has snapped out of his insanity but now his guilt of killing his wife Dolores and being responsible for the death of

his three children has dawned upon him and that guilt is not letting him live on, it's not letting him to accept the reality. If he discloses that he has not regressed, then Andrew will live on as the monster who took the life of his family. Instead, he decides to revert to Edward Daniels, the good man. Edward is taken by the staff for lobotomization. Sheehan himself seems to recognize this as a moment of veiled lucidity. Dr. Sheehan is confused by what he's heard and he tries calling out to him as the staff take him away. The film ends with this scene. Why do we want to hold on to what we believe is true even in the face of extreme evidence of the contrary? Martin.C. Scorsese is one of the most recognized writers who always been interested in seeking and asking questions of moral ambiguities. His films are often centered around Men who are on the brink of breakdown, grappling with violence and alienation in a broken world, just like in 'Raging Bull', 'Taxi Driver' or even in 'The Aviator'. The film takes place in 1954 in a mental hospital on Shutter Island, a mysterious place where everything seems threatening and inhumane. To uncover the case of a missing patient, called Rachel Solando, Teddy Daniels, a former Marshal played by Leonardo DiCaprio and his partner Chuck played by Mark Ruffalo begin to investigate while Teddy's mind is constantly affected by recurrent traumas. As the man begins to discover extraordinary things during the investigation, the authenticity of the Island and whether he will be able to defeat his own demons becomes questionable in his eyes. The world of Shutter Island is filled with odd synchronicities, unexpected events that creates a chain of events. Teddy is revealed to be a patient Andrew Laeddis in the mental institute who is suffering from a delusional disorder and he is undergoing a serious psychological experiment, led by Dr. Cawley also known as Ben Kingsley. Teddy, naturally is not aware of this. His mind is hunted by the memory of his mentally unstable wife, Dolores murdering her children as he goes to the extent of himself killing Dolores as a result of this.

The Interrogation scene (32:23) takes place in the Island's dining room. In a

medium close up, Teddy describes the next interviewee and then the camera as if it were the viewer itself, pans left to Chuck who says, "Can't wait..". When seeing his sarcastic reaction, two things should be important to point out. First, sympathy. Secondly, manipulation of the viewer's subconscious. At that moment, Chuck voices the view of highly probable thought evoking sympathy from the audience. Also, Scorsese planned to reveal the viewer's subconscious, that, just the study cannot escape the Island, viewers cannot escape the series of manipulation and deception. So, Identification with Teddy becomes the most essential driving force in the film. One should also pay attention to the 'mise en scene', that is the arrangement of the scenery, props, etc on the stage of a theatrical production or on the set of a film. For instance. the Band-aid on the man's forehead indicates that he's hiding something, just like in the first scene (01:11), he talks to himself in front of the mirror, "Pull yourself together, Teddy, pull yourself together", making the viewer question his mental state. This scene also portrays the character's split personality. The Director emphasizes here that, Teddy's traumas are constantly influencing his actions and his development as a character which is a recurring element of the noir genre.

In the lighthouse scene towards the end of the movie, the conversation between Andrew, Dr. Cawley and Chuck, Chuck discloses his real identity to Andrew (Teddy).

He asks (112:25), "Don't you recognize me, Andrew. I've been your primary psychiatrist for the last two years. I am Mr. Sheehan". This is a perfect example of subconscious deception. It is subtle, barely noticeable, but, at the same time it gives depth to the scene. German journalist and a realist film theorist, Siegfried Kracauer's main idea about film actually very much fits the analysis of Shutter Island. He said that, "Film brings the whole material world into play, reaching beyond theatre and painting, it for the first time sets that which exists into motion. It is interested in the refuse, in what is just there-both in and outside the human being. The face counts for nothing in film unless it includes the death's-

head beneath.” Thus, it is always the deeper meaning he is looking forward in a movie, this call beneath the human skin. Interpreting the Interrogation scene, it is through Teddy’s perspective that the viewers see the patients. It is undoubtedly, their dialogues and utterances that hint at their personal issues, viewers get more close to them emotionally and physically. In addition to this, using Peter’s agonizing reaction, Director highlights that, all humans are the most vulnerable when violently exposed to most painful traumas. This occurs through verbal interactions in the movie. The movie also has a hidden purpose of telling the viewers that what one is about to witness through Teddy is a mere fiction composed in his mind. The connection between him and the spectators have now been established, and we follow his point of view. Thus, the scene in 01:32, he even tells the spectators to,” Come on.” This emphasizes the relationship between the character and the spectator who follows the character’s dialogues and actions throughout the movie.

CONCLUSION

One of my central aims throughout these chapters has been to analyze the movie, 'Lone Star' in light of Bakhtinian concepts including Dialogism, Polyphony and Heteroglossia. From this study, I have been able to clarify how movies, being an interactive visual art form has the power to influence wider audience and how it is distinct from other perceptual and non -perceptual art forms.

In concluding, it's worth to understand in broader aims as theorists, film- appreciators and art lovers , to understand what artistic movies can do, to clarify what's involved in the interactions between the various characters belong to distinct regionalities, races, and nations, and to think more about how we see and cognize the fictional world we experience.

Movies in a great deal engage us imaginatively and perceptually. They construct many of their fictional and historical truths by visually showing it to the viewers in the form of dialogue and monologues. The inherent meaning of the utterances conveyed in the Dialogic interaction is of prime significance in order to understand the relationship, thought, context, mood of the speaker and the listener. Any literary work, be it a movie, novel or drama, there are important and highly interesting intertwinements between what we perceive, what we see, what we imagine, what we know and finally what we cognize during film viewing.

Movies are multi-modal and they are aesthetically complicative in nature.

I have hoped to bring out the essence of Bakhtin's popular theories through the western movies taken for Study.

WORKS CITED

Haynes, D.J. Bakhtin Reframed. 2013. London ; I.B. Tauris.

Lindsay Fiorelli. What Movies Show: Realism, Perception and Truth in Film.

<https://repository.upenn.edu/edissertations/1715>

Martin, Flanagan. Bakhtin and the Movies: New Ways of Understanding

Hollywood

Film. 2009

Mary Klages. Literary Theory; A Guide for the Perplexed. Continuum,2006

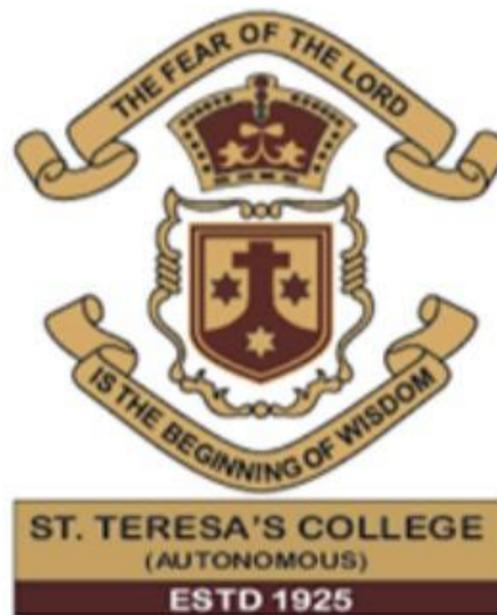
Mikhail Bakhtin. Discourse in the Novel.

Mikhail Bakhtin. Problems of Dostoevsky's Poetics.

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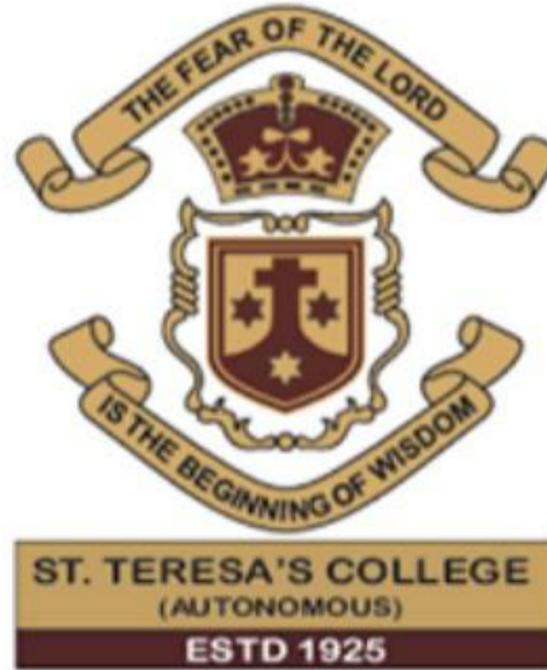
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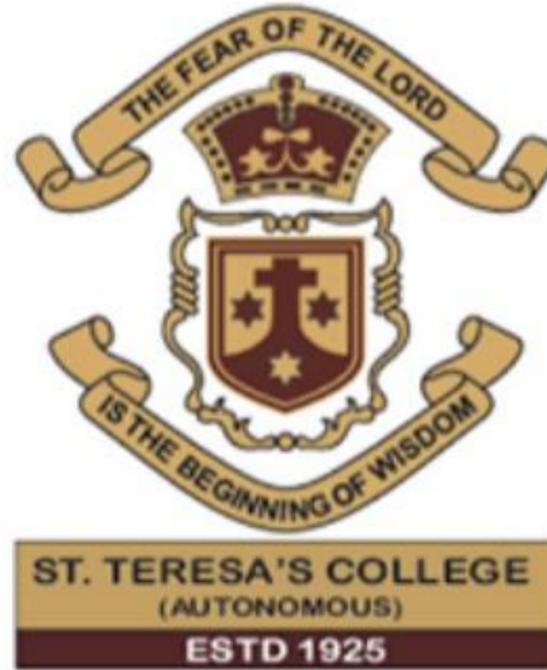
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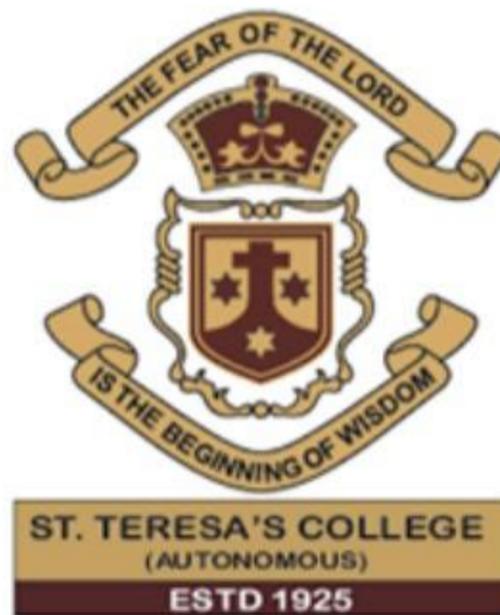
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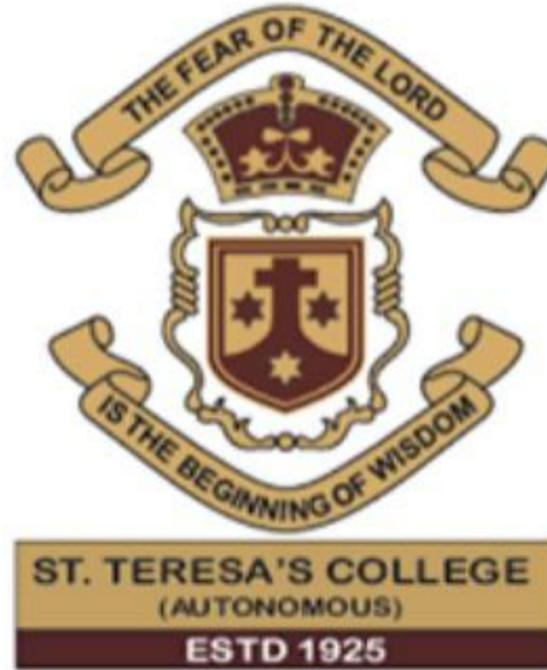
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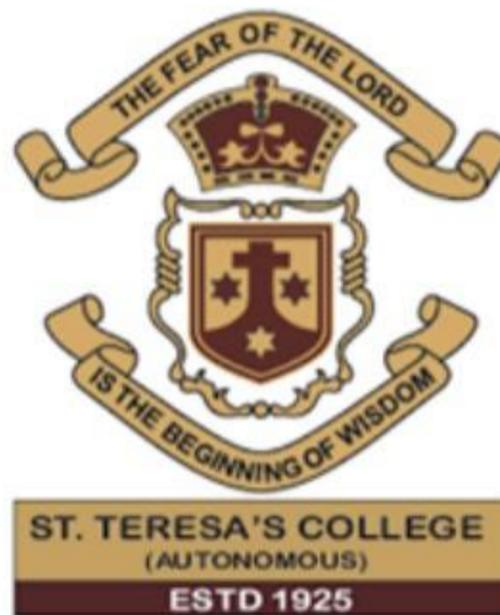
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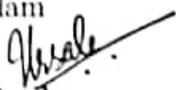


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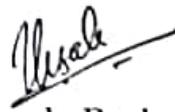
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PROJECT REPORT
THE RELATIONSHIP BETWEEN PERFECTIONISM AND ADJUSTMENT IN
ADULTS

Submitted by:

NIALA GAFOOR

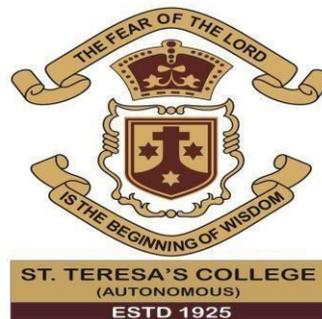
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Under the guidance of

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In partial fulfillment of the requirement for award of the degree of

B.Sc. PSYCHOLOGY



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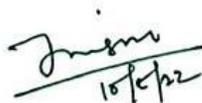
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DECLARATION

I, Niala Gafoor, hereby declare that the study presented in the dissertation entitled, "The Relationship between Perfectionism and Adjustment in adults", which is submitted to the Department of Psychology, St. Teresa's College, Ernakulam is a bonafide record of the research work carried out by me, under the supervision and guidance of Ms. Ann Joseph, Assistant Professor, Department of Psychology, St. Teresa's College, Ernakulam, in partial fulfillment of the requirements for the degree of Bachelor of Science in Psychology and has not previously formed the basis for the award of any degree, diploma, fellowship, title or recognition before.

Place: Ernakulam

Niala Gafoor

Date:

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Thanking

YouNiala

Gafoor

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ABSTRACT

Introduction: A perfectionist is someone who has a personality that strives for flawlessness. This is often accomplished through fixating on imperfections, trying to control situations, working hard, or being critical of the self or others. Perfectionism is a tendency to set up excessively high standards for yourself and/or others. In psychology, adjustment is the condition of a person who is able to adapt to changes in their physical, occupational, and social environment. It is defined as the behavioural process by which human beings and other organisms maintain equilibrium between various interpersonal and intrapersonal needs as well as their needs and the obstacles of the environments they belong to.

Methodology: This study was conducted among 300 participants who were undergraduates, postgraduates and even working people. The data was collected using convenience sampling through survey method with the help of Google forms.

Result: Perfectionism showed a negative correlation with Adjustment. According to the results, it can be noted that there is a significant relationship between Perfectionism and Adjustment. This was predicted using regression analysis, which also proved the same.

Conclusion: The study implies that as the level of Perfectionism increases, a person's adjustment level tend to decrease. A person finds it difficult to cope up with changes and step out of their comfort zones. A perfectionist hence suffers from deep pain, guilt and immense self-expectations. Perfectionism is associated with a variety of psychosocial adjustment problems like greater loneliness, shyness, and fear of negative evaluation, and lower levels of self-esteem. Individuals suffer from self-doubt and discouragement when things do not go their way.

Keywords: *Perfectionism, Adjustment, Undergraduates, Post graduates, working people, Adults*

CHAPTER 1
INTRODUCTION

1.1 .Background of the study:

According to the American Psychological Association, Perfectionism is the tendency to demand of others or of oneself an extremely high or even flawless level of performance, in excess of what is required by the situation. There are people in this world who always seem to strive for perfection. A Perfectionist is someone who has extremely high standards for their works, strives for success and tends to complete tasks on time. The person believes that there is no room for mistakes and everything should be perfect and flawless. They plan things the way they believe it should be in a very structured manner. They are very confident in whatever they do. They are achievement oriented and are hard working. Since the early 1990s, Paul Hewitt and Gordon L. Flett, professors of Psychology at York University in Toronto were of the idea that perfectionism comes in different forms, each associated with different kinds of problems. Some of those problems may be less severe than others but no form of perfectionism is completely problem free. Other researchers however suggested that some forms of perfectionism - particularly those that involve high personal standards -can be adapted. They also found that both adaptive and maladaptive perfectionists have personal standards, but failing to meet those standards is more stressful for the latter than for the former (Benson, 2003).

Most of us have heard as children that "practice makes man perfect," a familiar phrase with two meanings. On the one hand, the term may serve as a motivator for endurance, implying that if we work hard enough, we may finally fulfil our objectives and attain success. However, it indicates that perfection is an achievable state of being, and that something is wrong with us if our performance remains faulty despite extensive effort.

The academic literature reflects this binary view of perfectionism by discussing both the benefits and drawbacks of striving for perfection. While being a perfectionist can help you succeed, it can also harm your mental health, according to most experts. Indeed, academics continue to debate whether perfectionism can ever be categorised as a positive trait or whether it is always a negative one. Studies have discovered correlations between perfectionism and specific psychopathologies, highlighting the significance of further research into the construct.

The 'Adjustment as an achievement' model focuses on adjustment at a specific point in time,

taking into account an individual's adjustment to one challenge rather than all challenges they have faced. Adjusting to one scenario can be independent of struggling to adapt to another method. An example of this approach would be observing a poor student beginning to study during recess because they do not have a home environment to learn effectively. Starting to learn at a different time would be considered adequately adjusting to this scenario(Mohinuddin, 2021).

The 'adjustment as a process' theory portrays that, since the moment we are born, humans are in a constant state of adjustment. Since we exist in a state of constant, oftentimes rapid change, it follows that we cannot break these changes down into separate, unrelated challenges. This method of consideration asserts there is no way to 'adjust successfully', because something will always be about to change and prompt further adjustment. This approach views all life events as inextricable from some form of adjustment.(Wikipedia,2022)

Successful adjustment is also called being 'well adjusted' and is critical to mental health. Colloquially, being well-adjusted is defined as a person who "is reasonable and has good judgement...their behavior is not difficult or strange." It is important to remember that adjustment is a continuum, not a simple dichotomy; people can fluctuate and be adept at adjusting in different circumstances. In general, a person that is well-adjusted will have the following characteristics:

- An understanding of personal strengths and weaknesses and a tendency to play up strengths while limiting the appearance of weaknesses
- Personal respect and appreciation, a well-adjusted individual finds themselves to be inherently valuable
- Appropriate aspirations that require hard work and capitalizing on strengths without being too far out of reach and setting them up for failure
- Basic needs such as food, water, shelter, and sleep are consistently met, as well as a general feeling of security and positive self-esteem
- Positive attitude and a tendency to find the goodness in other people, objects and activities. A well-adjusted person will acknowledge others' weaknesses but not actively search for faults.
- Flexibility to respond to and accommodate for changes in the environment
- Ability to handle adverse circumstances: well-adjusted people are able to take negative life

events in stride, they will be motivated to take action to remedy the problem rather than passively accept it

- A realistic perception of the world that allows for a healthy amount of distrust of others and encourages pragmatic thinking
- A feeling of ease within surrounding environments. (Wikipedia,2022)

A well-adjusted person feels comfortable in different aspects of their community such as home, school, work, neighborhood, religious organization, etc. A balanced life philosophy that accounts for and acknowledges the impact that the world has on an individual, as well as the impact an individual can have on the world (Mangal, S. K.2002).

When perfectionism is healthy or adaptive it can be self-motivating and help the person to overcome adversity and achieve success. On the other hand, when it is unhealthy or maladaptive, that is, when the person becomes overly concerned with “perfect” work, when nothing becomes good enough, it can lead to unhappiness. They tend to avoid taking tasks for fear of making an error or not being able to complete it. They find it difficult to accept failure. This could adversely affect their physical as well as their mental health. Anxiety, depression, and suicidal ideation are only some of the mental health problems that specialists have repeatedly linked with this form of perfectionism (Sandoiu, 2018). Some studies have found that high blood pressure is more prevalent among perfectionistic people, and other researchers have even linked the trait with cardiovascular disease. The need to be perfect can also make a student struggle with fatigue, insomnia and chronic headaches, all of which can negatively impact a child’s ability to learn.

A person who is a perfectionist sometimes tends to find it difficult to adapt or adjust to anything that is out of his/her comfort zones.

1.2. Problem statement

The study aims to examine the relationship between Perfectionism and adjustment in adults and to assess the association between the Perfectionism.

1.3. Need and significance of the study:

The purpose of this research was to shed light on the paradoxical relationships between perfectionism and adjustment. It was proposed that the positive relationship between perfectionism and adjustment for one's studies triggers positive affect. Conversely, it is proposed that obsessive passion for studies, prescribed perfectionism with adjustment. Furthermore, Studies revealed that the positive effects of perfectionism are due to striving for perfection, a facet of perfectionism. In contrast, the negative relationship between perfectionism and adjustment is due to the importance of being perfect. Results provide insights on the role of perfectionism in adjustment and yield implications for the field of psychology.

The concept of perfectionism represents an important individual-difference variable that has received considerable attention. Perfectionism is now seen as being multidimensional in nature. The need of the study is to identify the relationship between perfectionism and adjustment among adults , how perfectionism affects a person's mental health and to study perfectionism in persons academic performance etc .

Perfectionism can make you feel unhappy with your life. It can lead to depression, anxiety, eating disorders, and self-harm. Eventually, it can also lead you to stop trying to succeed. Even mild cases can interfere with your quality of life, affecting your personal relationships, education, or work. Perfectionism can affect young people as well as adults. Children and teenagers are often driven to be overachievers in their schoolwork as well as activities such as sports, clubs, community service, and jobs. This can lead to an obsession with success.

Ultimately, it can interfere with the ability to achieve it. Perfectionism's cause isn't always clear. It's often a learned behaviour. People with perfectionism believe that they're valuable only because of what they achieve or what they do for other people. Academic settings can bring out perfectionism in young people.(Flett, G.L., Hewitt, P.L, 2002).

Meanwhile, adjustment is the condition of a person who is able to adapt to changes in their physical, occupational, and social environment. In other words, adjustment refers to the behavioural process of balancing conflicting needs, or needs challenged by obstacles in the environment. Humans and animals regularly adjust to their environment. Successful adjustment is also called being 'well adjusted' and is critical to mental health. Colloquially, being well-adjusted is defined as a person who "is reasonable and has good judgement...their behaviour is

not difficult or strange."It is important to remember that adjustment is a continuum, not a simple dichotomy; people can fluctuate and be adept at adjusting in different circumstances (Wikipedia, 2022).

Perfectionism is often seen as a positive trait that increases your chances of success, but it can lead to self-defeating thoughts or behaviours that make it harder to achieve goals. It may also cause stress, anxiety, depression, and other mental health issues. People who strive for perfection out of feelings of inadequacy or failure may find it helpful to speak with a therapist; this can often help people manage excessive self-criticism. It is typically viewed as a positive trait rather than a flaw. People may use the term “healthy perfectionism” to describe or justify perfectionistic behaviour (Curran, Thomas, Hill, Andrew. P, 2019).

Perfectionists always wanted to produce flawless work. They also have higher levels of motivation and conscientiousness than non-perfectionists. They set inflexible and excessively high standards. They hold an all-or-nothing mindset about their performance. Studies have also found that perfectionists have higher levels of stress, burnout, and anxiety (Swider, Harari, Breidenthal & Steed, 2018). Research has identified two distinct but related sub-dimensions of perfectionism. The first, which we call excellence-seeking perfectionism, involves tendencies to fixate on and demand excessively high standards. Excellence-seeking perfectionists not only stringently evaluate their own performance but also hold high performance expectations for other people in their lives. The second, which we call failure-avoiding perfectionism, involves an obsessive concern with and aversion to failing to reach high performance standards. Failure-avoiding perfectionists are constantly worried their work is not quite right or good enough and believe that they will lose respect from others if they do not achieve perfection. The “beneficial” effects of perfectionism were stronger for those higher in excellence-seeking perfectionism than those who exhibit more failure-avoiding perfectionistic tendencies. On the flip side, the “detrimental” effects of perfectionism were stronger for those higher in failure-avoiding perfectionism, but were usually still present for people higher in excellence-seeking perfectionism (Swider, Harari, Breidenthal & Steed, 2018).

1.4. Scope of the study:

People with perfectionism hold themselves to impossibly high standards. They think what they do is never good enough. Some people mistakenly believe that perfectionism is a healthy motivator, but that's not the case. Perfectionism can make you feel unhappy with your life. It can lead to depression, anxiety, eating disorders, and self-harm. Eventually, it can also lead you to stop trying to succeed. Even mild cases can interfere with your quality of life, affecting your personal relationships, education, or work. Perfectionism can affect young people as well as adults. Children and teenagers are often driven to be overachievers in their schoolwork as well as activities such as sports, clubs, community service, and jobs. This can lead to an obsession with success. Ultimately, it can interfere with the ability to achieve it. Perfectionism's cause isn't always clear. It's often a learned behaviour. People with perfectionism believe that they're valuable only because of what they achieve or what they do for other people. Academic settings can bring out perfectionism in young people. Meanwhile, adjustment is that condition of a person who is able to adapt to changes in their physical, occupational, and social environment. In other words, adjustment refers to the behavioural process of balancing conflicting needs, or needs challenged by obstacles in the environment. Humans and animals regularly adjust to their environment. For e.g; when they are stimulated by their physiological state to seek food, they eat (if possible) to reduce their hunger and thus adjust to their hunger stimulus. Adjustment disorder occurs when there is an inability to make a normal adjustment to some need or stress in the environment. High prescribed perfectionism was associated with a variety of adjustment problems, including greater loneliness, shyness, fear of negative evaluation, and lower level of self- esteem.

1.5. Objectives of the study:

- 1) To study the role of Perfectionism on Adjustment.
- 2) To assess the association between the Perfectionism and Adjustment.

1.6. Limitations of the study:

The study under consideration is not free of limitations. Many restrictions have been encountered in this study, which may have hampered its ability to fully solve the problem statement. Due to time restrictions, the research was held back in terms of quality. There are certain limitations to the study under consideration. The sample collection was shown to be confined to only a few districts in Kerala. In a short period of time, getting enough samples for data collection proved problematic. Among the samples, most of them were females (n= 251) who were students between the ages 18-22. There were a smaller number of samples who were males (n=48) and above the age of 22.

CHAPTER 2

LITERATURE REVIEW

A study on Perfectionism in Adolescence, associated with gender, age and socio-economic status was conducted in Norway. The sample consisted of 10,217 adolescents aged 16–19 years (52.9% girls). The levels of perfectionism were relatively similar between the genders in the present study, besides slightly higher Socially Prescribed Perfectionism (SPP) among girls than boys. There were also significantly more girls than boys among the high scorers on overall perfectionism, Self-oriented Perfectionism (SOP), and SPP, respectively. High perfectionism was related to Socio-Economic Status for perceived economic well-being, but not for parental education level. Implications for further research and clinical interventions were suggested (Sand, Boe, Shafran, Stormark and Hysing, 2021). The study on Perfectionism is increasing over time: a meta-analysis of Birth Cohort differences from 1989 to 2016 was conducted by Thomas Curran and Andrew Hill. It was the first study to compare perfectionism across generations, which found significant increases among more recent undergraduates in the US, UK and Canada. In other words, the average college student last year was much more likely to have perfectionistic tendencies than a student in the 1990s or early 2000s. They speculated that this may be because, generally, American, Canadian, and British cultures have become more individualistic, materialistic, and socially antagonistic over this period, with young people now facing more competitive environments, more unrealistic expectations, and more anxious and controlling parents than generations before. Their analyses are based on 164 samples and 41,641 American, Canadian, and British college students, who completed the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991) between 1989 and 2016. (Curran and Hill, 2019). A study on Perfectionism and Mental Health was conducted by Shiva Garenmayepour and Mohammed Ali Besharat. The aim of it was to examine the relationship between perfectionism and mental health in a sample of students. 185 students (92 girls, 85 boys, 8 unknown) were included in this study. All participants completed the Farsi version of the Positive and Negative Perfectionism Scale (FPANPS; Besharat, 2009) and the Mental Health Inventory (MHI; Besharat, 2006). Positive perfectionism was positively associated with psychological well-being and negatively associated with psychological distress. The results also revealed that negative perfectionism was negatively associated with psychological well-being and positively associated with psychological distress (Garenmayepour and Besharat, 2010). Perfectionism is a personality

disposition related to individual differences in performance in sport, school, and other areas of life where performance, tests, and competition play a major role. A study conducted on *Perfectionism and Performance* by Joachim Stoeber discusses the importance of differentiating two main dimensions of perfectionism—perfectionistic strivings and perfectionistic concerns—when examining the relationships between perfectionism and performance in sport, academics, music competitions, aptitude tests, and laboratory tasks. In contrast, the studies do not show that perfectionistic concerns are consistently negatively associated with performance. There is little evidence suggesting that perfectionistic strivings are detrimental to performance. On the contrary, across different domains and different indicators of performance, the evidence suggests that perfectionistic strivings are associated with higher performance and predict higher performance beyond what is expected from individuals' general aptitude or previous performance level. Perfectionistic strivings appear to have a motivational quality that gives individuals an extra “boost” to do their best, make an additional effort, and achieve the best possible results. Even some clinical psychologists are beginning to recognize that there is nothing unhealthy or maladaptive about perfectionistic strivings as such (Stoeber, J. 2012). A study was conducted on *Perfectionism as a predictor of subsequent adjustment: Evidence for a specific diathesis–stress mechanism among college students*. The relations among perfectionism, stress, subsequent psychological symptoms, and hopelessness were examined among 215 college students. Hierarchical regression analyses were conducted to determine whether dimensions of perfectionism (P. Hewitt & G. Flett, 1991) predicted psychological symptoms and hopelessness (1 month later), and the extent to which stress scores added incremental validity to these predictions. Results indicated that socially prescribed perfectionism was a significant predictor of both adjustment measures. In addition, stress accounted for a significant amount of additional variance in predicting adjustment beyond perfectionism. Consistent with a diathesis–stress model, a significant Perfectionism \times Stress interaction was found in predicting scores on adjustment measures beyond perfectionism and stress. However, this interaction was only found for socially prescribed perfectionism. Results provide support for a specific diathesis–stress mechanism and important implications for developing specific interventions in working with perfectionistic college students. (Chang & Rand, 2000). Another study was conducted on *Perfectionism and Psychological Adjustment among College Students: Does Educational Context Matter?* by David R. Hibbard and Kyra L. Davies. This study examined perfectionism

and psychological adjustment among students in two educational contexts. One hundred-twenty-five students from a selective private university and 106 students from a larger public university completed measures of perfectionism and adjustment. Private university students were more perfectionistic than public university students on several perfectionism dimensions, but associations between perfectionism and adjustment were broadly similar in both contexts. (Hibbard and Davies, 2000). Gordon L. Flett, Paul L. Hewitt and Tessa De Rosa conducted a study on Dimensions of perfectionism, psychosocial adjustment, and social skills. The present study sought to extend past research by determining the association between the three dimensions of perfectionism (self-oriented perfectionism, other-oriented perfectionism and socially-prescribed perfectionism) and measures of perceived social skills and psychosocial adjustment. A sample of 105 students completed the Multidimensional Perfectionism Scale along with multiple measures of psychosocial adjustment and perceived social skills. As expected, the correlational results demonstrated that high socially prescribed perfectionism was associated with a variety of psychosocial adjustment problems, including greater loneliness, shyness, and fear of negative evaluation, and lower levels of social self-esteem. In addition, socially prescribed perfectionists had lower self-perceived social skills. There were few significant findings involving self-oriented or other-oriented perfectionism. Taken together, these findings suggest that socially prescribed perfectionists are prone to suffer from various psychosocial problems and perceived deficits in social skills. (Flett, Hewitt and De Rosa, 1996). Abeer Saleh Alshehri conducted a study on the impact of perfectionism trait on anxiety and academic procrastination among international Saudi Arabian students studying in United States Universities. The aim of the study is to investigate the relationship of perfectionist personality traits to anxiety traits and academic procrastination. It is also done to examine the possibility of predicting trait anxiety and academic procrastination by measuring perfectionist personality traits. The sample consisted of 521 Saudi students studying in United States universities during the 2017-2018 academic year. The Student participants were invited to complete an electronic survey that included the Multidimensional Perfectionism Scale, State-Trait Anxiety Inventory - Form Y and Tuckman Procrastination Scale. The results of the study showed a significant positive linear relationship among trait anxiety with the three perfectionism dimensions: socially-prescribed perfectionism, self-oriented perfectionism, and other-oriented perfectionism. The findings also revealed a significant positive correlation between self-oriented perfectionism and

academic procrastination. The study is the first of its kind to investigate the perfectionist trait and its relationship to academic procrastination and anxiety among Saudi students studying in the US. (Alshehri, 2020). Goran Livazović and Karla Kuzmanović conducted a study on Predicting adolescent perfectionism: The role of socio-demographic traits, personal relationships, and media. The aim of the study was to investigate the relation between perfectionism; the quality of family, peer, and college relationships; and media usage and content interests. The sample included 203 students (134 female, 66%) aged 18-25 years, enrolled at the University of Osijek in Croatia. A hierarchical regression analysis was implemented with the aim of establishing significant perfectionism predictors. The results show that Age and gender were significant predictors of perfectionism. Participants with lower family relationship quality reported higher parental expectations and complaining as well as significantly higher doubts in personal performance and concern about mistakes. Similarly, a lower peer relationship quality predicted doubts in personal performance and stronger concerns about mistakes. The quality of college relationships positively predicted higher perfectionist personal standards and organisation. General life satisfaction predicted higher concerns about mistakes, while current situational life satisfaction predicted higher levels of perfectionist organisation. Media usage intensity had no significant effect. Adolescent interest in information-educational media predicted higher personal standards as well as concern about mistakes and organisation. Higher interests in entertainment media content predicted more concern about mistakes, while interest in negative media content negatively predicted organisation in adolescents. Socio-demographic traits, relationships with family, peers and colleagues, as well as life satisfaction and media content interests represent significant adolescent perfectionism predictors, explaining 14%-28% of individual perfectionism dimensions. (Livazović.G, Kuzmanović.K, 2020).

CHAPTER 3

THEORETICAL FRAMEWORK

PERFECTIONISM

Perfectionism is a tendency to set up excessively high standards for yourself and /or others. Like any personality trait, perfectionism includes a whole spectrum of characteristics, some positive and negative, that varies from person to person.

The literature focuses on two types of perfectionism: self-oriented and socially prescribed perfectionism. Perfectionism can be defined as excessively high standards for the performance of the self or others. Perfectionism can be maladaptive and has been associated with increased depression, stress, anxiety, eating disorder and suicide risk.

A comprehensive understanding of the factors that contribute to perfectionism may help design programs to prevent negative outcomes such as depression and stress.

Perfectionism can be classified as adaptive or maladaptive. Perfectionism is considered to be adaptive if it is solely a desire to achieve. However, it is maladaptive if the individual is also overwhelmed with concern over meeting his or her high standards. Adaptive perfectionists are satisfied when their goals are met and can accept their mistakes.

The following factors contribute to Perfectionism:

Parental perfectionism

Parental perfectionism has increases the likelihood of child perfectionism but this association differs among self-oriented and socially prescribed perfectionists. Self oriented perfectionist reported having a parent of same gender who was a perfectionist. Although the perfectionist parent held high expectations for his or her own performance, he or she did not have the same expectations for performance of his or her own child.

Parenting style

Parenting style also contribute to perfectionism. Students who have close relationship with

parents who were authoritative and supportive parents have realistic and flexible rules and were willing to communicate with children about those rules. Socially prescribed perfectionists who describe parents as more authoritarian and supportive. Parents also have realistic and flexible rules and were willing to communicate with children of those rules. Socially prescribed perfectionists described parents as more authoritarian.

Personality

Personality has also been implicated in the development of perfectionism (Hill, McIntire and Bachrach 1997). Several studies have examined perfectionism using big five frameworks which consist of the personality traits of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. (Costa and McCrae, 1992)

Academic achievement

Personal academic history also affects perfectionism. Neumeister's (2004) study, which examined gifted students with a history of academic successes, found that self-oriented and socially-prescribed perfectionists described early achievement as a key factor in their current perfectionism.

Genetics

In addition to previously described research on family influence, two twin studies have examined the genetic components of perfectionism. Tozzi and colleagues (2004) study of adult female twins in the USA found that identical twins are more likely to share perfectionism than fraternal twins.

ADJUSTMENT

The concept of adjustment was initially a biological one and was a cornerstone in Darwin's theory of evolution (1859). In Biology, the term usually employed was an adaptation. Darwin maintained that only those organisms most fitted to adapt to the hazards of the physical world survive. Biologists have continued to be concerned with the problem of biological adaptations, and much of human illness is based on transformation to the stress of life.

Adjustment, in psychology, the behavioural process by which humans and other animals maintain an equilibrium among their various needs or between their needs and the obstacles of their environments. A sequence of adjustment begins when a need is felt and ends when it is satisfied. Hungry people, for example, are stimulated by their physiological state to seek food. When they eat, they reduce the stimulating condition that impelled them to activity, and they are thereby adjusted to this particular need.

Social and cultural adjustments are similar to physiological adjustments. People strive to be comfortable in their surroundings and to have their psychological needs (such as love or affirmation) met through the social networks they inhabit. When needs arise, especially in new or changed surroundings, they impel interpersonal activity meant to satisfy those needs. In this way, people increase their familiarity and comfort with their environments, and they come to expect that their needs will be met in the future through their social networks. Ongoing difficulties in social and cultural adjustment may be accompanied by anxiety or depression. It then explores the seven theories of adjustment: stage models, Somatic-psychology, the disability centrality model, ecological models, recurrent or integrated model, transactional model of coping, and chaos theory.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. Objective of the study:

- 1) To study the role of Perfectionism on Adjustment.
- 2) To assess the association between the Perfectionism and Adjustment.

4.2. Hypothesis:

- 1) There is a negative relationship between Perfectionism and Adjustment.
- 2) Perfectionism has a significant role in Adjustment

4.3. Research design:

The researcher used correlational method to study the relationship between Perfectionism and Adjustment. A correlational research design investigates relationships between variables without the researcher controlling or manipulating any of them. It reflects the strength the relationship between Perfectionism and Adjustment. A correlation reflects the strength and/or direction of the relationship between two (or more) variables. The direction of a correlation can be either positive or negative. Correlational research is ideal for gathering data quickly from natural settings.

4.4. Source of data:

Data was collected from undergraduates, postgraduates and even working people.

4.5. Sampling design:

This is a non-probability sampling.

4.6. Sample size: The present study is based on a sample that consisted of 300 participants between the age of 18 to 40. The participants include undergraduates, postgraduates and even working people.

There were more female participants (251) than male participants (48).

4.7. Sampling method:

Convenience sampling is used here. It simply includes the individuals who happen to be most accessible to the researcher. This is an easy and inexpensive way to gather initial data.

4.8. Method of data collection:

The data was collected using Google forms. The information that is collected can be automatically entered into spreadsheets.

4.9. Drafting questionnaire:

The form consisted of four parts.

- The first part is informed consent. The subject is given the brief idea about the questionnaire and their consent was taken.
- The second part is socio-demographic sheet. It was developed by the researcher to collect data such as Name, Age, Occupation, Gender.
- Frost Multidimensional Perfectionism Scale (FMPS)

The Frost Multidimensional Perfectionism Scale (FMPS) is a 35 question self-report measure with four subscales of perfectionism: Concern over mistakes and doubts about actions, Excessive concern with parents' expectations and evaluation, Excessively high personal standards, Concern with precision, order and organization. This scale can be useful in formulating the underlying causes of a client's presenting concerns. The FMPS is appropriate for people 15 years and older. This scale can be useful in highlighting that perfectionism is in fact unhelpful, and provides clinicians and clients useful benchmarks regarding what "normal" levels of perfectionism are. The Frost Multidimensional Perfectionism Scale was developed by Dr.

Randy Frost and colleagues in 1990 and originally measured six subscales. Subsequent evaluation using principal components analysis found that four subscales were more appropriate. Stober (1998) validated the scale using 243 university student participants with an average age of 26 years. The validity of the scale has been widely established through convergence with other clinically significant problems, including anxiety in college students, insomnia, social phobia, obsessive-compulsive symptoms and anorexia nervosa. Perfectionism has been shown to be an underlying trait in many of these presentations.

- Weinberger adjustment inventory (WAI)

The Weinberger Adjustment Inventory (WAI) includes 10 subscales plus a short validity scale within an 84-item inventory. The inventory is designed to measure long-term functioning rather than short-term symptoms. It has been validated for use with both clinical and non-clinical populations. The exact same items can be used across a wide range of ages (children, parents, grandparents) as long as the individuals read at or above approximately the fourth-grade level.. There also is a 37-item short-form (WAI-SF) that takes adults about 5 minutes and children about 15. The two primary dimensions are distress (anxiety, depression, low self-esteem, low well-being) and self-restraint (impulse control, suppression of aggression, consideration of others, responsibility). The four subscales within both distress and restraint (i.e., selfrestraint) can also be used separately to assess the particular construct of interest (e.g., anxiety). In addition, there are two defensiveness scales: denial of distress, which refers to defensiveness about normative experience of distress, and repressive defensiveness, which refers to claims of nearly absolute restraint. Although these two scales correlate moderately, they are not composite. Two different short-forms have been used in research, both with 12-item distress and restraint subscales but varying in terms of which defensiveness subscale is included. In addition to use of the scales in correlational analyses, a six-group WAI typology of adjustment styles (Weinberger & Schwart (1990) has been validated crossing Distress.

4.10. Data analysis technique:

- Demographic details were analyzed using frequency, percentage and mean
- Kolmogorov-Smirnova test for normality

- Spearman rank correlation test
- Regression analysis

The data collected from the questionnaire was analyzed using software named IBM SPSS Statistics.

CHAPTER 5

DATA ANALYSIS

The study was conducted among 300 participants who were undergraduates, postgraduates and even working people. The objectives of the present study are (1) To study the role of Perfectionism on Adjustment and (2) To assess the association between the Perfectionism and Adjustment. To meet the objectives of the study, the following hypotheses have been put forward: (1) There is a negative relationship between Perfectionism and Adjustment, and (2) Perfectionism has a significant role in Adjustment.

Figure 1

Distribution of participants based on gender

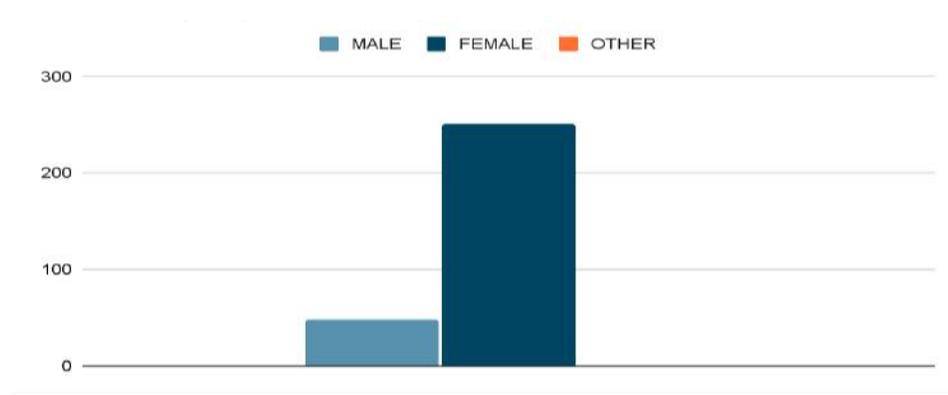


Figure 1 shows the distribution of participants in the study based on Gender, there were 48 male, 251 female and 1 other participants in this study.

Figure 2

Distribution of participants based on age

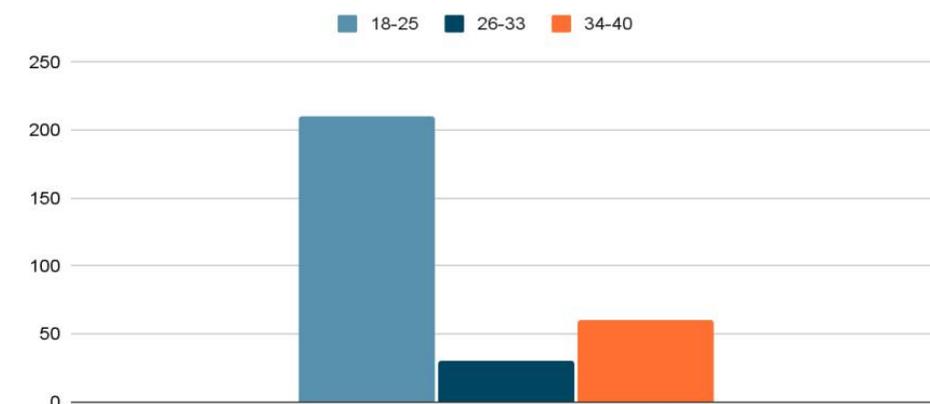


Figure 2 shows the distribution of participants in the study based on their age. In this study, 210 participants were under the age group 18-25, 30 participants were under the age group 26-33 and 60 participants were under the age group 34-40.

Table 1

Reliability of instruments obtained on the sample.

Sl.No.	Instruments	N	Cronbach's α
1	Frost Multidimensional Perfectionism Scale- Brief	300	0.608
2	Weinburger Adjustment Inventory- Short form	300	0.398

This table shows the reliability of the instruments using Cronbach's α and number of values in the Population (N). Since α of Perfectionism scale is greater than 0.5, the scale is reliable for this population. Since α of Adjustment is less than 0.5, the scale is not reliable for this population.

Table 2 *Result of Kolmogorov- Smirnova test of normality of Perfectionism and Adjustment*

	Statistic	df	Sig.
Perfectionism	.048	300	.089
Adjustment	.060	300	.011

The Kolmogorov- Smirnov Test for Normality pointed out that the significance level of both Perfectionism and Adjustment is less than 0.05 and hence it is not normally distributed. The results are given below:

There is a negative relationship between Perfectionism and Adjustment

Table 3

Summary of Spearman Rank Correlation between Perfectionism and Adjustment in adults.

Variable	Adjustment
Perfectionism	-.168**

**p < 0.01

The above table examines the relationship between Perfectionism and adjustment. With reference to the table, it can be noted that there exists significant negative relationship between Perfectionism and Adjustment, since the p-value is less than 0.01. Hence the hypothesis, there is a negative relationship between Perfectionism and adjustment, is accepted.

The study implies that as the level of Perfectionism increases, a person's adjustment level tend to decrease. A person finds it difficult to cope up with changes and step out of their comfort zones. A perfectionist hence suffers from deep pain, guilt and immense self-expectations.

Table 4

Regression analysis predicting the significant role of Perfectionism on Adjustment

Variable	R ²	Adjusted R ²	df	F	B	T	Sig
Perfectionism	0.35	0.32	299	10.849	-4.31	-3.294	0.001

The above table predicts the relationship between Perfectionism and Adjustment. With referenceto the table it can be noted that Perfectionism predicts adjustment. Since the regression coefficient is positive, it shows that Perfectionism plays a significant role in Adjustment. Hence the hypothesis is accepted.

Perfectionism is associated with a variety of psychosocial adjustment problems like greater loneliness, shyness, and fear of negative evaluation, and lower levels of self-esteem. Individualssuffer from self-doubt and discouragement when things do not go their way. Perfectionists havehigher levels of stress, burnout and anxiety.

CHAPTER 6

FINDINGS

Major Findings:

1. There is a negative relationship between Perfectionism and Adjustment among adults.
2. Perfectionism has a significant role in Adjustment.

Perfectionism showed a negative correlation with Adjustment. According to the results, it can be noted that there is a significant relationship between Perfectionism and Adjustment. This was predicted using regression analysis, which also proved the same.

The study implies that as the level of Perfectionism increases, a person's adjustment level tend to decrease. A person finds it difficult to cope up with changes and step out of their comfort zones. A perfectionist hence suffers from deep pain, guilt and immense self-expectations. Perfectionism is associated with a variety of psychosocial adjustment problems like greater loneliness, shyness, and fear of negative evaluation, and lower levels of self-esteem. Individuals suffer from self-doubt and discouragement when things do not go their way. Perfectionists have higher levels of stress, burnout and anxiety.

With reference to the Spearman rank Correlation table, it can be noted that there exists significant negative relationship between Perfectionism and Adjustment, since the p-value is less than 0.01. Hence the hypothesis, there is a negative relationship between Perfectionism and adjustment, is accepted.

With reference to Regression analysis table it can be noted that Perfectionism predicts adjustment. Since the regression coefficient is positive, it shows that Perfectionism plays a significant role in Adjustment. Hence the hypothesis is accepted.

CHAPTER 7

RECOMMENDATIONS

Many restrictions have been encountered in this study, which may have hampered its ability to fully solve the problem statement. Due to time restrictions, the research was held back in terms of quality. There is scope for further research as the dimensions that were present in both Perfectionism and Adjustment scale weren't taken into consideration. This research can be done by focusing on different socio-demographic details such as age groups, gender, education level etc.

CHAPTER 8
CONCLUSION

The purpose of this study was to look at the relationship between perfectionism and adjustment in adults. The research was carried out using Google form settings, and the data gathered can be automatically loaded into spreadsheets. The goal of the research was to study the role of Perfectionism on Adjustment and to assess the association between the Perfectionism and Adjustment. Perfectionism was the independent variable while Adjustment was the dependent variable. The present study was conducted on 300 participants who were undergraduates, Postgraduates and even working people. Among the sample there were 251 females, 48 males and 1 other participants. Most of the participants were between ages 18-25 (n=210). 30 participants were between the ages 26-33, and 60 were between the ages 34-40. Perfectionism was assessed using Frost Multidimensional Perfectionism Scale- Brief. Adjustment was assessed using Weinburger Adjustment Inventory- Short Form. Data analysis was done using a software called IBMSPSS Statistics. Kolmogorv-Smirnova test for normality, Spearman rank correlation test, and Regression analysis were the tests done for the same. According to the results, it can be noted that there is a significant relationship between Perfectionism and Adjustment. The study implies that as the level of Perfectionism increases, a person's adjustment level tend to decrease. A person finds it difficult to cope up with changes and step out of their comfort zones. A perfectionist hence suffers from deep pain, guilt and immense self-expectations. Perfectionism is associated with a variety of psychosocial adjustment problems like greater loneliness, shyness, and fear of negative evaluation, and lower levels of self-esteem. Individuals suffer from self-doubt and discouragement when things do not go their way.

References

- Adjustment*. (n.d). Retrieved from Britannica.com
- Adjustment(Psychology)*. (2021, December 31). Retrieved from Wikipedia.
- Bieling, P. J., Israeli, A. L., & Antony, M. M. (2004). Is perfectionism good, bad, or both? Examining models of the perfectionism construct. *Personality and Individual Differences*.
- Brian Swider (2018, December 27). The Pros and Cons of Perfectionism, According to Research . *Harvard Business Review*.
- Edward C.Chang, Natalie J.Lin, Abbey J.Herringshaw, Lawrence J.Sanna, Cathryn G.Fabian, Marisa J.Perera, Victoria V.Marchenko. (2011, February 17). Understanding the link between perfectionism and adjustment in college students: Examining the role of maximizing. *Personalityand Individual Differences*.
- Frost Multidimensional Perfectionism Scale (FMPS)*. (n.d). Retrieved from novopsych.com
- Gluch, V. (2018, April 4). View of Factors Influencing the Development of Perfectionism.Factors Influencing Development *of Perfectionism*.
- Gordon L.Fletta, Paul L.Hewitt , Tessa De Rosac. (1996, February). Personality and individual differences. *Dimensions of Perfectionism, Psychosocial Adjustment, and Social Skills*.
- Hewitt, P. L. & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality andSocial Psychology*.
- Hewitt, P. L., Mittelstaedt, W. M., & Flett, G. L. (1990). Self-oriented perfectionism and generalized performance importance in depression. *Individual Psychology*.Hibbard, D.R. (2014, June 2). Perfectionism and Psychological Adjustment among CollegeStudents: Does Educational Context Matter? *Perfectionism and Psychological Adjustment*.
- Lippman., B.L. (1990). Perfectionism. *Problematizing Perfectionism: A Closer look at the perfectionism construct*.
- Mohinuddin, M. (2021, January 8). Adjustment in Psychology. *SWeduCareBD*.Richard Pallardy (2005). adjustment | psychology. *Encyclopedia Britannica*.
- Sand, L. (2021). Perfectionism in Adolescence: Associations With Gender, Age, and Socioeconomic Status in a Norwegian Sample. *Frontiers*.

- Sandoiu, A. (2018, October 12). *How Perfectionism affects your (mental) health*. Retrieved From medicalnewstoday.com
- Scott, E. (2022, January 5). *10 Signs you maybe a perfectionist*. Retrieved from Verywellmind.com
- Ward, Colleen; Kennedy, Antony (1994-06-01). *Psychological adjustment*. International Journal of Intercultural Relations. 18 (3): 329–343.
- Wilding, M. (2021, September 14). *3 Types of Perfectionism to watchout for*. Retrieved from Psychologytoday.com
- Weinberger Adjustment Inventory (WAI)*. (2012, July). Retrieved from selfdefiningmemories.com
- Wikipedia contributors. (2022, April 21). Perfectionism (psychology). Wikipedia.

APPENDICES

APPENDIX A

Informed Consent

We are Niala Gafoor, Ruth Abraham and Anudarsha Manoj, final year students pursuing BSc Psychology at St. Teresa's College (Autonomous), Ernakulam. As part of our curriculum, we are conducting a study on the relationship between Perfectionism and Adjustment among adults. If you wish to participate we request you to fill this survey as honestly as possible. All information collected will be kept strictly confidential and only the researcher and the supervisor will have access to it. By clicking "I agree" below, you are indicating that you have freely consented to participate in this research study. The data obtained would be kept strictly confidential and used solely for research purposes

- Agree

Socio-demographic sheet

Name:

Age:

Gender:

Education:

Occupation:

FROST MULTIDIMENSIONAL PERFECTIONISM SCALE- BRIEF

ITEMS	Strongly disagree	Disagree	Unsure/Neutral	Agree	Strongly agree
1. If I fail at work/school, I am a failure as a person.					
2. I set higher goals for myself than most people.					
3. If someone does a task at work/school better than me, then I feel like I failed at the whole task.					
4. I have extremely high goals.					
5. Other people seem to accept lower standards from themselves than I do					
6. If I do not do well all the time, people will not respect me					
7. I Expect higher performance in my daily tasks					

finish something because I spent too much time “goofing around”	
17. I am never unkind to people I don't like	
18. Everyone makes mistakes at least once in a while.	
19. I often feel sad or unhappy.	
20. Once in a while, I say things that are not completely true.	
21. I usually feel I'm the kind of person I want to be.	
Part 2	
22. I do things without giving them enough thought	
23. when I have the chance, I take things I want that don't really belong to me	
24. if someone tries to hurt me, I make sure I get even with them.	
25. I feel nervous or afraid that things won't work out the way I would like them to	
26. I become “wild and crazy” and do things other people might not like	
27. I feel lonely	
28. Before I do something, I think about how it will affect the people around me\	
29. I will cheat on something if I know no one will find out	
30. when I am doing something for fun (for eg. Partying, acting silly)I tend to get carried away and go too far	
31. I do things that I know really aren't right. \	
32. I get into such a bad mood that I just feel like sitting around and doing nothing.	
33. I lose my temper and “let people have it” when I'm angry	
34. In recent years, I've felt more nervous or worried about things that	

I have needed to.	
35. I feel very happy	
36. I think about other people's feelings before I do something they might not like	
37. I make sure that doing what I want will not cause problems for other people	