RECENT TRENDS
IN COMMERCE, MANAGEMENT AND SOCIAL SCIENCES

(Edition II)

Edited by:
Dr. Bharati S. Math & Dr. Ravi Kant Modi

INSPIRA
JAIPUR - INDIA

India

RECENT TRENDS IN COMMERCE MANAGEMENT AND SOCIAL SCIENCES

Edited by:

Dr. Bharati S. Math

Assistant Professor/IQAC Co-ordinator
BLDEA's A.S. Patil College of Commerce (Autonomous)
Vijayapur, Karnataka, India

Dr. Ravi Kant Modi

HOD, Faculty of Commerce &
Associate Professor & Head, Department of EAFM
LBS PG College, Jaipur, Rajasthan, India

INSPIRA™
Reg. No. SH-481 R- 9-V P-76/2014
JAIPUR • DELHI (INDIA)

i

CONTENTS

$$\boxed{1}$$

Impact of Cashless Mechanism on Indian Economy

Pradeep H Kumbar*

Introduction

In the current scenario the life of every individual begins with internet and ends with internet. This proves to what extent the impact of internet is in force and to what extent one in any individual is dependent on internet access. The Internet is like a deep well where there is storage of gallons of information which benefits the individual when they need it. In this buzzing world almost, every country is with the cashless mode of transaction, they use non-cash payment for day-to-day consumption, expenditure, the payments are made through online mode in any service sector and business transaction. The consciousness about the non-cash method and cashless societies have given platform for cashless mechanism. Various reasons have contributed for country to become digitalized nations. In which the country is to be digitalized. In a cashless economy most of the transaction will be done by digital means like e banking, debit, and credit cards, PoS (point of sales) machines, digital wallets etc. In simpler words no liquid money or paper currency will be used by the people in a country. In a cashless economy the third party will be in possession of your money.

According to Government of India the cashless policy will not only increase employment, but also reduce cash related robbery thereby reducing risk of carrying cash. Cashless plan will also reduce cash related corruption and attract more foreign investors to the country. With this genuine cause several countries have implemented cashless transactions a decade ago. With no doubt one can experience the impact of cashless transactions in the modernization of payment system. The cashless transactions in association with e-banking system have witnessed high percentage of reduction in the cost of banking service, security and safety. Electronic banking has made the banking transaction very easier by implementing services closer to its customers. The e-banking industry performance has witnessed a rapid change and transformation through digital payment by making cashless economy idea in action.

---

*   Assistant Professor, Department of Commerce, B.L.D.E.A's, A.S. Patil College of Commerce (Autonomous), Vijayapur, Karnataka, India.

Objective of the Study

- To know the concept and modes of cashless payments.
- To know the prospects and confronts of cashless mechanism.
- To overcome the challenges of cashless mechanism.

What is a Cashless Mechanism?

Cashless mechanism can be defined as a situation in which the flow of cash within an economy is non-existent and all transactions must be through electronic channels such as credit cards, debit cards, electronic clearing, and payment systems such as Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT) and Real-Time Gross Settlement (RTGS) in India. In a cashless economy most of the transaction will be done by digital means like e- banking, debit and credit cards, PoS (Point of Sales) machines, digital wallets, phone pay, G-pay etc.

Why Cashless Mechanism is Important?

The digital India programme is a flagship initiative by the Prime Minister of India. The main vision is to transform India into a digitally empowered society. "Faceless, Paperless, Cashless" is one of the professed role of digital India. The needs of cashless economy are plenty in number and are known to every individual.

Highlights of Cashless Mechanism in India

- Post Demonetization, the Centre is making a big push for online and card-based transactions in the country to achieve its target for becoming a largely cashless economy.
- The growth of e-payment startups in the country has raised significantly.
- The launch of Unified Payments Interface (UPI) to facilitate cashless transactions has achieved a marvelous success in cashless economy.
- The Covid-19 pandemic fueled a massive shift towards digital transactions in India aligning with the Prime Minister's vision of a Digital India. In fact, according to the National Payments Corporation of India (NPCI) data, payments on UPI in June 2020 hit an all-time high of 1.34 billion in terms of volume with transactions worth nearly Rs 2.62 lakh crore.

Types of Cashless Modes and Payments

Mobile Wallet   **Plastic Money**   **Net Banking**

- **Mobile Wallet:** It is basically a virtual wallet available on your mobile phone. You can store cash in your mobile to make online or offline payments. Various service providers offer these wallets via mobile apps, which is to be downloaded on the phone. You can transfer the money into these wallets online using credit/debit card or Net banking. This means that every time you pay a bill or make a purchase online via the wallet, you won't have to furnish your card details. You can use these to pay bills and make online purchases.

- **Plastic Money:** It includes credit, debit and prepaid cards. The latter can be issued by banks or non-banks and it can be physical or virtual. These can be bought and recharged online via Net banking and can be used to make online or point-of-sale (PoS) purchases, even given as gift cards. Cards are used for three primary purposes – for withdrawing money from ATMs, making online payments and swiping for purchases or payments at PoS terminals at merchant outlets like shops, restaurants, fuel pumps etc.

- **Net Banking:** It does not involve any wallet and is simply a method of online transfer of funds from one bank account to another bank account, credit card, or a third party. You can do it through a computer or mobile phone. Log in to your bank account on the internet and transfer money via national electronic funds transfer (NEFT), real-time gross settlement (RTGS) or immediate payment service (IMPS), all of which come at a nominal transaction cost.

The cashless economy in India is being promoted through various platforms and applications which provide easy methods of funds transfer and payments:

Bharat Interface for Money (BHIM)   **Bharat QR**   **Unified Payment Interface (UPI)**

Prospects and Confronts of Cashless Mechanism

Prospects of a Cashless Mechanism

Cashless is a word which literally means having no cash but in today's world, it refers to using digital form of payments instead of cash for payment of various expenses or transactions done by the individual.

- **Increased Liquidity in Banking System**

Cashless transactions shall require people to keep all their cash with banks and hence liquidity in the banking system shall increase. Liquidity of banks is of vital significance as they are important to financial system. The proximate cause of a bank's demise is mostly liquidity issue when they fail to meet their payment and settlement obligations.

- **Increase the Tax Net**

All the transactions that are done can be monitored and traced back to a given individual. If officials from tax department smell something fishy then they can trace the money transaction back to the individual. Hence it will be really difficult for someone to evade tax. Increasing tax net is very important for any government.

- **Mobility of Funds**

Physically carrying of money will not be required therefore reducing the risk of theft. Just carrying mobile phones or cards will be required to carry out any transaction.

- **Transparency of Transactions**

Going cashless shall bring transparency and accountability in the hands of the senders and receivers, thereby going cashless shall eradicate corruption to some extent. Digital transactions are completely traceable and can be reconciled.

- **Savings in Maintenance Cost**

Flow of cash in an economy involves printing of currency and allied expenses like maintenance cost in the form of storage cost, transportation cost of transporting currency to distant places and security cost. Also, another important cost involved is distribution cost of currency.

Confronts of Cashless Mechanism

- **Security and Privacy Issues:** Cyber security is one of the major challenges for a cashless economy. Adequate security measures are required to safeguard online transactions against fraud. Cashless transactions give rise to security and privacy concerns as there is unending vulnerability to hacking and data breach. In cases where account is hacked, all the savings may be drained in a fraction of seconds. Activities such as phishing, duping money shall be easier in digital transactions.

- **Lack of Digital Literacy:** Everybody doesn't have the knowledge required for doing digital transactions and therefore, it is very difficult to implement a cashless economy where the demographic profile is centered towards rural areas.

- **Scalable Infrastructure:** Digital infrastructure requires lucrative investment for overcoming power outages, incessant access of network connectivity, increased POS terminals. 100 percent uptime can never be guaranteed resulting in failed transactions, blocking of funds. A strong and reliable backup system is required for loss or malfunctioning or electronic payment system or devices.

- **Resistance to Change:** Regardless of how effectively people are made aware of benefits associated with cashless economy; there shall be a section of people who would resist change. For e.g. Elderly section of society are not as much tech savvy as compared to the younger blood.

- **Increased Transaction Cost through PoS Terminals:** Digital modes of payment involve transaction fee which is not incurred while carrying out cash-based transactions which may prove to be a hindrance to the cashless economy.

"Steps to promote card payments with an aim to discourage cash transactions"

According to the committee on digital payments headed by Ratan P. **Former finance secretary and Principal Advisor, NITI Aayog**, PRB would be established within the overall structure of Reserve Bank of India (RBI) with majority of non-RBI members nominated by the central government.

- Recommend various measures to incentivize transactions through cards and digital means, e.g., through tax incentives/rebates, introduction of cash back/lottery.

- Review the payments system in the country and recommend measures for encouraging digital payments.

- Study and recommend need for changes, if any, in the regulatory mechanism under various laws, relevant for the purpose of promotion of payments by digital modes.

- Study feasibility of creating a payments history of all card and digital payments and ensure that merchants and consumers can leverage the data to access.

- Study and recommend ways for leveraging Unique Identification Number (UID) or any other proof of identity for authentication of card and digital transactions.

- Study introduction of single window system of payment gateway to accept all types of cards and digital payments of government receipts.

- Look into the scope of integration of all government systems like Public Finance Management System, Bharatkosh, Pay-Gov and e-Kuber.

- Identify regulatory bottlenecks and suggest changes. Study global best practices in payments and identify possible market failures along with suitable interventions

At present, the study said, **40% of all transactions in India are digital**, and payments worth $3 trillion were processed by digital instruments in 2021. This does not include payments made for financial services, corporate business payments, and government payments.

Conclusion

A cashless or a digital economy will require all the residents to have a bank account. Also, since digital transactions can be easily tracked, the incidences of tax evasion will reduce drastically and in the long term will help the common people in terms of better implementation of government policies.

The future of the Cashless India looks promising as the response of the country people towards this move of the government and the support towards it is a clear indication that the government's move is likely to succeed. The transparency in the economy will increase through the e-commerce transactions and the digital payment gateways will increase the GDP of the economy. This step of cashless transactions is creating ripples of big success and there is a positive impact of cashless mechanism on the Indian economy as well as citizens of country.

References

1.	https://www.livemint.com

2.	https://byjus.com/free-ias-prep/cashless-economy/

3.	Newspaper and Magazines.

4.	http://ijariie.com/AdminUploadPdf/a_study_on_the_impact_of_cashless_econo my_in_india_giving_special_reference_to_alappuzha_district__ijariie12253_co nverted.pdf

5.	https://taxguru.in/chartered-accountant/cashless-economy-pros-cons.html

❧❧❧

2

An Appraisal of the Effectiveness of Shri Siddesh Co-Operative Bank, Vijayapur

Prof. Kumarswamy Hiremath[*]
Mr. Sandeep R. Hiremath[**]

Introduction

Co-operative banks play an important role in rural finance in India, with land, livestock, milk, personal finance, self-employment and small unit establishments being one of the few focuses of urban and rural co-operative banks.

The cooperative banking system was created to encourage people to save and invest, especially in rural areas. Credit unions are small financial institutions that provide lines of credit to small businesses in both urban and suburban areas. They are supervised and regulated by the Reserve Bank of India (RBI) and fall under the Banking Regulation Act 1949 and the Banking Act 1965.

Needs for the Study

The role of study is to help the management of the organization in decision making regarding the subject matter. Calculation of financial statement and it needs to immense skill intelligence and foresightedness. It gives indication of the direction of change and reflects whether the organization financial position has improved or remain constant over period of time.

Statement of the Problem

The co-operative Banks is facing severe problems which have restricted their ability to ensure smooth flow of credit. Limited ability to mobilize resources. Low level of recovery. High transaction of cost. It is abusing power by the Leadership. It having Mismanagement and manipulation so, the interference of Government is high. Cooperative Banks not having modern banking practices. Lack of awareness towards

---

[*] Assistant Professor, Department of M.Com, B.L.D.E. A's, A. S. Patil College of Commerce (Autonomous), Vijayapur, Karnataka, India.
[**] M.Com Final Year Student, B.L.D.E. A's, A. S. Patil College of Commerce (Autonomous), Vijayapur, Karnataka, India.

the rules and regulations of the Bank. The cooperative movement has also suffered on account of important limitations on its working. It having lack of Professionalism. State-owned credit unions are unable, due to certain restrictions, to develop their own policies for investing funds, including surplus funds. Prior approval of the RBI is mandatory for the opening of new branches of SCB. SCB is obliged to submit a proposal to open a new branch to his RBI via his NABARD, which, if approved, will take precedence

Research Questions

The researcher would address the following questions:

- What is the satisfaction level of customers of Sri Siddeshwar Co-operative Bank?

- What is the level of profitability of Sri Siddeshwar Co- operative Bank?

Objectives of the Study

The more extensive goals of the review are as under:

- To evaluate the satisfaction level of the customers of Sri Siddeshwar Co-operative Bank, Vijayapur.

- To know the growth of Co-operative Banking sector in India.

- To suggest improving efficiency of Sri Siddeshwar Co-operative Bank.

Scope of the Study

The extent of the review is characterized concerning execution viewpoints and period under center.

- The researcher has chosen Sri Siddeshwar Co-operative Bank, Vijayapur for the study.

- The study is based on the primary through questionnaire

- Sri Siddeshwar Co-operative Bank were estimated through satisfaction level of customers.

Research Methodology

- **Source of Data:** The study is based on primary as well as secondary data.

- **Primary Data:** The information has been collected by visiting sampled banks by using structured questionnaire and interview techniques. The procedures adopted in the interviews were to meet the bank officers and customers also.

- **Sample Selection:** Non-probability sampling techniques have been used like convenience sampling to collect the Primary Data from the customers and employees of the selected bank with the help of structured questionnaire. Attempt has been made to collect samples from the head offices of selected bank. Sample size was 200 customers of selected bank.

- **Framework Analysis:** The functions of Sri Siddeshwar Co-operative Bank of Vijayapur will be estimated through 2 various strategies they are as per the following:
  - **Questionnaire:** Questionnaire consists of 32 statements. Five options given to the respondents on the bases of 5-point Likert scale ranging from strongly agree to strongly disagree. With the help of pretested structured questionnaire, researcher tried to know the different aspects of customers and employees regarding their expectations from the banks.

Scope for Future Research

- Additionally, the scope of the study can be expanded by considering public, private and foreign banks in India.

- Many internal and external factors affecting credit union financial performance can be analyzed to make prospective research more prominent and comprehensive.

- The researchers can extended their study to another districts and places also.

- The effects of price level changes can be applied for further study to know the true profitability and financial position of the Sri Siddeshwar Co-operative Bank.

Analysis of Customer Satisfaction Level

Socio - Demographic Information

Table 1: Gender

Sl. No.	Gender	Frequency	Percent
1	Male	112	56.0
2	Female	88	44.0
	Total	**200**	**100.0**
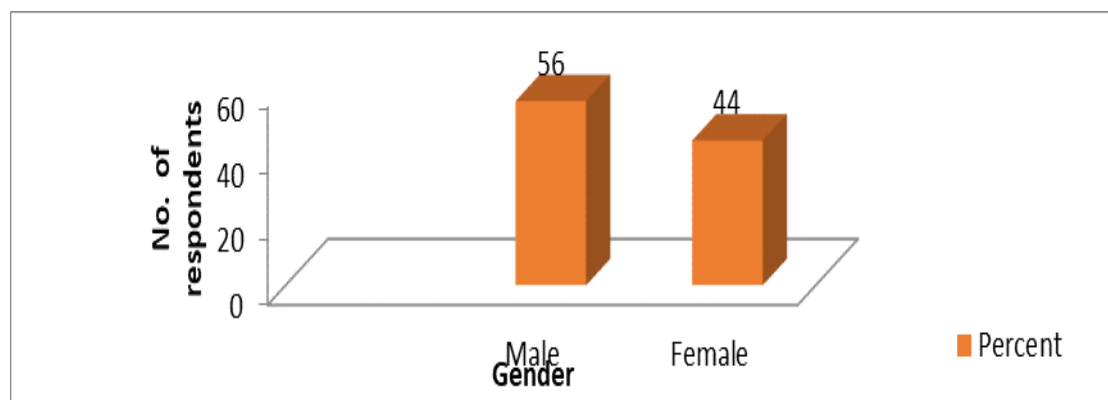
From the above table & graph we can infer that out of 200 respondents 112 (56.0 %) are male respondents and remaining 88 (44.0%) are female respondents.

Table 2: Marital Status

Sl. No.	Marital Status	Frequency	Percent
1	Married	92	46.0
2	Unmarried	108	54.0
	Total	**200**	**100.0**
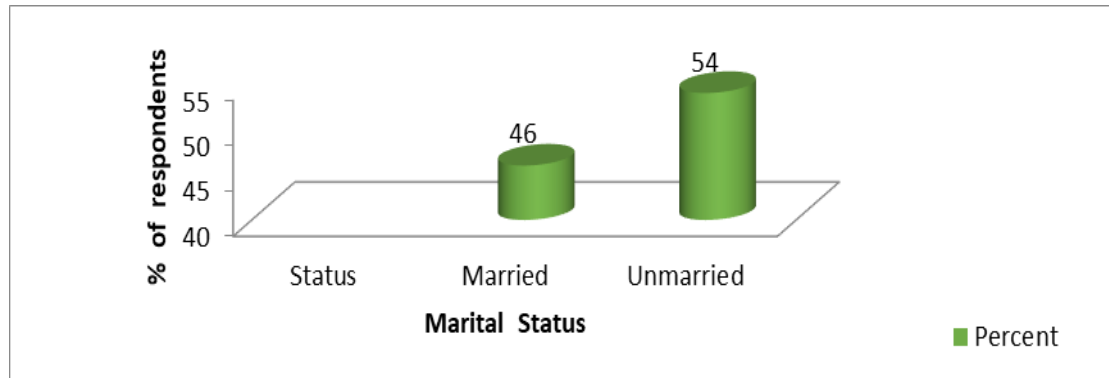
The above Table & graph shows that 92 (46.0%) are married respondents and 108 (54.0%) are unmarried respondents.

Table 3: Age of the Customer

Sl. No.	Age	Frequency	Percent
1	Below 25 Years	76	38.0
2	26 – 35 Years	44	22.0
3	36 – 45 Years	52	26.0
4	Above 45 Years	28	14.0
	Total	**200**	**100.0**
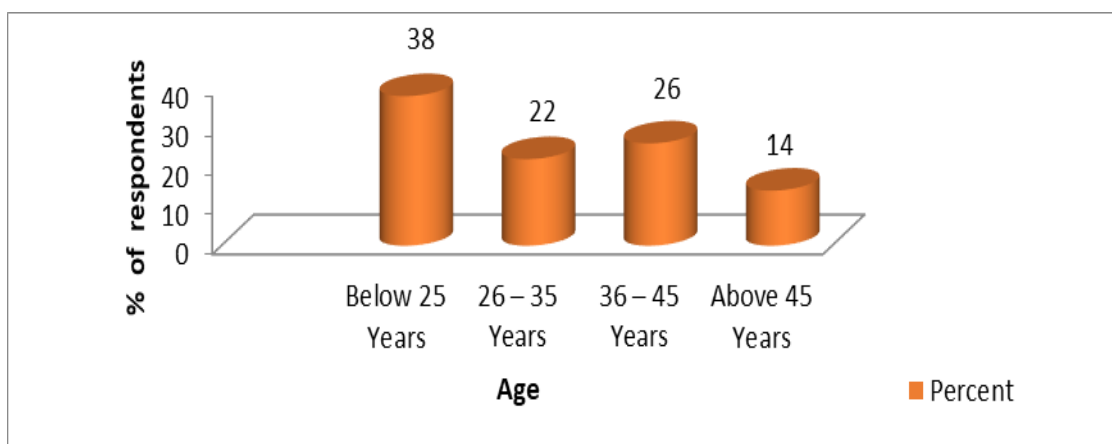
The above table & graph shows that 38.0 % of respondents are below 25 years, 22.0 % are between 26 -35 years, 26.0 % are between 36 -45 years and 14 % are above 45 years.

Table 4: Highest Level of Education

Sl. No.	Highest Level of Education	Frequency	Percent
1	Undergraduate	52	26.0
2	Graduate	60	30.0
3	Post Graduate	44	22.0
4	Others	44	22.0
	Total	**200**	**100.0**
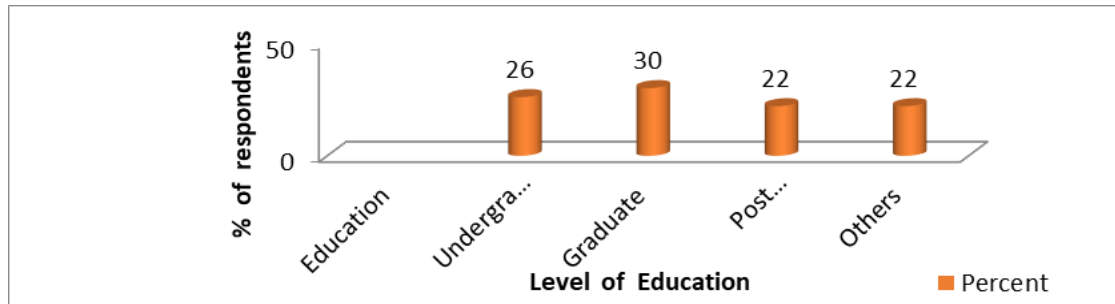
The above graph shows that 26.0 % of respondents are undergraduate, 30.0% of respondents are graduate and 22.0 % of respondents are post graduate and others.

Table 5: Occupation

Sl. No.	Occupation	Frequency	Percent
1	Farmer	20	10.0
2	Business	32	16.0
3	Government Service	12	6.0
4	Private Service	28	14.0
5	Student	44	22.0
6	Others	64	32.0
	Total	**200**	**100.0**
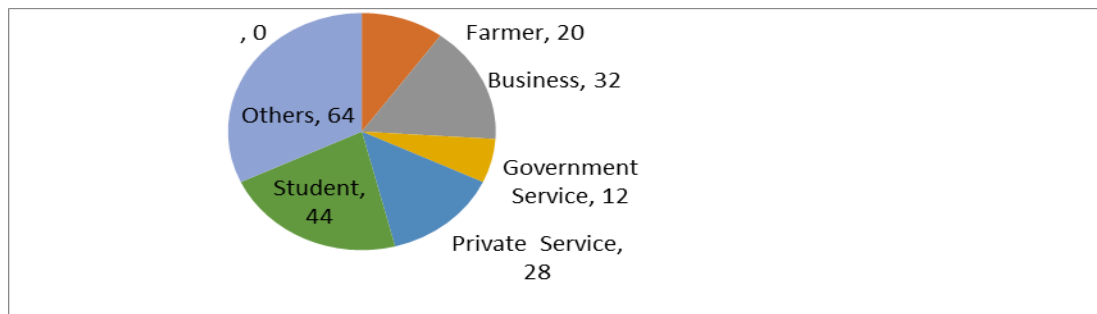
The above graph shows that 10.0 % of respondents are farmers, 16.0 % of respondents are doing business, 6.0 % of respondents are working under government services, 14.0 % of respondents are working under private service, 22.0 % of respondents are students and 32.0 % of respondents are others.

Table 6: Annual Income

Sl. No.	Annual Income	Frequency	Percent
1	Less than Rs. 5,00,00	96	48.0
2	Rs. 5,00,000 – 10,00,000	28	14.0
3	Rs. 10,00,000 – 20,00,000	44	22.0
4	More thanRs. 20,00,000	32	16.0
	Total	**200**	**100.0**
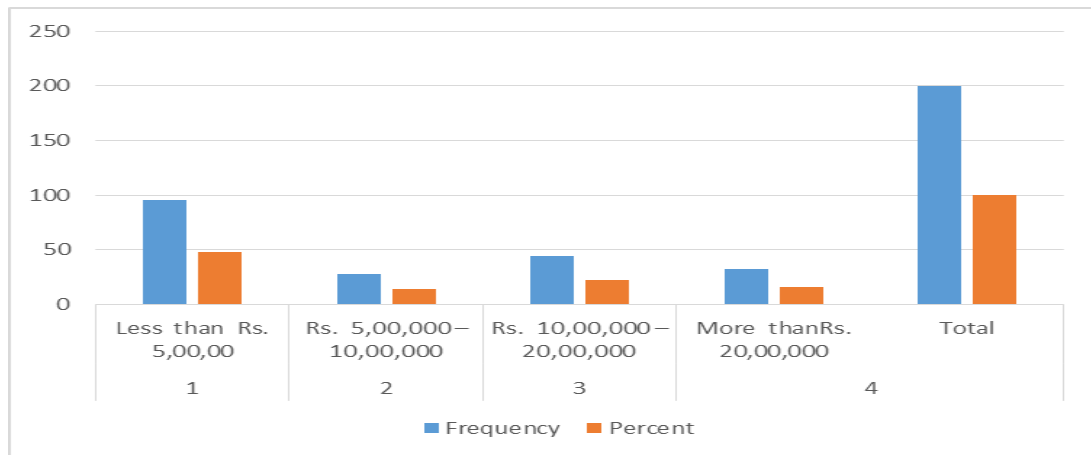
The above graph shows that 48.0 % of respondents annual income is less than 5,00,000 , 14.0 % of respondents annual income is 5,00,000 – 10,00,000, 22.0 % of respondents annual income is 10,00,000 – 20,00,000 and 16.0 % annual income is more than 20,00,000

Table 7: Type of Accounts

Sl. No.	Type of Accounts	Frequency	Percent
1	SB	124	62.0
2	CA	32	16.0
3	FD	28	14.0
4	Others	16	8.0
	Total	**200**	**100.0**
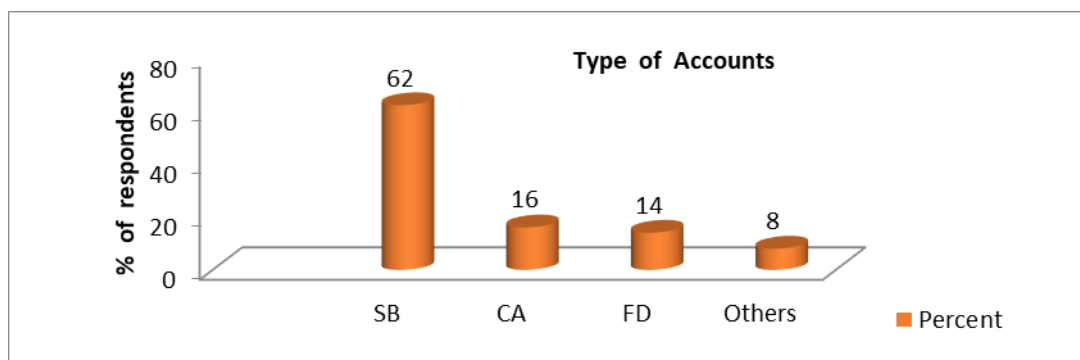
The above graph shows that 62.0% of respondents are having SB accounts, 16.0% of respondents are having CA accounts, 14.0 % of respondents are having FD accounts and 8.0 % of respondents are having other accounts.

Table 8: Frequency

Sl. No.	Frequency	Frequency	Percent
1	Daily	12	6.0
2	Weekly	44	22.0
3	Monthly	88	44.0
4	Rarely	56	28.0
	Total	**200**	**100.0**
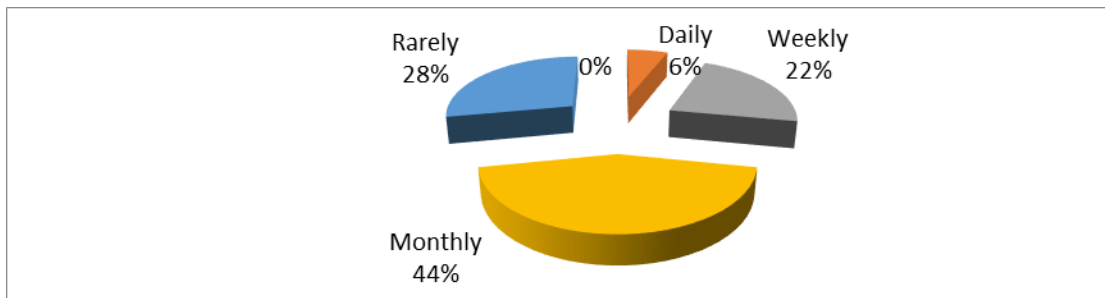
The above graph shows that 6.0 % of respondents are visiting daily, 22.0 % are weekly, 44.0% are monthly and 28.0 % are rarely.

Customer Satisfaction about the Services Bank Staff

Table 9: Skills and Knowledge

Sl. No.	Skills & Knowledge	Frequency	Percent
1	Excellent	96	48.0
2	Good	72	36.0
3	Average	24	12.0
4	Poor	8	4.0
	Total	**200**	**100.0**
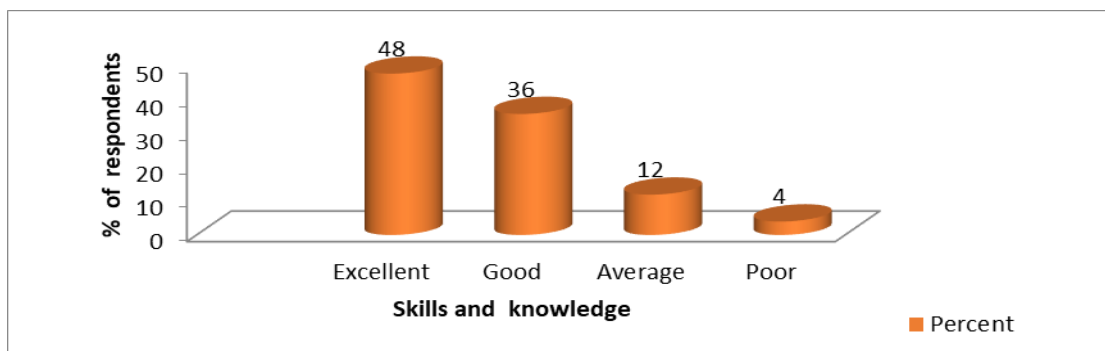
The above graph shows that, 48.0 % of respondents are having Excellent Skills and knowledge, 36.0% are Good, 12.0% are Average and 4.0% are poor.

Table 10: Friendly and Courteous Manner

Sl. No.	Friendly & courteous	Frequency	Percent
1	Excellent	100	50.0
2	Good	68	34.0
3	Average	20	10.0
4	Poor	12	6.0
	Total	**200**	**100.0**

From the above graph shows that, 50.0 % of respondents are having Excellent friendly and courteous manner, 34.0% are good, 10.0% are average and 6.0% are poor.

Table 11: Pleasing and Appearance

Sl. No.	Pleasing & Appearance	Frequency	Percent
1	Excellent	100	50.0
2	Good	52	26.0
3	Average	32	16.0
4	Poor	16	8.0
	Total	**200**	**100.0**
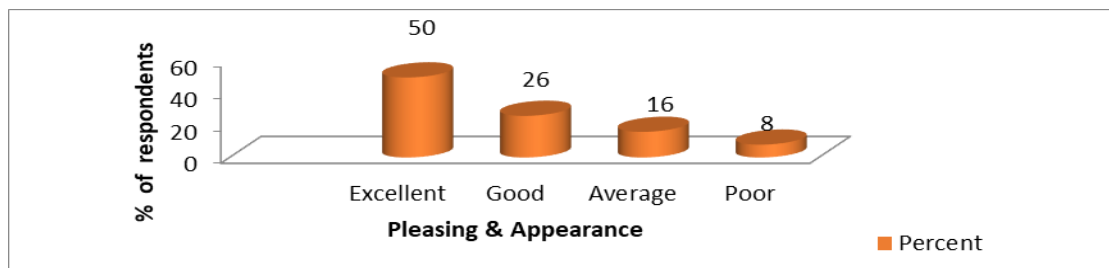
From the above graph shows that, 50.0% of respondents responded Excellent about pleasing and appearance, 26.0 % responded good, 16.0 % responded average and 8.0 % responded poor.

Table 12: Listen and Respond

Sl. No.	Listen & Respond	Frequency	Percent
1	Excellent	84	42.0
2	Good	84	42.0
3	Average	24	12.0
4	Poor	8	4.0
	Total	**200**	**100.0**

From the above graph shows that, 42.0 % of respondents responded Excellent 42.0% responded good, 12.0 % responded average and 4.0 % responded good about listen and respond from employees.

Table 13: Satisfied with branch staff

Sl. No.	Satisfied with Branch Staff	Frequency	Percent
1	Yes	180	90.0
2	No	20	10.0
	Total	**200**	**100.0**
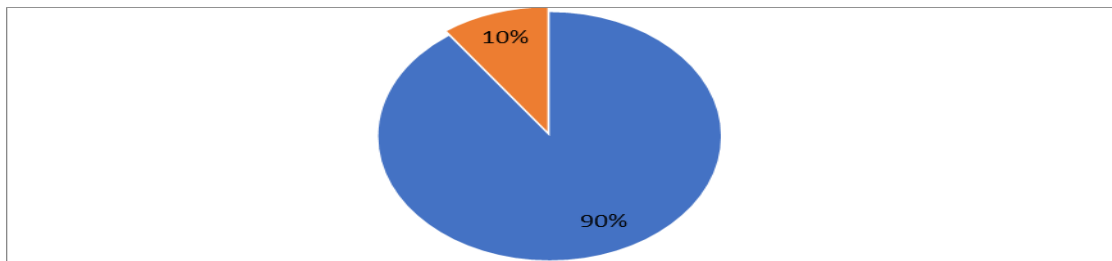
From the above graph shows that, 90.0% of respondents are agreed with (satisfied with branch staff) and 10.0 % of respondents are disagreed with (satisfied with branch staff).

Branch Appearance

Table 14: Branch Appearance Neat & Orderly

Sl. No.	Branch Appearance Neat & Orderly	Frequency	Percent
1	Yes	188	94.0
2	No	12	6.0
	Total	**200**	**100.0**
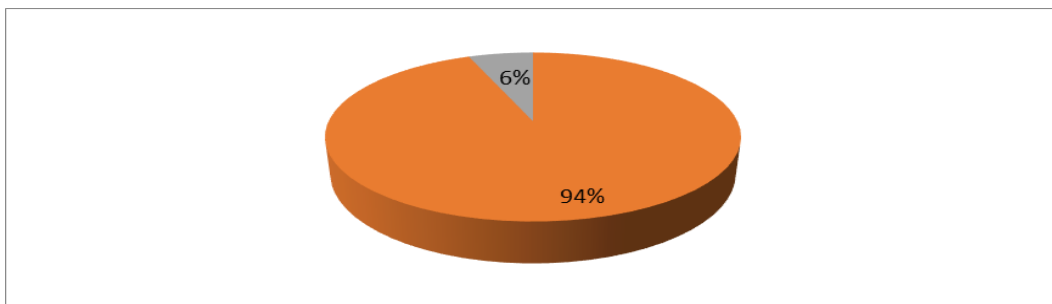
The above graph shows that, 94.0 % of respondents are agreed with branch appearance neat & orderly and 6.0 % of respondents are disagreed with branch appearance neat & orderly.

Table 15: Sufficient & Comfortable seating Arrangement

Sl. No.	Sufficient & Comfortable Seating Arrangements	Frequency	Percent
1	Yes	160	80.0
2	No	40	20.0
	Total	**200**	**100.0**
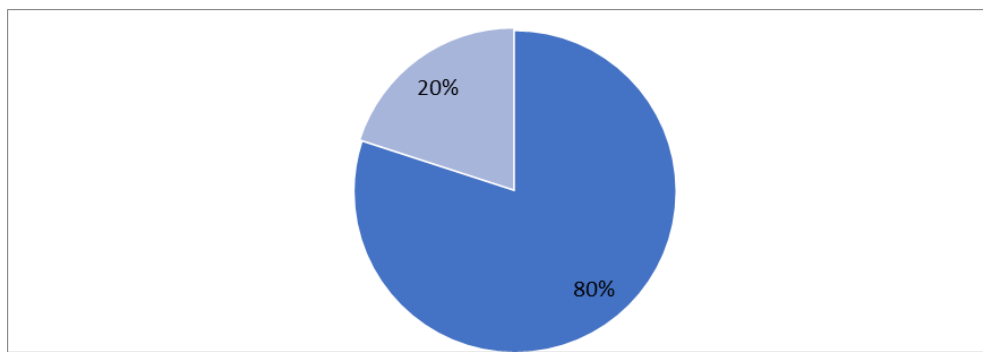
The above graph shows that, 80.0% of respondents are agreed with sufficient & comfortable seating arrangement and 20.0 % of respondents are disagreed with sufficient & seating arrangement**.**

Table 16: Consumer Representatives and Tellers

Sl. No.	Consumer Representatives & Tellers	Frequency	Percent
1	Yes	168	84.0
2	No	32	16.0
	Total	**200**	**100.0**
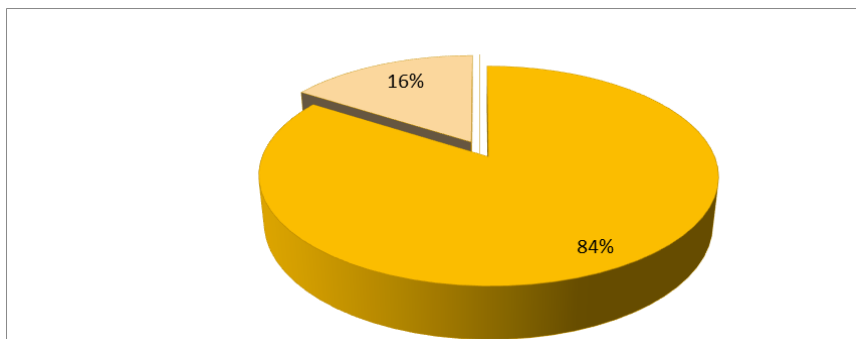
The above graph shows that, 84.0 % of respondents are agreed with consumer representatives and tellers and 16.0 % of respondents are disagreed with consumers representatives and tellers.

Table 17: Convenient Working Hours & Location

Sl. No.	Convenient working hours & Location	Frequency	Percent
1	Yes	176	88.0
2	No	24	12.0
	Total	**200**	**100.0**
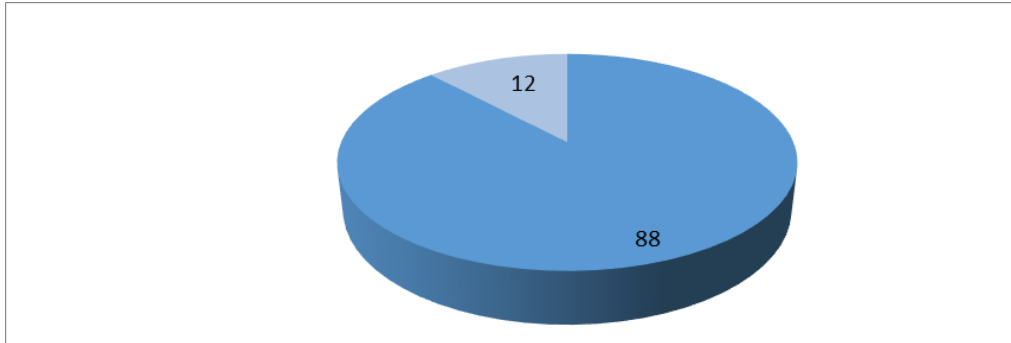
The above, graph shows that, 88.0 % of respondents are agreed with Convenient working hours & location and 12.0 % of respondents are disagreed with convenient working hours & location.

Table 18: Access of Online Banking

Sl. No.	Access of Online Banking	Frequency	Percent
1	Excellent	80	40.0
2	Good	76	38.0
3	Average	36	18.0
4	Poor	8	4.0
	Total	**200**	**100.0**
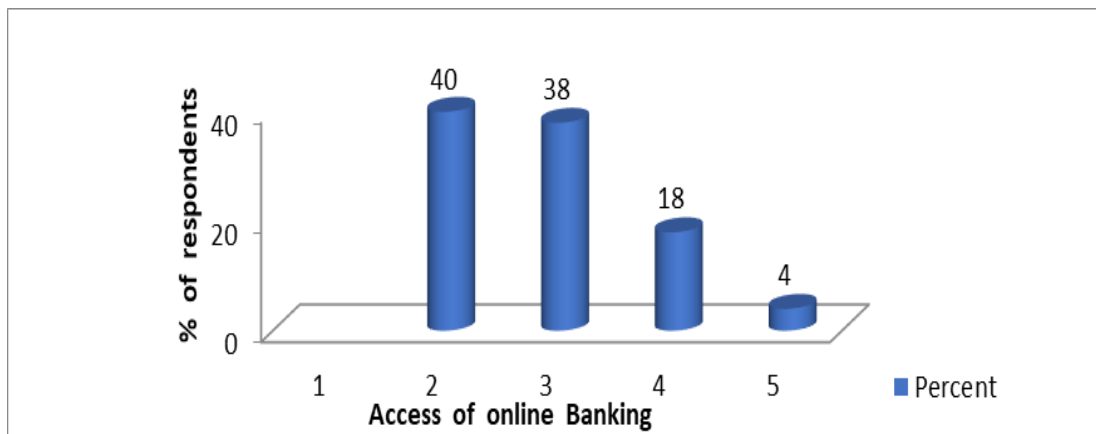
The above graph shows that, 40.0 % of respondents are having Excellent access of online banking, 38.0 % of respondents are having good access of online banking, 18.0 % of respondents are average and 4.0 % are poor.

Table 19: Service Offered on Online Banking

Sl. No.	Service Offered on Online Banking	Frequency	Percent
1	Yes	164	82.0
2	No	36	18.0
	Total	**200**	**100.0**
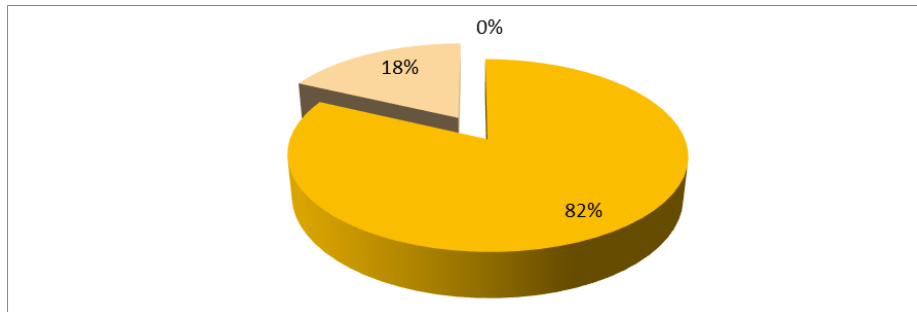
The above graph shows that, 82.0 % of respondents are agreed with service offered on online banking and 18.0 % of respondents are disagreed with service offered on online banking.

Call Centre

Table 20: Calls Answered Promptly

Sl. No.	Calls Answered Promptly	Frequency	Percent
1	Yes	176	88.0
2	No	24	12.0
	Total	**200**	**100.0**
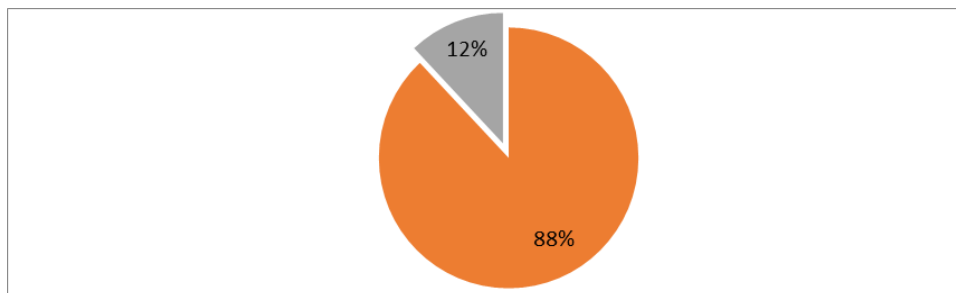
The above graph shows that, 88.0 % of respondents are agreed with calls answered promptly and 12.0 % of respondents are disagreed with calls answered promptly.

Table 21: Recommend Siddeshwar Bank to members

Sl. No.	Recommend to Members	Frequency	Percent
1	Yes	168	84.0
2	No	32	16.0
	Total	**200**	**100.0**
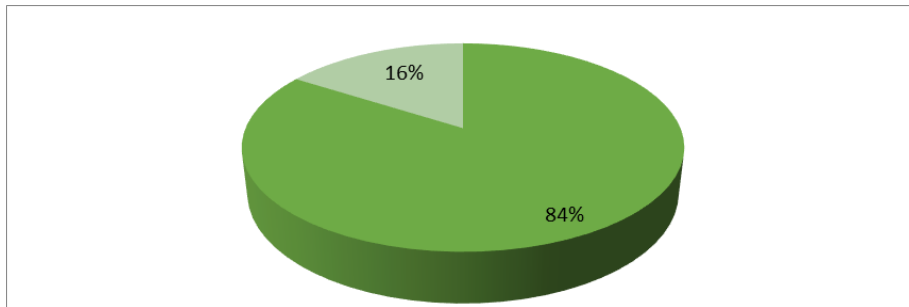
The above graph shows that, 84.0 % of respondents are agreed with recommend Siddeshwar bank to members and 16.0 % of respondents are disagreed with recommend Siddeshwar bank to members.

Table 22: Satisfied with Service

Sl. No.	Satisfied with Service Quality	Frequency	Percent
1	Strong Agree	88	44.0
2	Agree	92	46.0
3	Disagree	20	10.0
	Total	**200**	**100.0**
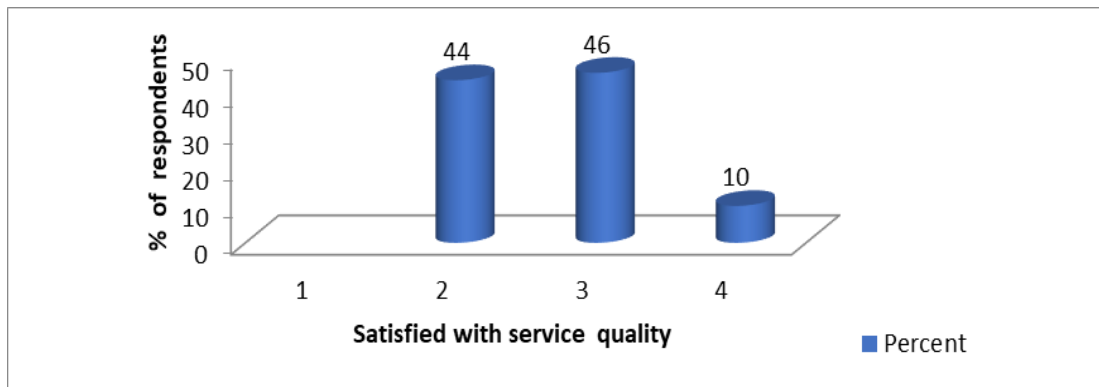
The above graph shows that, 88.0 % of respondents are strong agreed with (satisfied with service quality), 46.0 % of respondents are agree and 10.0 % of respondents are disagree.

Table 23: Service Quality at Co- Operative Bank

Sl. No.	Service Quality at Co- Operative Bank	Frequency	Percent
1	Very satisfied	72	36.0
2	Satisfied	56	28.0
3	Normal	40	20.0
4	Dissatified	20	10.0
5	Very dissatisfied	12	6.0
	Total	**200**	**100.0**
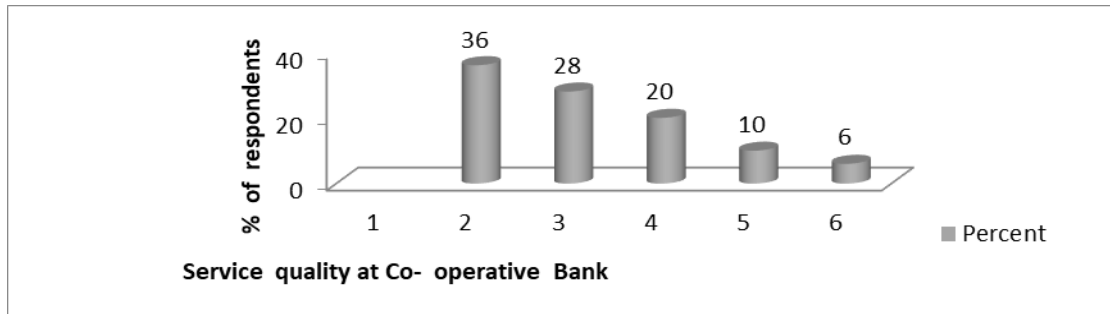
The above graph shows that, 36.0 % of respondents are very satisfied with service quality at Co- operative Bank, 28.0 % of respondents are satisfied, 20.0 % of respondents are normal, 10.0 % of respondents are dissatisfied and 6.0 of respondents are very dissatisfied.

Table 24: Recommend this Organization to others

Sl. No.	Recommend this Organization to others	Frequency	Percent
1	Yes	168	84.0
2	No	32	16.0
	Total	**200**	**100.0**
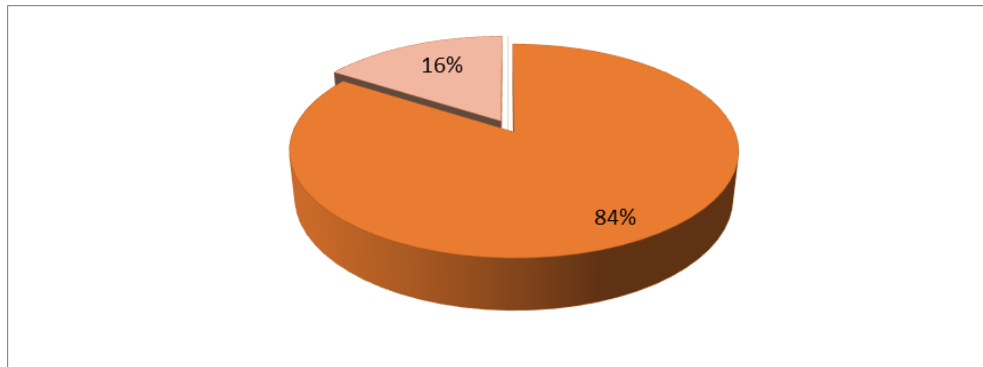
The above table and graph shows that 84% of the respondents recommends this organization to other and 16% are not recommends this organization to others.

Findings of the Study

Socio - Demographic Information

- **Gender:** It is found that out of 200 respondents 112 (56.0 %) are male respondents and reaming 88 (44 %) are female respondents.

- **Marital Status:** It is found that 46.0 % of the respondents are married and 54% are unmarried.

- **Age:** It is found that 38.0 % of the respondents are below 25 years, 22.0 % are between 26 to 35 years, 26.0 % are between 36 to 45 years and 14.0 % are above 45 years.

- **Education:** It is found that 26.0 % of the respondents are are undergraduate, 30.0 % are graduates, 22.0 % are post graduates and others.

- **Occupation:** It is found that 16.0 % of the respondents are business man, 10.0 % are formers, 6.0 % are government employees, 32.0 % are others, 14.0 % are private employees and 22.0 % are students.

- **Annul Income:** It is found that 48.0 % of respondent's annual income is less than 5,00,000, 14.0 % of respondents annual income is is 5,00,000 – 10,00,000, 22.0 % of respondents annual income is 10,00,000 – 20,00,000 and 16.0 % annual income is more than 20,00,000.

- **Type of accounts:** It is found that 16.0 % of the respondents are having the account of CA, 14.0 % are FD, 8.0 % are others & 62.0% are SB.

- **Frequency:** It is found that 6.0 % of the respondents are visiting daily, 44.0 % are monthly, 28 % are rarely and 22 % are weekly.

Customer's Satisfaction about Services
Branch Staff & Call Centre

- **Skills and Knowledge:** It is found that, 48.0 % of respondents are having Excellent skills and knowledge, 36.0 % are good, 12.0 % are average and 4.0 % are poor.

- **Friendly and Courteous Manner:** It is found that, 50.0 % of respondents responded Excellent about friendly and courteous manner, 34.0 % responded good, 10. 0% are responded averagr and 6.0 % responded poor.

- **Pleasing and Appearance:** It is found that, 50.0 % of respondents responded Excellent about pleasing and appearance, 26.0 % responded god, 16.0 % responded average and 8.0 % responded poor.

- **Listen and Respond:** It is found that, 42.0 % of respondents responded Excellent about listen and respond, 42.0 % responded good, 12.0 % responded average and 4.0 % responded poor.

- **Satisfied with Branch Staff:** It is found that, 90.0 % of respondents are agreed with branch staff and 10.0 % of respondents are disagreed with branch staff.

- **Branch Appearance Neat & Orderly:** It is found that, 94.0 % of respondents are agreed with branch appearance neat & orderly and 6.0 % of respondents are disagreed with branch appearance neat & orderly.

- **Sufficient and Comfortable Seating Arrangement:** It is found that, 80. % of respondents are agreed with sufficient & confortable seating arrangement and 20.0 % of respondents are disagreed with sufficient & seating arrangement.

- **Consumer Representatives and Tellers:** It is found that, 84.0 % of respondents are agreed with consumer representatives and tellers and 16.0 % of respondents are disagreed with consumers representatives and tellers.

- **Convenient Working Hours & Location:** It is found that, 88.0 % of respondents are agreed with convenient working hours and location and 12.0 % of respondents are disagreed with convenient working hours and location.

- **Access of online Banking:** It is found that, 40.0 % of respondents responded Excellent about access of online banking, 38.0 % responded good, 18.0 % responded average and 4.0 % responded poor.

- **Service Offered on Online Banking:** It is found that, 82.0 % of respondents are agreed with service offered on online Banking and 18.0 % of respondents are disagreed with service offered on online Banking.

- **Calls Answered Promptly:** It is found that, 88.0 % of respondents are agreed with calls answered promptly and 12.0 % of respondents are disagreed with calls answered promptly.

- **Recommend Siddeshwar Bank to Members:** It is found that, 84.0 % of respondents are agreed with recommend Siddeshwar Bank to members and 16.0 % of respondents are disagreed with recommend Siddeshwar Bank to members.

- **Satisfied with Service Quality:** It is found that, 88.0 % of respondents are strong agreed with service quality, 46.0 % of respondents are agreed and 10.0 % of respondents are disagreed.

- **Service Quality at Co–Operative Bank:** It is found that, 36.0 % of respondents are very satisfied with service quality at Co- operative Bank, 28.0 % of respondents are satisfied, 20.0 % of respondents are normal, 10.0 % of respondents are dissatisfied and 6.0 % of respondents are very dissatisfied.

- **Recommend this Organization to Others:** It is found that, 84.0 % of the respondents recommends this organization to others and 16.0 % are recommends this organization to others.

Suggestions
Customers Satisfaction Level

- Banks should be updated with the latest e-banking features such as internet banking, e-banking and mobile banking. This will help attract and reassure a new generation of users.

- Need to provide customers with more advanced equipment such as ATM (Automated Teller Machine), CDM (Cash Deposit Machine), passbook printer, etc.

- Banks also need to come up with new services and products to attract young people.

- Since customers are unaware of the bank's new products and services, a telephone service or toll-free number can be provided to keep the customer fully informed of the bank's activities.

- Various awareness programs can also be carried out to make customers aware of the new services of the bank.
- Banks need to replace manufacturers with technological alternatives, as more people want to use banks' online functions and other online services..
- Banks should also provide customers with more ATM, mobile banking and internet banking capabilities.
- In addition, working hours are longer than other credit unions, which gives a good impression.
- Bank loan programs are attractive, but interest rates need to be lowered.
- Banks should put more effort into their marketing strategies.
- Banks, like commercial banks, should conduct regular customer satisfaction reviews.
- Banks should conduct seminars and training programs to update their employees' knowledge.
- The co-operative banks may attract more aged customers by canvassing pensioners etc. with more customers friendly services.
- These banks improve their process of updating passbook.
- These banks may educate their staff to be more customers friendly.
- These banks have to improve their service quality.
- Co – operative banks needs to well train their employees for effective banking and need to learn how to solve all the problems raised by customers.

Conclusion

Monetary improvement of any nation is predominantly inflicted by the development of the financial business in that country. The current review has been directed to inspect the monetary exhibition of Sri Siddeshwar Co employable Bank, Vijayapur local, Karnataka utilizing benefit proportions. On the viable dimensional, this study is useful for brokers and supervisors in their decision making to work on the monetary execution and plan strategies that will advance compelling monetary framework. The concentrate additionally suggests measures that could be taken on by banks to guarantee sufficiency in their tasks.

The fate of helpful banks is testing a result of the competition from public area and confidential area banks. Public area banks and confidential area banks are focusing on their significant extension exercises both in an upward direction and on a level plane. The development of co-employable banks relies upon straightforwardness in charge and activity, administration, client - driven approaches, innovation - up degree and productivity. It tends to be closed from the examination that the reception of present-day innovation, banking changes and recuperation component extraordinarily supported working on the exhibition of the Bank.

References

Books

1.   Banking Awareness: Upendra Rai
2.   Financial Management: Dr. S. N. Maheshwari
3.   Urban Cooperative Banks: Vidya Pitre
4.   Performance Evaluation of Urban Cooperative Banks in India: Dr. Babu
5.   Bank annual reports
6.   Books
7.   Journals and Magazines

Articles

8.   Allred, T. A., & Addams, H. L. (2000). Service quality at banks and credit unions: What do their customer say. Managing service Quality,
9.   Dutta and Basak (2008) Appraisal of Financial performance of urban co – operative banks - a case study "The Management account, case study march 2008.
10.   Jyothi Gupta, Suman Jain (2012) "A study on co- operative banks in India with special reference to lending practice" International journal of scientific and research publication.
11.   Satyasi and Badatyer (2000), "Restructuring Rural Credit Cooperative Institutions", Economic & Political Weekly,
12.   Kothari, C. R. (2004), "Research Methodology - Methods and Techniques", New Age International (P) Limited, Publishers, New Delhi.
13.   Ganesan, N. (2006), A study on the Performance Analysis of the State Cooperative Banks in India,
14.   Das, Bishnu Mohan (2008), "Financial Inclusion through cooperative Banking: A Vital Tool for Rural Development," Economic Affairs,
15.   Ahmed, Rais (2009), "Cooperative Management and Development Text & Cases", Mittal Publications, New Delhi,
16.   Hooda, Vijay (2011), "State Co – operative Banks and Scheduled Commercial Banks: A Comparison of Three Financial Ratios", International Journal of Computing and Business Research.
17.   Dr. Bharati R. Hiremath (2021) Customer Satisfaction and Performance towards the Services of Cooperative Banks: A Case study of District Central Cooperative Bank, Vijayapur, Karnataka, International Journal of Advance Research and Commerce Management and Social Science.
18.   Dr. Bharati Math (2022): An analytical study on Financial Performance of Co-Operative Banks with Special Reference to Karnataka State, International Organization of Scientific Research.

❧❧❧

$$\boxed{3}$$

Study to Understand why Only few Indians Pay Income Tax

Vijayamahantesh V Balaganur[*]

Introduction

Every government relies heavily on taxation as a source of revenue. There are two ways to collect taxes: directly and indirectly. Indirect taxes include GST, customs duty, and tax withheld at the source. Direct taxes are assessed against people or businesses based on their income or profits in the case of businesses.

India has about 130 billion populations, yet just 5% of them filed income taxes in FY2022, despite the country's large population. (This implies that just 5.83 billion out of India's 130 billion people).

In India, who pays income taxes? According to the most recent income tax rules outlined in the Finance Minister's Union budget, only those who make more than 5 lakh per year will actually have to pay income tax.

Need for the Study

It is critical to understand why so few Indians pay taxes. Is it true that this burden affects only a small percentage of the population? And how many Indians earn more than five lakh rupees per year to be taxed?

Detailed Description

India has a low tax base not because millions of Indians hide their income and avoid paying taxes. It's because India's income tax structure is designed in such a way that only a small percentage of the population is eligible to pay income tax.

The government's Economic Survey of 2020 estimates that India's per capita income is ₹1.4 lakh. In other words, the typical Indian makes ₹1.4 lakh annually. Furthermore, as previously stated, the income tax threshold is ₹ 5 lakh. This means that the average Indian does not have to pay income tax.

[*]   Assistant Professor, Department of Economics, B.L.D.E.A's, A.S. Patil College of Commerce (Autonomous) Vijayapur, Karnataka, India.

According to estimates, just 3% of Indians earn more than 5 lakhs per year. When compared to other countries, only 5% of Americans, 4% of Britons, and approximately 3% of Chinese earn three times their annual wealth. This demonstrates so only 3% of Indians are indeed eligible to pay income taxes. As a result, India's income tax base is extremely low.

In reality, the upper 10% of Indians earn only 3 lakhs per year, and the 5 lakhs limit is extremely important because the government excludes all those earning less than 5 lakhs. They are not required to pay taxes.

An Indian who makes ₹25,000 a month is within the top 10% of income in the nation. It is according to the Institute for Competitiveness's most recent State of Inequality in India report.

This figure of ₹ 5 lakh is actually more than three times the country's GDP per capita.

For instance, In Mexico, Indonesia, and the Philippines, it is just 0.9x, 1.1x, and 0.4x respectively. Their cut off point is significantly lower, allowing the federal government to include more people in its tax net.

The income tax threshold in almost every other nation is lower than the average national income. Only Bangladesh and India have income tax thresholds that are significantly higher than the average annual income.

Let's examine other nations to provide some context.

The average American earns the same as America's per capita income and is subject to a 22% income tax. Similarly, the typical Chinese pays 10%, the typical Mexican pays 15%, and the typical German pays 14%.

Then there's agricultural revenue. A large number of Indians are still employed in agriculture, so all agricultural income is exempted from paying taxes, removing yet more Indians out of the tax net.

Conclusions

Everyone who earns less than five lakhs rupees is exempt from government taxes. They are exempt from paying income taxes. Legally, they are not required to. Thus, they are not at fault.

These individuals do pay taxes, but not on their income. They pay GST when they purchase a pack of biscuits. They pay taxes when they go to buy fuel. They pay their fair share through indirect taxes when they consume the majority of goods. Therefore, we also need to consider that.

Indisputably, a lot of people don't file their taxes because they still believe they can get away with it. Even others misreport their income, claim false deductions and pay less than their fair share.

Perhaps educating people about how tax revenue actually contributes to the nation's development would be a better strategy. Also for the government to demonstrate progress. This might encourage a behavioral shift. India's tax base might also be widened as a result.

Additionally, government revenue has significantly increased between 2021 and 2022. During the period of April through November 2021, the central government's revenue collections increased by 67.2% (YoY), compared to a projected growth of 9.6% in the budget estimates for the years 2021–22.

Both direct and indirect tax revenues have increased significantly in recent years. The figure below shows how this is possible. Since July 2021, the gross monthly GST collections have continuously exceeded 1 lakh crore.

Direct and indirect tax revenue
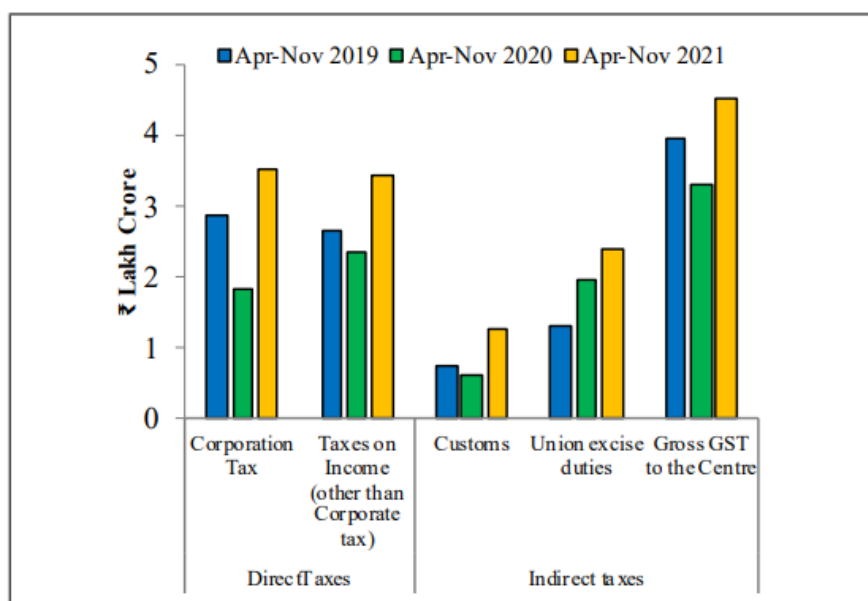
Source: Office of CGA

References

1. About 5.83 crore ITRs filed till 31st July, 2022 https://pib.gov.in/PressRelease Page.aspx?PRID=1847118https://www.indiabudget.gov.in/economicsurvey

2. State of economy https://www.indiabudget.gov.in/economicsurvey/doc/eschapter/echap01.pdf

3. Institute of competitiveness – Income Inequality https://eacpm.gov.in/wpcontent/uploads/2022/09/Competitiveness_Roadmap_for_India_at_100.pdf

❧❧❧

$$\boxed{4}$$

Analysis of Performance Pattern of
PGDM Students Using Two Step Clustering

Dr. Shilpa Sharma[*]

Introduction

In order to deal with the issue of mixed variables, Chiu, Fang, Chen, Wang, and Jeris developed two-step cluster analysis (when diversedimension scales are used for different variables). Both K-means and Hierarchical fail to cluster with one variable is on a real scale and the second is on a nominal scale [1]. It's possible that two-stage clustering can handle large datasets with ease, too. The cluster step receives as input the sub-clusters generated by the pre-cluster step, and organises them into the specified number of clusters. Because there are fewer sub-clusters than there are records, conventional clustering techniques can be used effectively. Two Step uses an agglomerative hierarchical clustering approach because it meshes well with the auto-cluster strategy [2].

- **Step 1: Pre-Cluster the Data**

Uses the concept of co-occurrence to convert discrete categories into continuous measures. It does a comparative analysis to find out how similar two things are. The idea behind co-occurrence is that things that share a high degree of similarity with one another are those that tend to appear together in the same object [3]. To begin clustering, we use a sequential clustering strategy. It goes through each record, one at a time, comparing it to the distance criterion, and deciding if it should join an existing cluster or create a new one. Constructing an adjusted cluster feature (CF) tree is what this method is all about. Each node in the CF-tree stores a certain number of items. The desired sub-cluster is represented by a leaf entry (a component of the leaf node). New data is quickly directed to the right leaf node with the help of the non-leaf nodes and their entries [4].

The number of records, average and standard deviation for continual variables, and category counts for categorical variables are all represented in a CF for

---

[*] Department of Computer Applications, Manipal University Jaipur, Jaipur, Rajasthan, India.

each entry. Each subsequent record initially starts at the root node and follows the nearest entry in that node to find the nearest child node, and so on down the CF-tree. When it reaches a leaf node, it seeks out the leaf entry that is geographically closest to its current position. A new entry is absorbed into the CF and the CF is updated if it is close enough to an existing leaf record. If not, it creates a new entry in the leaf node [5]. A leaf node splits in two if there isn't room for another leaf entry. The contents of the initial leaf node are split in half, with the farthest pair acting as seeds, and the remainder being redistributed according to the closest criteria. When a CF-tree reaches its maximum depth, it starts over by increasing the threshold distance until it reaches a new depth. The reduced size of the reconstructed CF-tree makes room for additional input data [6].

This procedure is carried out repeatedly until all the data has been dealt with. There is more detail on CF-tree building in BIRCH. The BIRCH cluster, in contrast to the pre-CF cluster, can only handle continuous data. The CF for BIRCH is the sum of the mean and standard deviation for each continuous variable, as well as the number of records in the entry. By including count values for each categorical variable, the SPSS CF extends the BIRCH CF. The CF for an entry stands for the set of records that share the same entry. If you know the previous CF and know that you're adding a new record to an entry, you can easily calculate the new CF from the previous CF. These features make it possible to express the entry CFs as a set of data rather than as a collection of separate pieces of information. The CF-tree is consequently much more manageable in size and can be kept in the primary memory rather than requiring a secondary memory cache [7] [8] [9]

- **Step 2: Grouping Data into Sub-Clusters**

It takes the sub-clusters generated in the first step as input and arranges them into the correct count of clusters. The Hierarchical clustering method, which merges clusters recursively, can be effectively employed because the count of sub-clusters is much lesser than the quantity of original records [10, 11]. The resulting set of clusters is then compared, and the two that are the most similar are merged; this process is repeated until all clusters have been merged. This recursive merging of clusters makes it easy to evaluate multiple cluster-count solutions. SPSS relies on the agglomerative hierarchical clustering approach because it complements the auto-cluster process. The modular design makes it easy to incorporate emerging technologies as they become practical [12, 13].

The number of clusters is calculated automatically. The dataset's characteristics determine the answer to the question of how many clusters there are. Hierarchical clustering generates an escalating number of partitions (1, 2, 3,...) at each iteration. The k-means and EM (expected maximisation) methods would need to be repeated numerous times to generate the sequence (one for each specified

number of clusters [14, 15]). SPSS developed a two-stage procedure that effectively pairs with the hierarchical clustering approach. In the first phase, we estimate the total number of clusters by computing the BIC for each possible cluster size. The distance between the two nearest clusters is measured at each stage of the hierarchical clustering process to further refine the initial result [16, 17].

Background

The number of clusters chosen is a crucial factor in cluster analysis. The problem is that a hierarchical approach does not provide enough guidance for making such a decision. Unified distances are the only metric that matters [18]. A solution can be sought in which an additional combination of clusters or objects occurs at a significantly greater distance, much like the scree plot in factor analysis. In the same way that we don't yet know what constitutes excellence, this evaluation is also highly subjective. When compared to hierarchical methods, K-means clustering performs better because it is less affected by noise and outliers. Additionally, very large datasets can be analyzed with k-means as opposed to hierarchical approaches because of its low computational cost (500 or more). K-means clustering is limited to interval and ratio scaled data due to the use of Euclidean distances [19, 20].

Another serious problem with K-means algorithms is that they cannot be used without first being provided with a value for k. This diminishes k-means' appeal and keeps a lid on its widespread application in practise. Therefore, the number of clusters is often determined using a hierarchical technique before k-means is applied [21]. Using hierarchical clustering allows us to easily probe solutions with a growing number of clusters, even with a small data set. k-means clustering can be used if the desired number of clusters is known, and the data size is manageable [22]. The nature of the data being clustered is another essential factor to think about. The use of hierarchical or partitioning clustering techniques is straightforward when the data is metric; however, when the data is mixed, the aforementioned algorithms can lead to inaccuracies. The following are some of k-means' main drawbacks that have been identified

An application of binary distance to category value. When two objects have the same categorical value, their distance is zero; otherwise, it is one. Because categorical values cannot have the same degree of difference, this may not hold true in practise. The distinction between "good" and "average" should not be the same as that between "average" and "bad," for instance.

At the heart of the cluster, one attribute value is selected to stand in for the rest. Even though they may be crucial to the clustering process, less frequently occurring categorical values are thus less likely to be presented at the cluster's center [23, 24].

Performance Pattern Study based on Academic Performance

As was previously mentioned, two-step clustering provides a straightforward method of assessing the groups [25]. To demonstrate the value of two-step clustering in obtaining relevant data, we used student records from two school years. Over 500 people are studied as a sample. The academic achievements of roughly 550 students from two consecutive academic years at a number of prestigious business schools in North India were used. The students' sex and demographic details were also recorded. Two stages of SPSS 13 analysis revealed interesting trends

Two-step Clustering Results of SPSS for PGDM Batch

As can be seen in Table 1 below, the count of cases in the final cluster solution could be evaluated utilizing a two-step clustering approach. There are now four distinct groups. The breakdown of clustered cases shows that 33.2% of the total are located in the largest cluster, while 19.7% are located in the smallest. Size-wise, every grouping stands out to some degree.

Table 1: Cluster Distribution

		N	% of Combined	% of Total
Cluster	1	136	24.8%	24.7%
	2	182	33.2%	33.1%
	3	108	19.7%	19.6%
	4	122	22.3%	22.2%
	Combined	548	100.0%	99.6%
Excluded Cases		2		0.4%
Total		550		100.0%

In Table 2 below, we can see the aggregate data from all four groups, broken down by grade level: 10th (High School), 12th (Intermediate), Bachelor's, and Master's.

Table 2: Statistical Analysis of All Four Clusters

		High School		Intermediate		Graduation		PGDM	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Cluster	1	69.3694	9.74142	70.5890	9.14710	62.0897	7.41374	71.1596	7.94958
	2	66.5897	10.27900	66.1419	9.60194	66.7344	8.94679	68.1862	9.61742
	3	73.3719	9.46423	70.9148	8.77387	69.1326	7.53547	73.3863	7.94643
	4	65.9933	8.92106	65.8521	8.57972	57.6325	5.70008	65.3552	8.53346
	Combined	68.4834	10.04976	68.1217	9.38115	64.0280	8.71692	69.3187	9.09412

When the means and standard deviations of all four groups are added up, PGDM has the highest overall average at 69.31. Cluster 3 has the highest average across all four groups. Table 4.3 includes both males and females in clusters 2 and 3, respectively. Individuals who identify as female make up all of Cluster 1, while men make up all of Cluster 4. There are 258 females and 290 males total. The number of men and women are therefore roughly equal.

Table 3: Clusters based on Genders

		Female		Male	
		Frequency	**Percent**	**Frequency**	**Percent**
Cluster	1	136	52.7%	0	.0%
	2	78	30.2%	104	35.9%
	3	44	17.1%	64	22.1%
	4	0	.0%	122	42.1%
	Combined	258	100.0%	290	100.0%

Taking a look at Table 4, we can see that students have been grouped into four distinct clusters based on their respective areas of study at the university: cluster 1 is made up entirely of students with a background in Commerce; cluster 2 includes students from the fields of management, science, and the arts; cluster 3 is made up entirely of students with a background in technology; and cluster 4 is made up entirely of students with a background in Commerce. To put it another way, there are 258 students with a background in commerce, 142 with management experience, 108 with a technical background, and just 40 with a background in science and the arts (20 each from science and the arts).

Table 4: Clusters based on Background

		Commerce		Management		Science		Arts		technical	
		No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Cluster	1	136	52.7%	0	.0%	0	.0%	0	.0%	0	.0%
	2	0	.0%	142	100.0%	20	100.0%	20	100.0%	0	.0%
	3	0	.0%	0	.0%	0	.0%	0	.0%	108	100.0%
	4	122	47.3%	0	.0%	0	.0%	0	.0%	0	.0%
	Combined	258	100.0%	142	100.0%	20	100.0%	20	100.0%	108	100.0%

Evaluating the Structure of the Clusters

Cluster arrangement can be quickly evaluated using bar charts for categorical data and box plots for constant data. Although SPSS offers a number of visualisation options, including tables, to aid researchers in identifying the clusters' constituent parts, this is not always enough. When looking into categorical variables like gender, bar charts are useful. There appears to be a strong correlation between gender and cluster formation. Table 3 displays the racial breakdown of each grouping by showing what fraction of students are male and what fraction are female. The ratio of males to females varies depending on the group. In Cluster 1, all members are women, while in Cluster 4 all members are men.

Clusters 2 and 3 appear to have nearly identical gender compositions. Table 4 also investigates another categorical variable: the student's background. Clusters 1 and 4 are made up entirely of business students, while Cluster 3 is made up of only technical students. Cluster 2 is an interdisciplinary group of students from various academic disciplines. A disproportionate number of PGDM students come from the

business administration major. 8 percent or fewer of students have a strong background in either the arts or the natural sciences. This shows that those with a business or technical background are the ones most interested in enrolling in PGDM programmes. The presentation only includes a box plot of PGDM grades. The little circles represent the average PGDM mark in each of the four groups, and the vertical line represents the overall spread of PGDM marks. Cluster 3 has the highest average PGDM grades, as can be seen. Both female and male students with a technical background (Cluster 3) consistently outperform the norm from 10th grade through graduate business school (refer Table 2) Cluster 4 has significantly below-average results across the board. Men who have an interest in business make up Cluster 4. Cluster 2 has the lowest average grades out of the four classes, which is an important finding. In this group, you will find a high concentration of BBA and BBM.
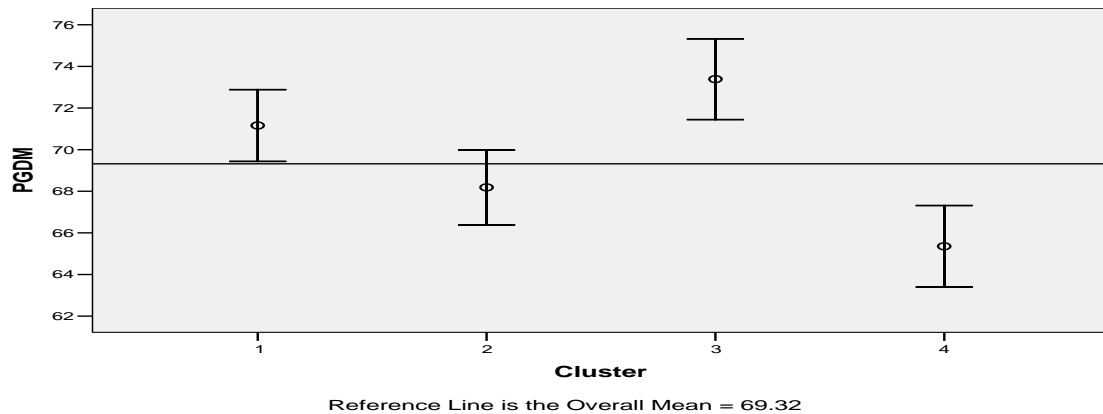
Figure 1: Performance of Students in PGDM Program

Two-step Clustering Results of SPSS for PGDM batch n-1

SPSS13's two-stage cluster analysis is applied to both the batch n-1 student data and the batch 16 data. The same method is used to learn about the dataset's useful patterns. Approximately the same number of observations can be found in each cluster (Table 5). Similarly to the previous dataset, this one divides into four distinct groups with a nearly identical distribution pattern. In total, there are 572 students.

Table 5: Cluster Distribution

		N	% of Combined	% of Total
Cluster	1	154	26.9%	26.9%
	2	124	21.7%	21.7%
	3	152	26.6%	26.6%
	4	142	24.8%	24.8%
	Combined	572	100.0%	100.0%
Total		572		100.0%

Table 6: Statistical Analysis of Clusters based of Academic Presentation

		Marks in PGDM First Year		Marks in Graduation		Marks in 12th Standard		Marks in 10th Standard	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Cluster	1	67.4697	6.57465	58.2745	6.82192	66.8253	9.93256	64.2278	8.65343
	2	74.5897	9.03862	68.0132	8.63722	68.0632	8.42724	73.8171	8.91064
	3	66.3653	8.57294	65.0680	6.76636	64.1696	8.12345	67.2550	9.73112
	4	71.1211	10.37952	62.8162	7.17765	71.7386	9.03846	70.5411	9.59673
	Combined	69.6262	9.23097	63.3185	8.11756	67.6077	9.32511	68.6783	9.87072

Referring Table 6, the aggregated grades for PGDM (first year), graduation, and both the 12th and 10th grades are displayed. The PGDM average is highest in Cluster 2, while it is lowest in Cluster 3

Table 7: Clusters based on Gender of Students

		Female		Male	
		Frequency	Percent	Frequency	Percent
Cluster	1	0	.0%	154	48.4%
	2	52	20.5%	72	22.6%
	3	60	23.6%	92	28.9%
	4	142	55.9%	0	.0%
	Combined	254	100.0%	318	100.0%

As shown in Table 7, All males are grouped together in cluster 1, while all females are in cluster 4. Clusters 2 and 3 have a more even gender distribution, while cluster 1 has a slightly higher proportion of male students.

Table 8: Clusters based on Background of Students

		Commerce		Management		Science		Arts		Technical	
		No.	%	No.	%	No.	%	No.	%	No.	%
Cluster	1	154	52.0%	0	.0%	0	.0%	0	.0%	0	.0%
	2	0	.0%	0	.0%	0	.0%	0	.0%	124	100.0%
	3	0	.0%	98	100.0%	32	100.0%	22	100.0%	0	.0%
	4	142	48.0%	0	.0%	0	.0%	0	.0%	0	.0%
	Combined	296	100.0%	98	100.0%	32	100.0%	22	100.0%	124	100.0%

According to Table 8, clusters 1 and 4 contain exclusively students from the commerce stream, while cluster 2 has only students from the practical stream. Cluster 3 is a mixture cluster that includes students with backgrounds in administration, science, and the arts. In Figure 4, technical students (cluster 2) perform best in PGDM when compared to students from other streams, whereas students in cluster 3 perform worse. This cluster includes students with backgrounds in administration, science, and the arts. When compared to students from the commerce stream, technical students perform better in graduation. Cluster 4 is also above normal, with solely females.
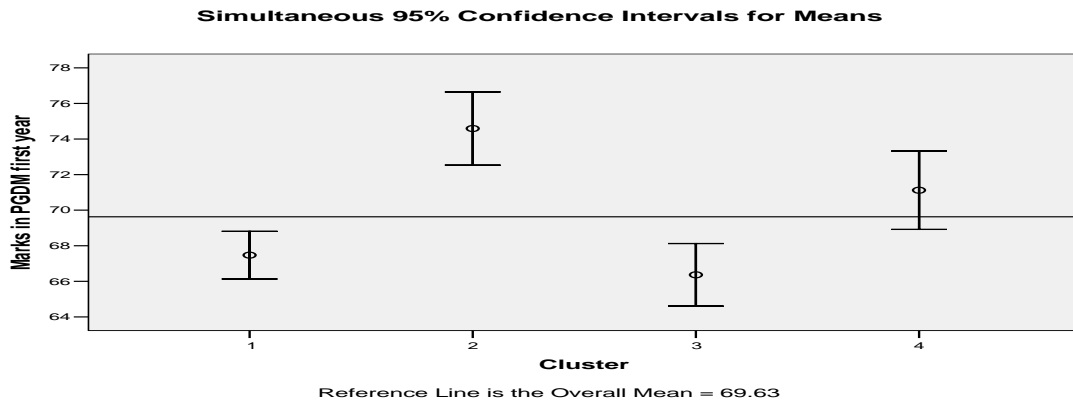
Figure 4: Descriptive of Marks in PGDM

Cluster 3 students' below-average academic performance (see Table 6) persists from grade 10 all the way through graduate school. Learners in Cluster 2 are consistent high achievers who fare well across a variety of academic contexts.Technically-inclined PGDM students, consequently, outperform their non-technical peers in the classroom and ultimately graduate with higher GPAs.

Finally, we use One-way ANOVA to get descriptive statistics for both batches of PGDM students across disciplines like Management, Commerce, Technical, Arts, and Science. Due to the merging of several disciplines (Management, Science, and Arts), it is now necessary to probe the concealed data. Tables 9 and 10 show our analysis of this information for PGDM classes n-2 and n-1, respectively.

Table 9: Descriptive of Marks in PGDM with Respect to all Streams of Batch n-2

		N	Mean	Std. Deviation
PGDM(14-16)	Commerce	260	68.3604	8.70115
	Management	142	65.7611	9.21670
	Science	20	70.7650	12.93394
	Arts	20	66.5250	5.22208
	Technical	108	73.3863	7.94643
	Total	550	69.2896	9.09029

The performance of Managementlearnersas from Graduation is under average in PGDM as shown in Table 9. The results are lower than students from Arts.

Table 10: Descriptive of Marks in PGDM with respect to Background of Batch n-1

		N	Mean	Std. Deviation
PGDM (15-17)	Commerce	296	69.2214	8.78927
	Management	98	64.9094	7.97765
	Science	32	68.6450	10.77718
	Arts	22	69.5345	5.89129
	Technical	124	74.5897	9.03862
	Total	572	69.6262	9.23097

The next group, n-1, follows the same pattern as the previous one, 2014–16. It's worth noting that while kids from scientific and artistic backgrounds tend to do well, they're a statistically insignificant minority.

Conclusion

Recognizing clusters is an essential step in the cluster analysis process. This step is critical because it establishes whether or not the parts are separate. Using a two-stage clustering approach makes this an easy task to complete. This was shown through a comparison of two cohorts of Postgraduate Certificate in Management (PGDM) students. Clustering data in two stages is an effective strategy for dividing a large dataset into manageable chunks that can then be further analysed and categorized. This large dataset of Management students over two years allowed us to easily extract some meaningful information, as shown by the two-stage analysis. As was mentioned above, students who had a strong practical knowledge in Graduation did well not only in the PGDM programme, but also in the more traditional curriculums of Graduation, 12th, and 10th grades.

The number of clusters relies heavily on the categorical factors selected from the data set. In this analysis, we used two groups of students with different demographics. It is crucial to wisely select these features before attempting two-step clustering. Both of these factors are essential in our scenario for identifying the clusters. It's also worth noting that PGDM students from management backgrounds typically fare poorly in the programme.

However, PGDM courses streamline the course structure of BBA or BBM programmes. If we dig deeper, we might find that these students simply aren't very well-rounded intellectually. Their grades in both high school (10th) and college (12th) are much lower than the national average, proving this. Unfortunately, the number of science and art students in this group is relatively small.

Therefore, Management majors have the largest impact on overall grades. Thus, one can draw that although learners have studied similar type of curse in their UG level the important conclusion that a student's background in undergraduate programs is irrelevant to their success in PGDM. The demographic of students taking PGDM degrees is also very interesting. Universities should make more of an effort to entice students with interests in the sciences and arts rather than the business, management, and technical fields because those majors are the most likely to enroll in this program. As we have seen above with the example of PGDM students' academic performance, Two Step Clustering in SPSS is very useful for analysing data. It's an impressively effective method of handling both large data sets and a wide variety of data types.

References

1. R. S. J. D. Baker and K. Yacef, "The state of educational data mining in 2009: A review and future visions", J. Edu. Data Mining, vol. 1, no. 1, pp. 3-17, 2009.
2. J. E. Beck and B. P. Woolf, "High-level student modeling with machine learning", Proc. 5th Int. Conf. Intell. Tutoring Syst., pp. 584-593, 2000.
3. H.-M. Chen and M. D. Cooper, "Using clustering techniques to detect usage patterns in a Web-based information system", J. Amer. Soc. Inf. Sci. Technol., vol. 52, no. 11, pp. 888-904, 2001.
4. N. A. Rashid, M. N. Taib, S. Lias, N. Sulaiman, Z. H. Murat and R. S. S. A. Kadir, "Learners' learning style classification related to IQ and stress based on EEG", Proc.-Social Behavioral Sci., vol. 29, pp. 1061-1070, 2011.
5. P. D. Antonenko, S. Toy and D. S. Niederhauser, "Using cluster analysis for data mining in educational technology research", Edu. Technol. Res. Develop., vol. 60, no. 3, pp. 383-398, Jun. 2012.
6. G. Cobo, D. García-Solórzano, J. A. Morán, E. Santamaría, C. Monzo and J. Melenchón, "Using agglomerative hierarchical clustering to model learner participation profiles in online discussion forums", Proc. 2nd Int. Conf. Learn. Anal. Knowl., pp. 248-251, 2012.
7. S. Valsamidis, S. Kontogiannis, I. Kazanidis, T. Theodosiou and A. Karakos, "A clustering methodology of Web log data for learning management systems", Educ. Technol. Soc., vol. 15, no. 2, pp. 154-167, 2012.
8. A. Dharmarajan and T. Velmurugan, "Applications of partition based clustering algorithms: A survey", IEEE Int. Conf. Comput. Intell. Comput. Res. (ICCIC), pp. 1-5, Dec. 2013.
9. C. Li and J. Yoo, "Modeling student online learning using clustering", Proc. 44th Annu. Southeast Regional Conf., pp. 186-191, 2006.
10. M. M. A. Tair and A. M. El-Halees, "Mining educational data to improve students' performance: A case study", Int. J. Inf. Commun. Technol. Res., vol. 2, no. 2, pp. 1-7, Feb. 2012.
11. D. Perera, J. Kay, I. Koprinska, K. Yacef and O. R. Zaïane, "Clustering and sequential pattern mining of online collaborative learning data", IEEE Trans. Knowl. Data Eng., vol. 21, no. 6, pp. 759-772, Jun. 2009.
12. S. A. Sardareh, S. Aghabozorgi and A. Dutt, "Reflective dialogues and students' problem solving ability analysis using clustering", 3rd Int. Conf. Comput. Eng. Math. Sci. (ICCEMS), pp. 52-59, 2014.
13. O. A. Abbas, "Comparisons between data clustering algorithms", Int. Arab J. Inf. Technol., vol. 5, no. 3, pp. 320-325, Jul. 2008.

14. Z. Qu and X. Wang, "Application of RS and clustering algorithm in distance education", Int. Workshop Edu. Technol. Training Int. Workshop Geosci. Remote Sens, pp. 7-10, Dec. 2008.

15. S. V. Lahane, M. U. Kharat and P. S. Halgaonkar, "Divisive approach of clustering for educational data", Proc. 5th Int. Conf. Emerg. Trends Eng. Technol. (ICETET), pp. 191-195, Nov. 2012.

16. K. Govindarajan, T. S. Somasundaram and V. S. Kumar, "Continuous clustering in big data learning analytics", Proc. IEEE 5th Int. Conf. Technol. Edu. (T4E), pp. 61-64, Dec. 2013.

17. C. Troussas, M. Virvou, J. Caro and K. J. Espinosa, "Mining relationships among user clusters in Facebook for language learning", Int. Conf. Comput. Inf. Telecommun. Syst. (CITS), pp. 1-5, May 2013.

18. B. Chakraborty, K. Chakma and A. Mukherjee, "A density-based clustering algorithm and experiments on student dataset with noises using Rough set theory", Proc. IEEE Int. Conf. Eng. Technol. (ICETECH), pp. 431-436, Mar. 2016.

19. T. Chellatamilan, M. Ravichandran, R. M. Suresh and G. Kulanthaivel, "Effect of mining educational data to improve adaptation of learning in e-learning system", Int. Conf. Sustain. Energy Intell. Syst. (SEISCON), pp. 922-927, Jul. 2011.

20. F. Xhafa, S. Caballe, L. Barolli, A. Molina and R. Miho, "Using bi-clustering algorithm for analyzing online users activity in a virtual campus", 2nd Int. Conf. Intell. Netw. Collaborative Syst. (INCOS), pp. 214-221, Nov. 2010.

21. H. Hani, H. Hooshmand and S. Mirafzal, "Identifying the factors affecting the success and failure of e-learning students using cluster analysis", 7th Int. Conf. e-Commerce Develop. Countries Focus e-Secur. (ECDC), pp. 1-12, Apr. 2013.

22. F. Bouchet, J. M. Harley, G. J. Trevors and R. Azevedo, "Clustering and profiling students according to their interactions with an intelligent tutoring system fostering self-regulated learning", J. Edu. Data Mining, vol. 5, no. 1, pp. 104-146, 2013.

23. F. Bouchet, J. M. Harley, G. J. Trevors and R. Azevedo, "Clustering and profiling students according to their interactions with an intelligent tutoring system fostering self-regulated learning", J. Edu. Data Mining, vol. 5, no. 1, pp. 104-146, 2013.

24. C. Bouveyron and C. Brunet-Saumard, "Model-based clustering of high-dimensional data: A review", Comput. Statist. Data Anal., vol. 71, pp. 52-78, Mar. 2014.

25. A. Bovo, S. Sanchez, O. Héguy and Y. Duthen, "Clustering moodle data as a tool for profiling students", Proc. 2nd Int. Conf. e-Learn. e-Technol. Edu. (ICEEE), pp. 121-126, 2013.

❧❧❧

<div style="text-align:center">

5

</div>

Financial Well being and Health Status among Elderly

Anamika Verma[*]
Reshma Boolchandani[**]

Introduction
Chapter Outline

- Elderly Population

- Process of Ageing

- Major problem in old age

- Income of ageing adults

- Financial dependence in old age

- Impact of financial status on health in old age

- Relationship between financial status and medical problem

- Awareness about financial rights among Ageing adults

- Government program and Supportive Services

Elderly Population

Demographic trend in the older adult population are changing dramatically in fact the chronic logical age at which a person is considered to be an all the adults varies among groups and increase over time the U.S. census bureau define those 55 years and older as the "older population" and those 65 and older as the "elderly population".

In 21th century, the greatest achievement is longevity of life. Globally, it is estimated that there are 605 million people aged over 65 years. In Asia, it is estimated that the elderly population will increase from 50% in 1990 to 58% in 1925. This has

---

[*] Research Scholar, Department of Home Science, University of Rajasthan, Jaipur, Rajasthan, India.

[**] Associate Professor, Department of home science, University of Rajasthan, Jaipur, Rajasthan, India.

lead to an increased focus on the aging population in the developing countries. In India accordingly to 2001 census the democratic transformation has led to population aging and over the past few decreases the population of people aged over 60 year has raised to this can be evidenced from the fact that the life span of the Indian population has increased from 32 years in 1947 to the current level of 62 years. While the population of the elderly people aged above 60 years was at 6.8% in the year 1991, In the year 2001, almost 7.7% of the total population was aged above 60 years, increasing to 8.6% in 2011, While this increase may appear modest, better control of infectious disease and improvements in healthcare services are expected to stimulate greater increases; by the year 2050. India's older adult's population is expected to reach 324 millions.

Process of Aging

Aging is a normal process being at conception and with that individuals are known to age at different traits. Heredity and good nutrition may slow the agent process so that the individual enjoys physical and mental vigour in his eighties.

The process of aging brings about physiological psychological and immunological changes which influence the nutritional status. The changes associated with aging and partially influenced by genetics race and gender as part of aging process the functioning of the organ may changes which may influence nutrients status and health status.

Today, two broad types of theories on the causes of aging exist. First theory of ageing as a result of random events and 2nd theory of ageing as a result of programmed event.

First prominent theory of aging the free radicals theory involve the continuous formation of free radical as a result of exposed to Oxygen and harmful exposure to environmental factors these highly reactive substance lead to damage and alterations in the structure of protein, lipid, carbohydrates and chromosomal material in cell which probably leads to changes associated with aging.

Second theory of aging based on predetermined or programmed events include the genetic theory and the pacemaker theory. The genetic theory describes aging as being determined by inherited genes. Genes can be either helpful by promoting longevity or harmful by shortening the lifespan. The pacemaker theory describes aging as a biological clock paced by the neuroendocrine and immune system, which regulate the rates of Ageing.

Major Problem in Old Age

The major problems which oldest people face are lack of economic provisions, poor health conditions, lack of emotional support and illness in the post retirement period. This state of affairs becomes a social economic problem or issue as many people feel it is a problem. The problem of inadequate income after retirement, loss

of spouse or ample free time, poor health, social isolation, were family relationship and physically and financially dependency etc.- all these situations are interrelated or interdependence, The traditional Indian joint family system is now declining and more families are becoming nuclear. On the background it is taken to explore the correct situation of care and support for all the oldest people in the families.

Majority of older persons, particularly in rural areas, still suffering from a lot of medical, social and financial problems evenafter having good net-worth value, because there are hardly any dedicated and elderly sensitive schemes for senior citizens which can ensure comfortable and respectable old age.

The study of World Health Organization was also focused on major problems of older persons.

• More than four fifth (approx 80%) of subjects shared the fact that their major problems were related to medical and healthcare.

• More than half of the elderly respondents claimed that their major old age problems were related to social issues.

• About one third respondents have been facing problems primarily due to financial issues.

• Every fifth older person (20% elderly respondents) was found to be disturbed primarily due to legal matters and cases pending in various courts.

• 5% elderly said that their major problems in old age were related to other than medical, financial, social and legal matters.

Income of Older Persons

Pension/family pension has been main source of income of two fifth of the respondents. Interest on deposits, dividend on savings and rent from house properties etc., their main source of income has been found to be also main source income of respondents. For approx 10 % elderly respondents, old age pension was found to be the main source of income and 10% percentage of respondents who claimed to be earning their income mainly from businesses / professions and there was no source of income for 5% respondents. About every eighth subject informed that they were working or engaged in some gainful assignment and income from such activities as main source of their income.

As regards monthly income, it was observed that almost more than one third of the informants earned fairly good monthly income age (more than Rs. 10,000 per month) during old age and two fifth of the respondents stated to have their monthly income up to Rs. 5000/-.Approx 15% older persons said that their monthly income is below Rs. 5000 and 15% elderly claimed that they have no or negligible monthly income.

In comparison to rural area's approx half of elderly respondents said that they get pension as their main source of income and approx 20 % respondents claimed that they get old age pension, whereas in urban areas only few respondents were getting old age pension.

In urban areas approx. 1/4th respondents were earning income as interest/rent, etc. whereas in rural areas number of such respondents was one tenth respondents claimed that their major part of income comes from their business/professions, whereas in rural areas only few percentages of elderly respondents were earning money from business/professions.

Financial Dependence in Old Age

- More than half of the respondents, approx 70% oldermen and 40% older women claimed that they were financially independent.

- The percentage of elderly dependent on their children/close relatives for their financial needs is approx 30% (20% older men and 40% older women) whereas approx 15% informants (10% older men and 20% older women) were found to be dependent on others for financial needs.

Relationship between Income and Health

The relationship between income and health varies with age. In Indian respondents, income and health are more strongly associated in elder life (60 years old) than in younger age groups (Mackenbach et al., 2007). A US longitudinal study also found income was a strong predictor of health, particularly below age 65. These age differences may be due to reverse causation, as individuals in mid-life are more likely to depend on income from paid work, whilst in later life income primarily comes from pensions. Since health can impact on the ability to work, health is more likely to influence income in mid than later life, leading to a stronger relationship between income and health in mid-life (Muennig, 2008).

US research finds that income is a more important determinant of health than other measures of socio-economic status (SES), such as education and social class (McDonough, & Williams, 2002). Given changes in the structure of labor markets and the possibility that social class may be less central for health now than in the past (Scambler, 2012), it is pertinent to examine the relative importance of social class, education and employment status, as well as income, in patterning health. Health inequalities research has paid less attention to *subjective* measures of status, such as subjective financial well-being, although 'people's sense of their social positioning is salient for their health' (Scambler, 2012).

Most studies of SFW and health have focused only on older people. These have found that older people who experienced periods of financial inadequacy throughout the life course report poorer health (Kahn &Pearlin, 2006) and older

people reporting current financial strain or subjective financial inadequacy had worse subjective health (Nummela et al., 2007; Angel et al., 2003). US research on women aged 70-79 found that those who reported subjective financial strain were 60% more likely to die within five years when absolute income and socio-economic status were adjusted (Szanton et al., 2008).

Awareness about Financial Rights among Ageing Adults

It's seen that the elderly populations are subjected to physical and mental negligence, denial of basic needs and lower social status. Hence in order to improve the quality of living of the elderly people the government and also other organizations have undertaken measures and provisions. But this can be optimally utilized only if the elderly populations are aware of their basic rights and the facilities and provisions that is levied for their welfare. The WHO study showed that there is a moderate awareness regarding the basic human rights and provisions that are implemented for the welfare of the elderly population. This can be changed through media, celebrating "International day of elderly persons" and by conducting awareness programmes regarding the welfare facilities for the elderly people. Now the focus should be shifted to the younger generation by sensitizing them about the problems faced by the older generation and supplying them with the necessary information regarding the provisions and facilities available. There is a need to know the awareness regarding the human rights and facilities available for the elderly citizen in India.

Government Program and Supportive Services

The National program for the health care of elderly NPHCE launch in 2011 which is an articulated version of earlier act of 2007 you and un convection on the right of person with disabilities (UNCRPD) and national policy of older person (NPOP). Through this program the government aim to provide basic healthcare to the elderly and improve their quality of life by collaborating with health care services social welfare scheme and rural health development oriented schemes.

- The "Integrated Programme for Older Persons" (IPOP), is a Central Sector Scheme that was implemented in 1992, amended in 2008 and incorporated new creative projects for the welfare of Senior Citizens. The Scheme was amended on April 1, 2008, and April 1, 2015. Implemented for improving the quality of life of senior citizens. Basic amenities such as shelter, food, medical care, and entertainment opportunities were provided. supports old age homes, respite care homes, mobile medicare, centres for dementia care, clinics, training centres and many more.

- Since 2005, the International Day for Older Persons (IDOP) has been marked on October 1st. At the India Gate in New Delhi, an intergenerational walkathon is held, and National Awards are presented.

- In January 1999, the National Policy on Older Persons (NPOP) was announced to ensure the well-being of the elderly, envisions government assistance to assure financial and food security, and provides access to programmes to improve their quality of life along with many other provisions.

- In 1999, a National Council for Older Persons (NCOP) was established to monitor the implementation of the National Policy for Older Persons, In 2012, NCOP was reorganised and renamed the National Council of Senior Citizens (NCSrC).

- The Maintenance and Wellbeing of Families and Elderly People Act were passed in December 2007, with the goal of ensuring maintenance based on needs and welfare for parents and senior citizens.

- The Vayoshreshtha Samman was first presented in 2005 by the Ministry of Social Justice and Empowerment to honour the efforts of notable senior individuals and institutions involved in distributing distinguished services to the elderly persons, particularly destitute senior citizens. In 2013, this Samman was given the status of a National Award which was presented for the first time on October 1, 2013. Every year, the Award is givenin thirteen categories to prominent and outstanding institutions, organisations, and individuals.

Other Programs for the Care and Welfare of Seniors

- In 1982, India's government started the **"National Mental Health Programme (NMHP),"** focusing on the needs of the aged suffering from Alzheimer's disease, dementias, Parkinson's disease, and other problems.

- **Ministry of Rural Development has implemented** The Indira Gandhi National Old Age Pension Scheme under which Central assistance is given towards pension at Rs. 200/- per month for persons aged over 60 years and Rs. 500/- per month for persons over 80 years who belong to a household BPL

- **Ministry of Health & Family Welfare** provides geriatric clinics in hospitals run by the government and provides separate queues for senior citizens in govt. Hospitals.

- For more information on Government run programmes and policies, information can be obtained on 'ELDERLY IN INDIA. 2016 Central Statistics Office, Ministry of Statistics and Programme Implementation Government of India. www.mospi.gov.in'.

❧❧❧

<div style="text-align:center">

6

</div>

e-Commerce and its Reliability in Comparison to Physical Markets

Dr. Celia B R[*]

Introduction

E-commerce (electronic commerce) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. These business transactions occur either as business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer or consumer-to-business. E-Commerce has paved way for easy and comfortable buying.

Electronic commerce popularly known as E-Commerce dates back to the 1960's. The development of the Electronic Data Interchange (EDI) in the 1960s paved the way for electronic commerce. EDI replaced traditional mailing and faxing of documents by allowing a digital transfer of data from one computer to another. E-commerce is closely intertwined with the origin of the internet. With the dawn of the internet in 1991 online shopping commenced and Amazon was the first site to trade online in the US, following which many other sites entered the online shopping sector.

Though E-Commerce dates back to the 1990's online trading became popular in the recent decades. People were not aware of Ecommerce until recently. The information about E Commerce though had a widespread reach, people were not convinced to buy products online, as they felt that buying would be complete and satisfied only if done physically not online.

Elements of e-Commerce

Electronic commerce is a combination of communication services, data management and security mechanisms which provides a platform to organizations where they can share information about the selling of goods and services:

---

[*]   Associate Professor, Department of Commerce, Saveetha College of Liberal Arts and Sciences, SIMATS, Thandalam, Chennai, India.

- **Communication Services**

  Electronic transfer of information from buyer to seller is supported by communication services.

- **Data Management**

  It is exchange and storing of data in a constant, format which enable easy exchange of information

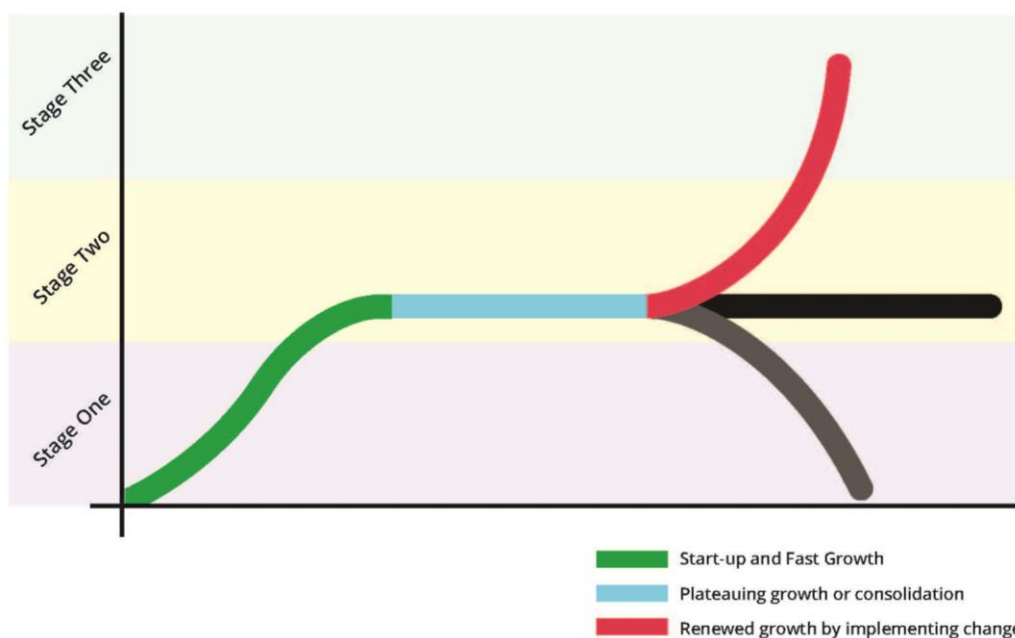- **Security Mechanisms**

  Security mechanisms provides following functions:

  - Authenticates the source of information
  - Guarantees the integrity and privacy of information.

  E-commerce covers many services over the Internet for example, customer service, banking, billing, marketing, retailing, secure distribution of data, corporate sector purchasing and other value-added services.

Stages in the Growth of e-Commerce

E Commerce in the recent years has faced a tremendous growth due to certain situational factors. The stages of growth that it has undergone is clearly represented in this Graph

Legend:
- Start-up and Fast Growth
- Plateauing growth or consolidation
- Renewed growth by implementing change

- **Stage 1:** This was considered as the initial stage or the start up level when Ecommerce was initially introduced. As it was an entirely new concept of new origin it experienced a fast growth during the initial stages

- **Stage 2:** This was the stage where online trading came to a standstill. This stage could also be termed as the stagnation stage where E Commerce came to a halt. People realized the reality of online trading and also faced and heard many fraudulent activities, where by companies trading online supplied cheap or poor quality goods and also gave fake products. This was when customers no more trusted online trading and preferred to physical trading.

- **Stage 3:** Online trading again flourished with the emergence of new companies, which gave them the assurance of supplying quality products, provided them the system of return policy etc. customers regained confidence in these companies and E Commerce experienced a drastic growth. The facilities and trading options provided by E Commerce companies have attracted more customers to online trading and it has become the need of the hour as people have become busy and have no time to spend for Physical shopping.

Types of Ecommerce

Much of the world's business today is carried out over digital networks that connect people and companies. Several types of e-commerce models are in use today. The major online marketing domains are given below:

- **B2C (Business to Consumer)**

In B2C model of e-commerce, businesses sell products and services to individual consumers directly. All the products and services are offered online through electronic channels in e-commerce which supplements the traditional commerce. Internet acts as an electronic channel.

e-Commerce

Examples : www.flipkart.com, www.infibeam.com, www.amazon.in, www.home shop18.com are websites that comes under this category. Through these websites individual can purchase clothes, mobiles and electronic products etc.

Some of advantages of this model are as follows:

- Provides better way to deal with suppliers
- Provides customer service centres that are physically located
- Provides opportunity to return purchase item
- Eliminates middlemen

- **B2B (Business to Business)**

Business-to Business (B2B) e-commerce model describes electronic transactions between businesses such as between manufacturer and wholesaler. The major factors in increasing the acceptance of B2B e-commerce are Internet and dependence of many business operations upon other businesses for supplying raw

materials, utilities and services. It is very fast developing segment in e-commerce. Company can check and updates purchase orders, invoices, inventory and shipping status directly through the Internet.

The advantages of b2b e-commerce model are as follows:

- Reduces cycle tine of inventory and costs.
- Enables business partners to share relevant information timely with accuracy.
- Improves supply-chain management among business partners.
- Eliminates manual activities and hence reduces errors.

- **C2C (Consumer to Consumer)**

Consumer-to-Consumer (C2C) e-commerce is a business model that facilitates the transactions of product and services between two consumers. In this e-commerce model, consumers sell product and services directly to other consumers using Internet and Web technologies. An individual customer uses classified advertisements to advertise or promote different products and services on web or through online auction sites.

e-Commerce Examples: eBay.com, quicker.com, craigslist.org, gittigidiyor.com. It entails lower cost for both buyer and seller customers. Using this e-commerce model, customers can also advertise and sell their products and services to other employees over organizational Intranet.

- **C2B (Consumer to Business)**

Consumer-to Business (C2B) is an e-commerce model where consumers (individuals) sell products and services which are consumed by businesses and organisations. This model is opposite to B2C model. In this model, price and value for specific products and services are created by individuals.

For example**:** when a customer writes reviews for new product or gives a useful idea for new product development then he/she is creating value for the company if the company adopts the review or idea. Company can facilitate C2B model by setting discussions forums on their websites.

For example: the websites such as www.mobshop.com, www.pazaryerim.com and www.priceline.com are organizers of C2B transactions.

- **Business-to-Government (B2G)**

In marketing context, B2G marketing is also known as "public sector marketing". It is derived from B2B marketing and is comprised of activities such as marketing of products and services to government agencies. Such marketing is undertaken via various integrated marketing techniques like advertising, branding, managing public relations, online communication strategies, etc.

Merits and Demerits of e-Commerce with special Reference to the Customer

- **Merits of e-Commerce**
  - It enables faster buying
  - Customers are able to choose from a wide range of products
  - It creates a convenience in shopping as the customer need not travel.
  - It facilitates customers to compare products and prices.
  - Customers can access the online sites at time of the day.
  - It keeps customers well informed about the offers
  - Customers are able to judge a product based on the reviews and feedback given.

- **Demerits of e-Commerce**
  - Customers are mislead by the attractive pictures of the product
  - Products may not be of the same quality as stated in the website
  - Products may reach the customers in a damaged condition
  - Online shopping will not help customers to touch or feel the product
  - The same product ordered may not reach the customer
  - It is difficult to ensure the security or privacy of online transactions.

Recent Trends in Ecommerce and its Reliability

E Commerce has witnessed a great revolution in the recent days inspite of the many complaints and fraudulent transactions. People are busy and companies offer work 24/7. They have found it easier to shop online as they are able to save time and money

- Access to the global market
- Easy payment modes
- Flexibility of timing
- Comparability of products
- Selection from a wide range of products and brands
- Shopping all categories of products based on customer needs
- Awareness about the awareness of new products

Most of these reasons have made E Commerce a part of everybody's life. People have identified the ease of shopping and have accustomed themselves to it. Online trading though has it's own shortfalls, it has been ignored and people have started depending on it to a great extent.

Conclusion

E Commerce which was considered to be an illusion to many has become a reality in the present day scenario as people have become more time and money conscious. Having no time to spare, Ecommerce has made them even more lazier by bringing in the entire world home. Now people can buy anything online and even sell their old products on line if the wish to. To add to the effect the dawn of the pandemic brought about a tremendous change in the mindset of people. They started thinking that E Commerce was the safe and best way to trade as there were restrictions laid by the government on movement of people. Despite the various cases of fraud in E-commerce transactions people are in a mindset that, not all websites would swindle, and they will have a feeling of protection and safety in adverse situations

References

1.   https://www.techtarget.com › searchcio › e-commerce

2.   https://www.shiprocket.in ›   Blog   ›   eCommerce
        https://www.space48.com/blog/ecommerce-lifecycle-three-stages-growth/

3.   https://blog.miva.com › the-history-of-ecommerce-how..

4.   https://www.toppers4u.com/2021/01/e-commerce-types-features-
        advantages.html

5.   https://www.tutorialspoint.com/e_commerce/e_commerce_disadvantages.html.

❧❧❧

$$\boxed{7}$$

Data Mining Techniques in Education Management

Dr. Shilpa Sharma[*]

Introduction

The educational environment of a country's citizens determines its progress. Majorly all the blooming and developed nations have a high literacy rate. With the development of the nation the countries educational demands also rise. As the demand of education is increasing exponentially so is the private universities and colleges are also increasing from past few years and will carry on in future. Despite the success of educational domain over last yew years Indian Educations still face the following changes:

- **Difference among Demand and Supply**: India as a nation has a low admission rate for higher education or post-graduation at 12%, while China has a higher education rate of 26%. The Indian government has set a target of 30 percent for gross admissions, which would promote 40 million university spots and increase enrollment to 14 million within six years [1].

- **Low Quality Teaching as well as Learning**: Many of the system's institutions are plagued by quality issues, including a chronic shortage of well-educated teaching staff, poor quality teaching, educational practices and methods that have been used for decades, an absence of accountability and quality control, and the inability to divide academic work from service work [2].

- **Short Research Potential**: Since only 1% of eligible students applied for a PhD in 2012–13, the country is not producing a sufficient number of high-quality researchers. This is because there are few opportunities for interdisciplinary and multidisciplinary work, no early-stage research experience, a weak ecosystem for innovation, and minimal engagement with researchers from the private sector. The reasons for lower rates of enrollment

---

[*]   Department of Computer Applications, Manipal University Jaipur, Jaipur, Rajasthan, India.

in higher education, as well as poor quality of teaching, learning, and research, must be discovered in order for any nation to achieve the desired growth. Today, there is an abundance of tools available to help reform and improve the educational system. Data collection and analysis in the field of education have improved greatly with the advent of the digital age, allowing for more informed policy decisions to be made with concrete metrics [3].

The organization of this chapter is done as follow: Section 2 elaborates related works done in EDM. The areas of predicting student's admission in higher education are discussed in Section 3. Section 4 emphasizes on various dimensions of teachers teaching performance. Also, it strives to clarify the skills useful in enhancing the Employability Index of students. Finally, we conclude in Section 5 with the conclusion
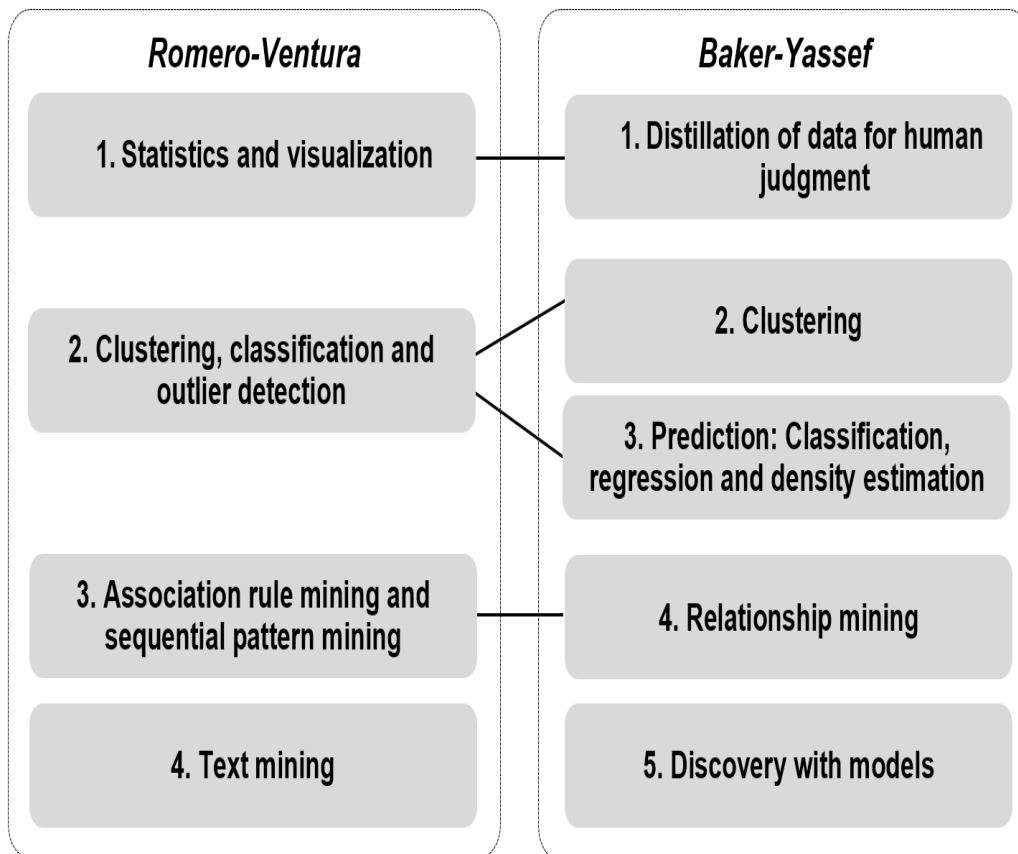
Related Works

There are vast swaths of untapped academic data that could significantly expand our understanding of teaching and learning over the next decade. Rapid growth in the quantity and variety of data collected about schools and students reflects the close relationship between education and information technology. Opportunities to collect and analyse student data, discover patterns and trends in those data, invent and test hypotheses about how students learn through online classes, and so on have arisen with the emergence of new computer-supported interactive learning methods and tools, such as enhanced tutoring systems, simulation games, and the like [4]. Data mining algorithms can explore the rich variables in information gathered from online learning platforms to construct more accurate models of student performance.

When it comes to classifying data mining methods for use in classrooms, there are two primary taxonomies to consider. Figure 1 depicts these, illustrating the interconnectedness of various groups. Romero-taxonomy Ventura's is expanded with four new categories that are the main utility for educational data collection over internet. The authors include "Statistics and visualisation" despite the fact that it is not technically data mining because it is frequently the first step in any investigation. Data mining projects typically involve the first two types of work, while the fourth type can be seen as an extension of data mining to text data and is related to web content mining [5].

Baker-Yassef's Romero-"Statistical Ventura's and visualisation" is the first category that this taxonomy corresponds to, and the fifth is model construction based on accumulated knowledge. Improve students' models, uncover models of the knowledge structure, investigate tutorial care provided by education software, and make scientific discoveries about learning and learners are the four application domains identified by Baker in relation to the utilization of data gathering in education [6].

Romero-Ventura	Baker-Yassef
1. Statistics and visualization	1. Distillation of data for human judgment
2. Clustering, classification and outlier detection	2. Clustering
	3. Prediction: Classification, regression and density estimation
3. Association rule mining and sequential pattern mining	4. Relationship mining
4. Text mining	5. Discovery with models

Figure 1: Taxonomies in Educational Data Mining

Data mining, as discovered by Siraj F et. al., can be put to use in the context of predictive modelling to make sense of the connections and patterns already present in collected admissions data. These types of studies yield invaluable insights for the adoring and registering staff [7]. Clustering, decision trees, and associations are just a few of the data mining techniques that Verma S. et al. propose using to boost students' academic routine in the higher education system. The results of this procedure can be used by instructors and advisors to better serve their students' needs. The course planning office could also benefit from this and be prompted to pursue more cutting-edge methods of instruction as a result [8].

Using data mining and text mining strategies, He & Wu investigate how students use LVS (Live Video Streaming) to participate in and benefit from educational opportunities. They discovered that students express a wide range of feelings and sentiments in online chats, from happiness to sadness to solidarity. The number of chat messages also does not correlate favourably with students' final marks or grades. According to Maqsood, Reporting and analysing data gathered through data mining is useful for creating targeted marketing campaigns for student

groups. Research based on data mining for higher education and its legal suggestions are discussed by Samira et al. They concluded that "barely any research that put light on applications for improving education sector using data in a holistic way" exists. They propose that educators can profitably employ data mining to uncover fresh insights for bettering instruction and assessing students' progress. According to Cios, data mining permits automated detection of trends and patterns in data. In order to assess incoming college freshmen's level of computer literacy, Tsai et al. investigated data mining techniques (cluster analysis, decision tree) applied to computer proficiency tests. They came to the conclusion that data mining techniques aid universities in locating multiple groups in need of retraining and promoting computer proficiency more effectively [9] [10].

To better categorise students based on their Moodle activity, Cristobal Romero and Sebastian Ventura looked into a number of data mining strategies. Real data from seven Moodle courses taken by students at Cordoba University was also used to determine the most effective classification approach. Pena et al. surveyed the use of data mining in the field of online instruction. Student modelling, tutoring, content, and assessment using data mining techniques. As a result of their analysis, they came to the conclusion that education data mining is useful for gaining insight into student learning outcomes, determining which students shared similar learning behaviours, and describing distinct student populations [11].

Jindal and Kharb represent the powerful search in the Web environment based on the users query significance factor. The objectiveis to design a user helped search based on the keyword-based investigation, to provide the user assisted ranked results so that user can identify the priority links and efficient search optimization model over the open web. The main objective was to provide a user-friendly environment and analysis of work under various variables. V. Ramesh et al. applied data mining methods for predicting the performance of the students and conclude that Multi-Layer Perception algorithm was best suited to predict the student results. They designed a tool using .NET framework to predict the final result of the student by inputting different parameters as input [12].

The CHAID prediction model was used by M.Ramaswami and R.Bhaskaran to analyse the correlation between factors that can be used to foretell how well a student will do in their senior year of high school. Students' success in post-secondary education was most strongly correlated with factors such as their primary language, their secondary school grades, their home neighborhoods, and the type of secondary school they attended [13].

In order to improve their prediction results of academic performances for two real case studies, Nguyen Thai-Nghe, et al. (2009) made use of machine learning techniques. The class imbalance problem was addressed using three different

methods, all of which were effective. First, we rebalanced the datasets, and then we used State vector machine (SVM) for the smaller datasets and Decision Tree for the larger datasets to perform cost-insensitive and sensitive learning, respectively. The models are first tested on a private network [14].

Data collection techniques, like Clustering and classification algorithms, were investigated by N.Sivaram for their applicability to the recruitment problem domain. In this study, we analysed recruitment records from a specific industry using data mining techniques like K-means and fuzzy C-means clustering as well as decision tree classification algorithms. According to research conducted by Md.Hedayetul Islam Shovon, the K means clustering algorithm can accurately predict a student's performance in school. Assessments included both in-class quizzes and midterm and final exam scores. The study's authors hoped their findings would be useful to educators in reducing the high school dropout rate. The k-means clustering technique was used by Oyelade to make predictions about students' performance. He explored the potential of several clustering algorithms for use in educational data mining to forecast students' theoretical performance and its inferences [14].

Patterns in student data were identified by Kabakchieva, which could help predict how well Bulgarian college students would do based on their individual characteristics and background knowledge. Steinmayr and Spinath looked at the impact of positive thinking on adolescent academic performance and growth projections. To determine the impact of demographic variables like age, gender, and country of origin, Farooq et al. used t-test and ANOVA analyses. They experimented with several methods of education to determine which led to the best academic results. Classification methods, such as discriminant analysis or logistic regression, are preferable to multiple linear regression for predicting whether or not a student will succeed in school, as observed by Wilson & Hardgrave [15].

A decision tree was used by Kumar and Vijaylakshmi to anticipate a student concluding exam grades. The purpose of the study is to provide educators with the tools they need to identify students who could benefit from extra support in order to improve their academic performance and achieve better test results. Cluster analysis and k-means algorithm methods were used by Erdogan and Timor to examine the correlation between students' performance on standardized tests taken prior to enrolling in college and their subsequent academic achievements. The purpose of the research is to better predict which students are at risk of dropping out or performing poorly based on their academic performance. Ogor created a framework using performance prediction indicators by introducing a simple student performance assessment and monitoring system into a classroom setting in order to foretell students' final achievement status upon graduation. The framework is built around the three pillars of assessing, monitoring, and reporting on student performance [16].

Data mining techniques were used by Sembiring et al.to develop a model of student performance predictors that examined the relationship between student behaviour and academic performance. In their 2013 article, "Defining Learning Analytics," Dietz-Uhler and Hurn laid out the term, the technologies available for learning analytics, and the ways in which educators can use data in the classroom to track and predict students' progress. Learning analytics were also the subject of a number of concerns and questions raised by the group. In regard to higher education, Delavari et al. presented the educational data mining capabilities. To help universities, make better decisions, they proposed a set of best practises for analytical thinking. In addition, they employed data-mining methods to unearth hidden information that could guide choices about higher learning [17].

Data Mining in Predicting Student's Admission in Higher Education

Students' expectations of these institutions are rising as more and more institutions are founded in the private sector. They only enroll in new courses after carefully examining a number of variables that are thought to be crucial for their overall development. Graduation Stream was determined to be the key factor in predicting students' enrollment, according to Yadav et al. According to the study, a decision tree model utilising the ID3 algorithm may be created using a student's prior academic achievement to predict whether or not they will enrol in an MBA programme. According to the study, MBA students who had backgrounds in computers or mathematics did better than those who had other backgrounds. Data mining techniques that are frequently utilised for making these predictions include classification and regression (CART). CART was employed by Kovacic, J. Zlatkoto forecast student admittance. In 2006, Aksenova et al. developed a predictive model for new, continuing, and returning graduate and undergraduate students. According to pre-enrollment data, it was suggested that mentorship be provided to students who are deemed to be at "High Risk" in order to prevent dropouts [18].

- **Predicting Students' Profiling**

Student profiling based on both hard and soft skills can be accomplished with the help of EDM. Education, test scores, and professional accomplishments are examples of hard factors, while interpersonal skills, outlook, and interests are examples of soft factors. There are a wide variety of Data Mining techniques and approaches that have been used to get here. The most common algorithms for student profiling are Naive Bayes, Bayes Net, Support Vector Machines, Logistic regression, and decision trees. This allows for student profiling to be clustered, allowing for more nuanced, segmented marketing strategies to be developed. Cluster analysis is also known as data segmentation. This was found by a group of researchers.

- **Predicting Students' Course Selection**

Many factors, such as the student's level of interest, their academic performance, the expected future demand, etc., play into the student's decision regarding which course to take. Characteristics, workload, grades, course type, duration, amount of time conflicts, final test schedule, and student demand are just some of the variables that Kardan et al. use neural networks to identify as influencing students' course selection decisions. These components are used as input in neural network models. In addition, Guo employs neural networks to analyse and foretell students' reactions to their courses. He found that the number of students enrolled and the percentage of A+ and A students in the final grade were the two most significant factors influencing student course satisfaction [19].

- **Students' Targeting**

Segmentation, targeting, and positioning are three of the most important aspects of product marketing. Having the "right" students enrolled in the "right" classes is crucial to the success of any educational institution. As stated by Woo et al Customer targeting is "the process of developing strategy toward specific customers," as defined by the Oxford Dictionary. The customer map is supposedly the best tool for visualising data related to customer targeting. Mapping your customers' journeys can help you better serve them. This cutting-edge method of finding similar customers allows you to target them with greater precision. Its three customer targeting dimensions are consumers' values (use and behaviour), their demographics and psychographics, and their needs (complaints and satisfaction). One way to zero in on your ideal clientele and formulate strategies to best reach them is with a customer map [20].

Teachers' Teaching Performance

There are various ways to evaluate a teacher's teaching efforts. Although student input is a common indicator, the results are frequently unreliable. Because there is a strong association between student grades and instructor evaluations. Association rule mining has been the most frequently utilized. DM methodology in this assignment, however other methods have also been applied. Mardikyan and Badur used stepwise regression and decision tree data mining approaches to pinpoint variables that influence university lecturers' ability to teach. Teaching effectiveness is influenced by the instructor's mood, student attendance, teacher standing, and student feedback.

Curriculum Development

Several high-quality techniques are utilised to identify what the learner needs and how it might be met. One of them, Quality Function Deployment (QFD), takes a long time to achieve conclusions. Colored A tool for data mining commonly used in curriculum creation is Petri Nets. Association rule mining has been used to find and

comprehend whether curriculum revisions may have an impact on university students. Hsia et al. used data mining algorithms such decision trees, link analyses, and decision forests to analyse students' choices for courses, completion rates, and professions. They discovered a link between the course category and the professions of the students. They emphasize the value of data mining in curriculum development [21].

Predicting Students Survival in a Course

There is an alarming rate of attrition in professional education. It's not uncommon for students to begin a programme, then decide it isn't a good fit, and finally withdraw. Massa and Puliafito used the cutting-edge data mining method of Markov Chains to investigate the issue of student attrition. In the end, they determine that Markov chains are a useful tool for examining normal group dynamics. It's useful for grouping students into categories according to their potential for dropping out [22].

Predicting Students' Performance

In education, data mining is most often used to make predictions about students' future performance. Decision trees, Bayesian networks, neural networks, regression, correlation analysis, and other methods of prediction are just some of the options out there. Kumar and Uma assessed students' work in the class using data mining techniques, particularly classification methods like Nave Bayes and Decision trees. This information was derived from the students' unique identifiers and their course grades. In addition, they advocate for the enhancement of the higher education system through the use of data mining to categorise the efficiency of teachers. Students and educators alike benefit from the use of data mining tools in the classroom. Tair M. M. Abu and coworkers provided an example of the application of data mining to the study of student achievement in higher education. Several strategies are proposed to improve academic outcomes for postgraduates. Methods of classification such as Rule Induction and a Naive Bayesian classifier are proposed for use in predicting the graduate student's final grade. K-means clustering was used to classify the students into groups. We used the outlier technique, which takes into account both distance and density, to identify any anomalies in the data. Normal Recurrence (FP) Arockiam et al. compared the skills of city and country kids at programming by using a tree and a K-means clustering technique. FP Tree mining is used to determine the structure of a dataset and extract the patterns within it. K-means clustering is used to examine the students' coding skills. Students from urban areas were found to have significantly higher levels of programming proficiency than students from rural areas [23].

Engineering-specific content areas and their correlation with student success were uncovered by Nikhil Rajadhyax and Rudresh Shirwaikar They focused on classifying students as either "good," "average," or "poor" based on their performance

in school. Using a decision tree, we were able to forecast how our students would perform and target our resources accordingly. In addition, they singled out subsets of students who could contribute to enhancements in performance tracking and content-area instruction [24].

Predicting Students' Placement Opportunities

The difficulty of placing students is another significant issue in higher education. In this area, the majority of institutions are having trouble. Quality student placement is not only essential but also very significant in building institute brands as students' expectations rise. Based on historical data from a database, Shreenath Acharya and Madhu Nsuggested a model for forecasting student placement that educational institutions can use to uncover some intriguing trends that can be evaluated to plan their future activities. For higher-ups like directors and department heads, it has been discovered to be actually helpful [25].

Conclusion

The expansion of information technology, the need for data mining in education, and the relevance of its applications were mostly discussed in this chapter. Data mining is now very essential in order to retrieve this hidden knowledge from huge data. Because so many students are enrolling in higher education these days, EDM has received a lot of interest. Teachers and other stakeholders in the universities can increase student happiness using EDM. In addition to descriptive and predictive analytics, educational data mining also finds use in prescriptive analytics, which allows for the prescription of appropriate actions. It provides a general classification of data mining jobs based on the knowledge types to be mined, the technologies used, and the applications that are directly relevant to employability and student selection. Finally, educational data mining has the potential to significantly enhance learners' overall learning process in a highly efficient way. Future research can examine the numerous creative applications of EDM.

References

1. L. Talavera and E. Gaudioso, "Mining student data to characterize similar behavior groups in unstructured collaboration spaces", Proc. 16th Eur. Conf. Artif. Intell. Workshop Artif. Intell. (CSCL), pp. 17-23, 2004.

2. T. M. Khan, F. Clear and S. S. Sajadi, "The relationship between educational performance and online access routines: Analysis of students' access to an online discussion forum", Proc. 2nd Int. Conf. Learn. Anal. Knowl., pp. 226-229, 2012.

3. R. Saadatdoost, A. T. H. Sim and H. Jafarkarimi, "Application of self organizing map for knowledge discovery based in higher education data", Int. Conf. Res. Innov. Inf. Syst. (ICRIIS), pp. 1-6, Nov. 2011.

4. B. E. Vaessen, F. J. Prins and J. Jeuring, "University students' achievement goals and help-seeking strategies in an intelligent tutoring system", Comput. Edu., vol. 72, pp. 196-208, Mar. 2014.

5. S. Martin, G. Diaz, E. Sancristobal, R. Gil, M. Castro and J. Peire, "New technology trends in education: Seven years of forecasts and convergence", Comput. Edu., vol. 57, no. 3, pp. 1893-1906, Nov. 2011.

6. H. Guruler, A. Istanbullu and M. Karahasan, "A new student performance analysing system using knowledge discovery in higher educational databases", Comput. Edu., vol. 55, no. 1, pp. 247-254, Aug. 2010.

7. T. Chellatamilan, M. Ravichandran, R. M. Suresh and G. Kulanthaivel, "Effect of mining educational data to improve adaptation of learning in e-learning system", Int. Conf. Sustain. Energy Intell. Syst. (SEISCON), pp. 922-927, Jul. 2011.

8. M. Kock and A. Paramythis, "Towards adaptive learning support on the basis of behavioural patterns in learning activity sequences", 2nd Int. Conf. Intell. Netw. Collaborative Syst. (INCOS), pp. 100-107, Nov. 2010.

9. S. Aghabozorgi, H. Mahroeian, A. Dutt, T. Y. Wah and T. Herawan, "An approachable analytical study on big educational data mining" in Computational Science and Its Applications—ICCSA, Springer, pp. 721-737, 2014.

10. S. K. Mohamad and Z. Tasir, "Educational data mining: A review", Proc.-Social Behavioral Sci., vol. 97, pp. 320-324, Nov. 2013.

11. A. Banumathi and A. Pethalakshmi, "A novel approach for upgrading Indian education by using data mining techniques", Proc. IEEE Int. Conf. Technol. Enhanced Edu. (ICTEE), pp. 1-5, Jan. 2012.

12. F. Siraj and M. A. Abdoulha, "Uncovering hidden information within university's student enrollment data using data mining", Proc. 3rd Asia Int. Conf. Modelling Simulation, vol. 1, pp. 413-418, May 2009.

13. G. Siemens and R. S. J. D. Baker, "Learning analytics and educational data mining: Towards communication and collaboration", 2nd Int. Conf. Learn. Anal. Knowl. (LAK), pp. 252-254, 2012.

14. M. M. A. Tair and A. M. El-Halees, "Mining educational data to improve students' performance: A case study", Int. J. Inf. Commun. Technol. Res., vol. 2, no. 2, pp. 1-7, Feb. 2012.

15. S. B. Aher and L. Lobo, "Applicability of data mining algorithms for recommendation system in e-learning", Int. Conf. Adv. Comput. Commun. Inform. (ICACCI), pp. 1034-1040, 2012.

16. T. S. Madhulatha, An overview on clustering methods, 2012, [online] Available: https://arxiv.org/abs/1205.1117.

17. S. Sagiroglu and D. Sinanc, "Big data: A review", Proc. Int. Conf. Collaboration Technol. Syst. (CTS), pp. 42-47, May 2013.

18. S. Parack, Z. Zahid and F. Merchant, "Application of data mining in educational databases for predicting academic trends and patterns", Proc. IEEE Int. Conf. Technol. Enhanced Edu. (ICTEE), pp. 1-4, Jan. 2012.

19. N. A. Rashid, M. N. Taib, S. Lias, N. Sulaiman, Z. H. Murat and R. S. S. A. Kadir, "Learners' learning style classification related to IQ and stress based on EEG", Proc.-Social Behavioral Sci., vol. 29, pp. 1061-1070, 2011.

20. F. Tian, S. Wang, C. Zheng and Q. Zheng, "Research on e-learner personality grouping based on fuzzy clustering analysis", Proc. 12th Int. Conf. Comput. Supported Cooperat. Work Design (CSCWD), pp. 1035-1040, Apr. 2008.

21. P. D. Antonenko, S. Toy and D. S. Niederhauser, "Using cluster analysis for data mining in educational technology research", Edu. Technol. Res. Develop., vol. 60, no. 3, pp. 383-398, Jun. 2012.

22. G. Cobo, D. García-Solórzano, J. A. Morán, E. Santamaría, C. Monzo and J. Melenchón, "Using agglomerative hierarchical clustering to model learner participation profiles in online discussion forums", Proc. 2nd Int. Conf. Learn. Anal. Knowl., pp. 248-251, 2012.

23. C. Romero, M. I. López, J.-M. Luna and S. Ventura, "Predicting students' final performance from participation in on-line discussion forums", Comput. Edu., vol. 68, pp. 458-472, Oct. 2013.

24. C.-T. Huang, W.-T. Lin, S.-T. Wang and W.-S. Wang, "Planning of educational training courses by data mining: Using China motor corporation as an example", Expert Syst. Appl., vol. 36, no. 3, pp. 7199-7209, Apr. 2009.

25. M. M. A. Tair and A. M. El-Halees, "Mining educational data to improve students' performance: A case study", Int. J. Inf. Commun. Technol. Res., vol. 2, no. 2, pp. 1-7, Feb. 2012.

❧❧❧

$$\boxed{\textbf{8}}$$

Wearable Technologies in Physiotherapy for Better Treatment

Dr. Shantanu Sharma[*]
Dr. Anamika Beniwal[**]

Introduction

In an era of shifting health care, the focus is on integrating and delivering preventive health programmes while consumers are adopting newly developed tech, such as robots that help with rehabilitation. Wearable technology is changing the world of healthcare. The most common use of this technology is to monitor the patient's daily activities, their fitness and their general wellness.

This device can be inexpensive and unobtrusive, and for many this makes it easier for them to work on their health. There are lots of ways in which, Wearable technology can be used by physiotherapists. Wearable technology tools can provide feedback on posture and body mechanics, supply educational material or prompt patients to change their habits. Physiotherapy is a field that can integrate Wearable technology into its practices for better outcomes.

Wearable technology provides tools such as collecting reliable outcome measures of vital signs, monitoring data outside the clinical visit and providing feedback on posture and body mechanics. There are many old school Physiotherapists who need to catch up with the use of new technology. One reason for the slow adoption of mHealth by physiotherapists thus far may be a mismatch between their technological preferences and current offerings. It's been difficult understanding the barriers to adoption and improving acceptance.

Wearable Technology in Health Care

Internet of Things (IoT) in clinical and medical care works on physiological information assortment, screens the force of human proactive tasks, works on clinical therapies, among different benefits. Medical services advancements utilizing IoT, particularly wearable technology, can assist clinical experts with pursuing IoT

---

[*]   Associate Professor and HOD of Physiotherapy Department, UEM school of Physiotherapy, Jaipur, Rajasthan, India.
[**] Assistant Professor, UEM school of physiotherapy, Jaipur, Rajasthan, India.

directions in medical care and furthermore streamline remote observing consideration for the worldwide populace. With IoT in the medical services industry, care suppliers can computerize normal examining processes, and have the option to focus closer on the significant things that require human mediation.

Wearables gather a lot of information that assist the doctor with deciding the connection between's medical issue to be managed productively. Coronary illness treatment has profited from the review and checking of wellness information by wearable trackers. This framework allows doctors to screen the everyday admission, calories, and day to day action of patients and can in a split-second store the information of patients on clinical records and online data sets. These gadgets can assist wellbeing associations with teaming up from a distance to streamline and further develop medical services processes.

Better Admittance to Patients' Wellbeing

Savvy medical care IoT gadgets can assist specialists and specialists with working on their exhibition by gathering and dissecting wellbeing information from a distance. When associated with the cloud, IoT gadgets can give constant bits of knowledge into different side effects. Additionally, the technology can permit remote consideration. For instance, IoT-empowered cleanliness gadgets can be enacted when a patient's ailment is compromised. By giving exact and ideal data to medical services professionals, IoT technology in medical services can diminish blunders and increment patients' trust in the nature of their consideration.

Better Patients' Clinical Consistence

With far off quiet observing gadgets and medical services IoT applications, ongoing patients can all the more likely conform to medical care suppliers' remedies. By guaranteeing that medicine is taken routinely, medical care suppliers have some control over the progressions in states of their patients all the more dispassionately and successfully concerning therapy. Wearable technology can help patients in various ways, including giving normal warnings to drugs they are taking. Furthermore, wearables can continually follow indispensable patient information and, in view of the information gathered, a shrewd gadget can send updates for pills in light of glucose levels or use of vital inward breaths.

Improved on Diagnosing

Savvy medical services utilizing IoT might actually assist with improving on diagnosing. By permitting patients to self-analyze their own medical issue, IoT medical care arrangements can assist emergency clinics with decreasing the expenses related with their consideration. IoT in medical services can give the right knowledge to come to additional legitimate conclusions about a specific therapy in view of patient information gathered. It can likewise decrease the medical care costs spent on installments for extra visits to the medical services suppliers, as well as expenses for

on location medical care administrations. With the capacity to analyze patients from a distance, medical care will be more improved and responsive.

Faster Response of Medical Care Suppliers

The principal effect of IoT in medical care is the assistance of cycles. By utilizing IoT technology, specialists can screen the strength of patients progressively. Now and again, IoT wearable gadgets will send messages to other IoT gadgets for additional investigation or information stockpiling. For instance, on the off chance that somebody has a contamination, they can rapidly contact the medical care supplier by squeezing a button, which will empower contact trackers and caution different patients and clinical staff in the structure. The wellbeing business will profit from this data since it can assist with lessening the instances of interior pestilences in medical care foundations as well as decrease risk for patients.

Furthermore, on the off chance that a patient is going through a medical procedure, IoT gadgets will be helpful to follow the advancement of their condition and send updates for the overseeing of oxygen or different prescriptions. These wearable IoT gadgets can screen even the littlest deviations from the standard, and give all the vital data to make a fast move, if fundamental.

With the presentation of IoT wearable gadgets, specialists can screen a patient's pulse, glucometer readings, carbohydrate level, and other crucial signs. This data can assist doctors with better dealing with patients' wellbeing and security. It can likewise assist specialists screen the consistence of prescriptions with treatment plans. With IoT arrangements, medical care is more productive, easy to understand, and progressed.

Wearable Technology in Physiotherapy

A few wearable innovations of today can address follow-up and movement issues by following a patient's exercises after their medical procedure. This technology permits a specialist to follow their patient's exercises somewhat through the Internet of Things (IoT) and screen twisted mending through mild estimation.

Another helpful wearable technology include is by utilizing a blend of sensors, biometrics, and calculations to break down movements or basically movement investigation. Something other than counting the means of an individual, wearable technology can furnish clients and their doctors with significant and important information that they can use to work on persistent administration.

Wearable technology can likewise be effectively utilized in the restoration cycle by utilizing sports biomechanics to plan preparing programs and change preparing gadgets to ensure that the patients use hardware that is tailor-met to their requirements. As the patient wears the groups while doing their activities, specialists and actual advisors can straightforwardly survey the dynamic and kinematic

developments to dissect adaptability, strength, equilibrium, and speed, which are pivotal in anticipating the outcome of the restoration program.

Guideline of feeling is one more helpful yet unexploited worth of wearable advancements. Patients that are recuperating from an individual physical issue often have a deferred mending process. As indicated by www.rbrlawfirm.com/individual injury-attorneys/, it very well may be on the grounds that, beside managing the actual injuries, they likewise need to manage their profound weights. Wearable advancements can assist patients with dealing with their feelings of anxiety and quiet their nerves, permitting them to zero in on what makes a difference.

From mechanical exo suits to electronic sensor skins, wearable innovation is assisting PTs with giving enormous upgrades in their patients' versatility, freedom, and personal satisfaction.

Exo suits are battery-fueled advanced mechanics worn over dress, initially produced for military applications to assist warriors with conveying heavier burdens. Therefore presented for preparing in a remedial setting, these have now gotten FDA endorsement for home use. The expense of these strong mechanical technology will commonly put individual proprietorship far off for most patients, however the advantages of involving these with a specialist as a feature of an extensive treatment plan are making a few facilities think about the venture. The help and versatility gave by an exo suit can further develop flow and oxygen admission, decrease agony, and lead to better inside and bladder capability and joint support. What's more, for some patients, the mental effect of having the option to stand and look at their friends and family without flinching again is incomprehensible.

Electronic sensor skins may be less emotional, however for patients who benefit from them, they're no less progressive. This wearable tech seems as though texture, yet it's bound with many shrewd sensors ready to peruse, examine, and map body conduct. These assists span the correspondences with gapping among PTs and patients and can assist with working on the remedial relationship and keep patients devoted to crafted by their recuperation.

ReWalk

ReWalk permits individuals with spinal rope wounds to stand and walk utilizing engines at the hip and knee, alongside unpretentious gravity sensors that permit the client to "drive" the framework with minor changes in their weight circulation. In the US, this is the principal exoskeleton to get FDA endorsement for individual and restoration use.

Ekso Bionics

Ekso is a walk preparing exoskeleton intended for therapeutically directed use. EksoHealth initially centered around assisting individuals with spinal line wounds who were informed they could at absolutely no point ever stroll in the future make

autonomous strides. EksoNR was the primary exoskeleton to be supported by the US Food and Medication Organization (FDA) for clinical use in the treatment of strokes, cerebrum wounds, and spinal rope wounds.

BioSleeve

BioSleeve is a super lightweight sleeve with an organization of interconnected sensors that catch movement and biometrics continuously. BioSleeve associates the coordinated sensors to a dashboard by means of Bluetooth to show a virtual symbol, permitting actual specialists to go through activities and track information in a facility or from a distance.

Recovery Robots

Recovery robots are consequently worked machines — from roboticized arms to adjust sheets and slant tables — intended to further develop development for individuals with weakened actual working. At their best, they are expansions of the advisor: they permit PTs to assist a greater number of patients with their activities than they could previously and engage them to offer more information driven instructing. Recovery robots permit patients to become familiar with an activity — for instance, pressing a hand or moving individual fingers or toes against a sensor — from a machine that is aligned to make minute changes. A review has shown that patients do more reiterations with the recovery robot, and they partake in the freedom of having the option to rehearse the activity all alone. Also, PTs get helpful, fine-grained information from every patient's meeting with the robot, permitting the PT to actually utilize their time and skill more.

Blade Wellbeing

Blade Wellbeing clients get a unit that incorporates sensors and a tablet through which they interface with a man-made intelligence specialist as well as a human advisor from a distance. The computer based intelligence Advanced Advisor utilizes sensor readings to direct patients through their activity program and deal live criticism. Sword Wellbeing is recruiting PTs for parttime, remote work all over the nation, so while this may not be an answer for upgrading your current practice, it could assist you with broadening.

Exer Physio

Exer Physio runs on normal cell phones and requires no extra equipment or sensors. This framework can be utilized with any cell phone or tablet with a camera, and it depends on simulated intelligence instead of the equipment to screen patients' developments. Simulated intelligence tracks movement through the camera on the patient's gadget to unequivocally gauge their structure while they do their activities and offers nitty gritty continuous structure remedies. Exer artificial intelligence ensures the client's records are kept up with thorough and exact information and can do an inside and out investigation of the information to assist PTs with spotting hidden

issues. Exer simulated intelligence upholds the PT and patient relationship by giving Ai's very best - saving time and creating shrewd information - to engage PTs to succeed in every one of the parts of the job that innovation can't supplant.

So much extreme forefront tech can feel overpowering. Innumerable new entryways are being opened for PTs, however here's reality: you don't need to stroll through every one of them. PTs can construct a special practice, convey remarkable results, and extend their associations with their patients by connecting innovatively with the difficulties and potential outcomes given by arising tech.

Touchpoint Wearable Technology

Touchpoint technology utilizes respective exchanging feeling material (Impact) or unpretentious miniature vibrations that movement to the mind to change the body's reaction to stressors, making them more quiet and calmer. Beside decreasing feelings of anxiety, it likewise lessens a patient's going with side effects, like migraines, sleep deprivation, and chest torments.

Wearable technology is one of the quickest developing advances of today. It has helped numerous people, principally the individuals who use it for their wellness. All the more as of late, it is seeing broad utilization among those in the medical services industry, especially patients who need to go through actual restoration after a medical procedure or a serious actual physical issue.

Conclusion

Wearable technology furnishes us with the capacity to screen our wellness levels, track our area with GPS, and view instant messages all the more rapidly. The best part is that the majority of the gadgets that permit us to do this are sans hands and compact, dispensing with the need to remove our gadgets from our pockets. These sensors can give experiences into pulse, respiratory rate, oxygen immersion and circulatory strain, and can identify essential sign irregularities that give significant context-oriented data or give criticism to the wearers. With the presentation of IoT wearable gadgets, specialists can screen a patient's pulse, glucometer readings, carbohydrate content, and other crucial signs. This data can assist doctors with better dealing with patients' wellbeing and security. It can likewise assist specialists screen the consistence of meds with treatment plans.

References

1. Gomez C, Oller J, Paradells J. Overview and evaluation of bluetooth low energy: an emerging low-power wireless technology. Sensors (Switzerland). 2012;12(9):11734–53.

2. Zhang M, Sawchuk AA. A feature selection-based framework for human activity recognition using wearable multimodal sensors. BODYNETS 2011 - 6th Int ICST Conf Body Area Networks. 2012; 1:92–8.

3.   Mannini A, Sabatini AM. Machine learning methods for classifying human physical activity from on-body accelerometers. Sensors. 2010;10(2):1154–75.

4.   Zhang Z, Fang Q, Ferry F. Upper limb motion capturing and classification for unsupervised stroke rehabilitation. IECON Proc (Industrial Electron Conf). 2011:3832–6.

5.   Myronenko A, Song X. Point set registration: coherent point drift. IEEE Trans Pattern Anal Mach Intell. 2010;32(12):2262–75.

6.   Berndt D, Clifford J. Using dynamic time warping to find patterns in time series. Work Knowl Knowl Discov Databases. 1994; 398:359–70 Available from: http://www.aaai.org/Papers/Workshops/1994/WS-94-03/WS94-03-031.pdf.

7.   Zhang M, Lange B, Chang CY, Sawchuk AA, Rizzo AA. Beyond the standard clinical rating scales: fine-grained assessment of post-stroke motor functionality using wearable inertial sensors. Proc Annu Int Conf IEEE Eng Med Biol Soc EMBS. 2012:6111–5.

8.   Nagi SZ. Some conceptual issues in disability and rehabilitation. In: Sussman M. (ed). Sociology and rehabilitation, Washington, DC: American Sociological Society, 1965, pp. 100. [Google Scholar]

9.   World Health Organization. International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease, published in accordance with resolution WHA29. 35 of the Twenty-ninth World Health Assembly, May 1976, 1980.

10. World Health Organization. International Classification of Functioning,, Disability and Health: ICF. World Health Organization, 2001. [Google Scholar]

11. Jette AM, Keysor JJ. Disability models: implications for arthritis exercise and physical activity interventions. Arthritis Care Res 2003; 49: 114–120. [PubMed] [Google Scholar]

12. Haghi M, Thurow K, Stoll R. Wearable devices in medical internet of things: scientific research and commercially available devices. Healthc Inform Res 2017; 23: 4–15. [PMC free article] [PubMed] [Google Scholar]

13. Banaee H, Ahmed MU, Loutfi A. Data mining for wearable sensors in health monitoring systems: a review of recent trends and challenges. Sensors 2013; 13: 17472–17500. [PMC free article] [PubMed] [Google Scholar]

14. Thilarajah S, Clark RA, Williams G. Wearable sensors and mobile health (mHealth) technologies to assess and promote physical activity in stroke: a narrative review. Brain Impairment 2016; 17: 34–42. [Google Scholar].

❧❧❧

$$\boxed{9}$$

A Study of Motivation and its Effects on Work

Dr. V. Lalitha*

Introduction

Employee motivation is one of the major issues faced by every organization. It is the major task of every manager to motivate his subordinates or to create the 'will to work' among the organization. It should be remembered that a worker may be immensely capable of doing some work; nothing can be achieved if he is not willing to work. Motivation is a process that starts with a physiological and psychological need that activates a behavior or a drive that is aimed at a goal. Every employee is expected to show increased and qualitative productivity by the manager in an organization. To achieve this behavior of the employee is very important. The behavior of the employee is mostly influenced by the work environment and also their personal life. So, the Motivation of employees is one of the important factors that effect the employee work

Motivation is the forces either within or external to a person that arouse enthusiasm and persistence to pursue a certain course of action. Employee motivation affects productivity, and part of a manager's job is to channel motivation toward the accomplishment of organizational goals. The study of motivation helps managers understand what prompt people to initiate action, what influence their choice of action, and why they persist in that action over time. People have basic needs for food, achievement or monetary gain that translate into an internal aspiration that motivates specific behaviors' with which to fulfill the need. To the extent that the behavior is successful ,the person is rewarded in the sense that the need is satisfied. The reward also informs the person that the behavior was appropriate and can be used again in the future .Motivation can lead to behavior that reflects high performance within organization .Studies have shown that high employee motivation

---
* Associate Professor, Aradhana School of Business Management, Hyderabad, Telangana State, India.

goes hand-in-hand with high organizational performance. Managers can use motivation theory to help satisfy employee's needs and simultaneously encourage high work performance. Additionally, When looking at factors that affect job satisfaction, we find that Agency theory might be helpful as it explains the extent to which organizations need to think of their human resource responsible in producing the output needed by organizations to meet shareholders value. Agency theory is concerned with issues related to the ownership of the firm when that ownership is separated from the day-to-day running of the organization.

Objectives of the Study

The objectives of study are:

- To identify the needs of the employee of suryachkra power corporation limited, Hyderabad

- To identify the motivators those are motivating the employees in the organization to achieve their goals

- To identify the nature of the organization and product

- To identify the nature of the industry and environmental forces like government policies

- To examine the level of motivation in employees to perform the job

Research Methodology

Research Design

The present study is descriptive study:

Sources of Information

- **Primary Source**

Primary source include the respondents from whom the required information was collected directly and their personal opinion was required. There was no force on the respondents while collecting the data. The data was also collected through personal interview and through questionnaire.

- **Secondary Source**

Secondary data are data collected for some purpose other than the problems at hand. It include information made available by business and government sources, commercial marketing research firms and computerized databases. Secondary source include people, personal, manual, magazines and the concerned literature on the subject from organization and library.

Sampling Design

- The method of sampling used was random sampling. The respondents were chosen at random due to business and non-availability of the employees.

- The aim of the study was to cover employees at all hierarchy levels. Therefore, the sample of the respondents was chosen at each level of the hierarchy in all the departments and services.

- The sample size was taken as 50.

- The sample design included the respondents from head level to the lower division level; so that the parameters for the study are generalized for all the levels in the organization.

Sample Size

The sample size of the survey is taken as 50 respondents.

Tools for Data Collection

Tools used for data collection are as follows:

- Discussion (unstructured discussion)

- Questionnaires (structured discussion)

Sampling Technique

Finally, the best sampling method is always the one that could best answer our research question while also allowing for others to make use of our results (generalisability of results). When we cannot afford a random sampling method, we can always choose from the non-random sampling methods.

Data Analysis and Interpretation

- **Response about the Support from the HR department**

Table 1

| S. No	Particulars	No. of Respondents	Percentage
1	Highly satisfied	18	36
2	Satisfied	29	58
3	Neutral	3	6
4	Dissatisfied	0	0
	Total	**50**	**100**
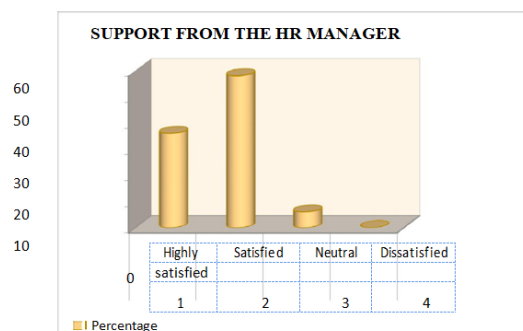
Figure 1

Interpretation

From the above table it can be stated that, 58% of employees satisfied and 36% are highly satisfied with the response about the support from the HR department.

- **The Promotion Policy in the Organization Makes feel Happy**

Table 2

S. No	Particulars	No. of Respondents	Percentage
1	Strongly agree	27	54
2	Agree	10	20
3	Disagree	7	14
4	Strongly disagree	6	12
	Total	50	100
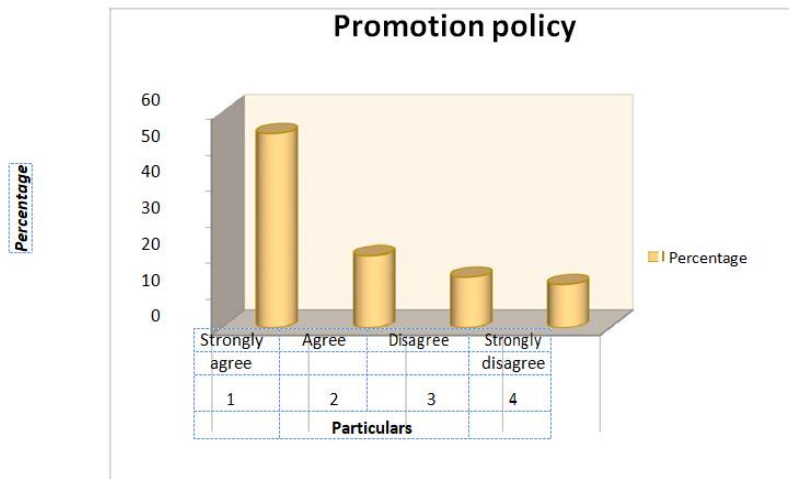
Figure 2

Interpretation

54% of the employees are strongly agreed with the promotion policy. 20% of the employees are agreed, 14% of the employees are disagreed and 12% of the employees are strongly disagreed with the promotion policy in the organization makes feel happy.

- **The training and development programs provided by the company is the satisfactory**

Table 3

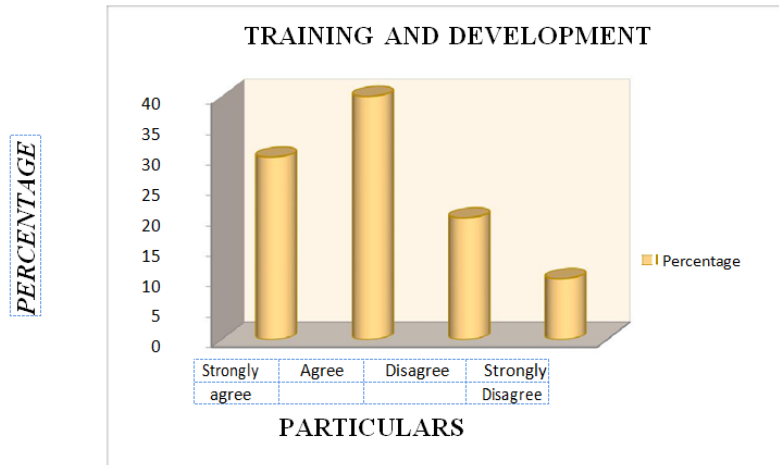| S.No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	15	30
2	Agree	20	40
3	Disagree	10	20
4	Strongly Disagree	5	10
	Total	50	100

Figure 3

Interpretation

30% of the employees are strongly agreed, 40% of the employees are agreed, 20% of the employees are strongly disagreed and 10% of the employees are disagreed with the training and development programs provided by the company.

- **There are enough number of mechanisms to reward incentives for the any work performed and contribution made by employees.**

Table 4

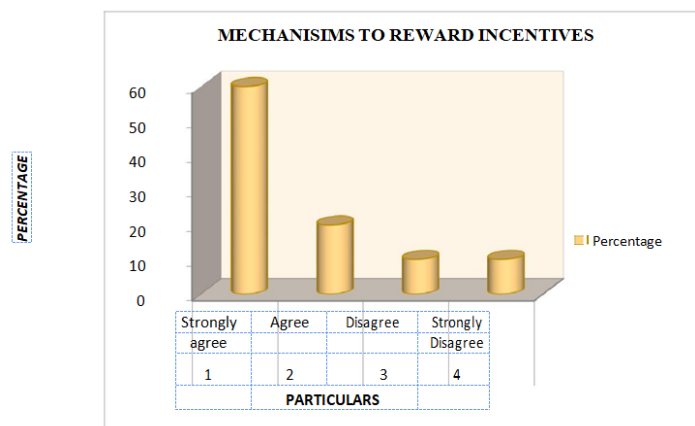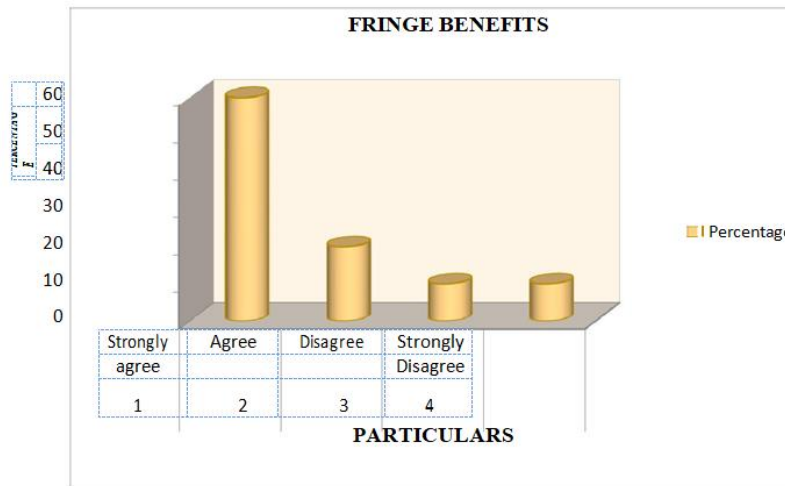| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	15	30
2	Agree	25	50
3	Disagree	8	16
4	Strongly Disagree	2	4
	Total	**50**	**100**

Figure 4

Interpretation

30% of the employees are agreed, 50% of the employees are strongly disagreed, 16% of the employees are disagreed and 4% of the employees are strongly disagreed that there are number of mechanisms to reward incentives for any work performed and contribution made by employees.

- **The fringe benefits provided to employees makes feel happy**

Table 5

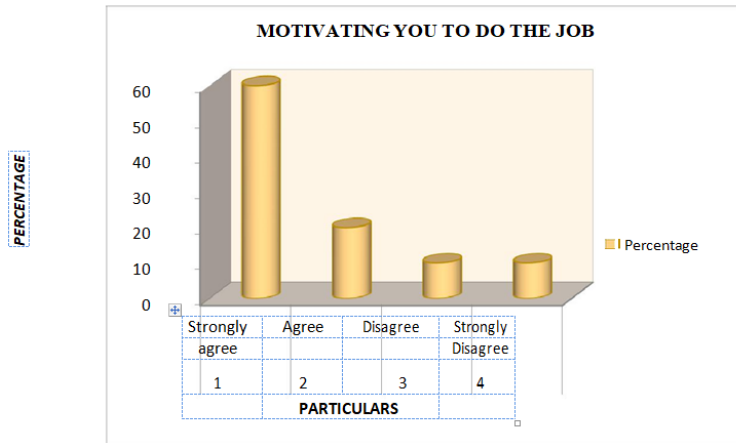| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	18	36
2	Agree	20	40
3	Disagree	8	16
4	Strongly Disagree	4	8
	Total	**50**	**100**

Figure 5

Interpretation

50% of the employees are strongly agreed, 30% of the employees are agreed, 12% of the employees are disagreed and 8% of the employees are strongly disagreed that the fringe benefits provided to employees makes feel happy.

- **The organization is motivating you to do the job in a better way**

Table 6

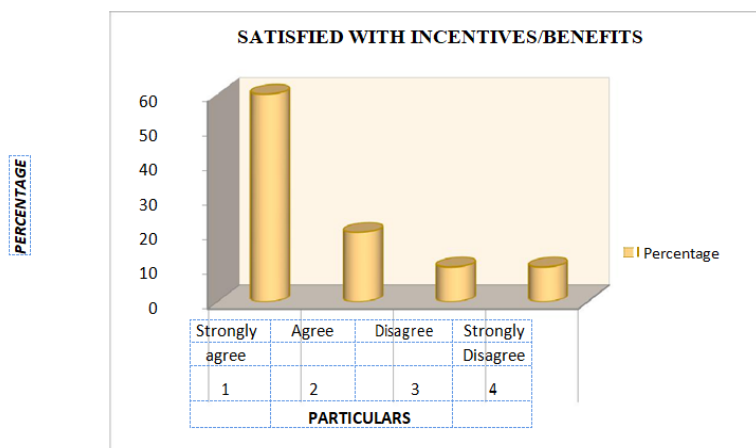| S. No	Particulars	No. of Respondents	Percentage
1	Strongly agree	28	56
2	Agree	15	30
3	Disagree	5	10
4	Strongly Disagree	2	4
	Total	**50**	**100**

Figure 6

Interpretation

56% of the employees are strongly agreed, 30% of the employees are agreed, 10% of the employees are disagreed and 4% of the employees are strongly disagreed with that the organization is motivating you to do the job in a better way.

- **Employees are satisfied with incentives/benefits provided by the Electronics Corporation of India Limited**

Table 7

S. No	Particulars	No. of Respondents	Percentage
1	Strongly agree	28	56
2	Agree	14	28
3	Disagree	3	6
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 7

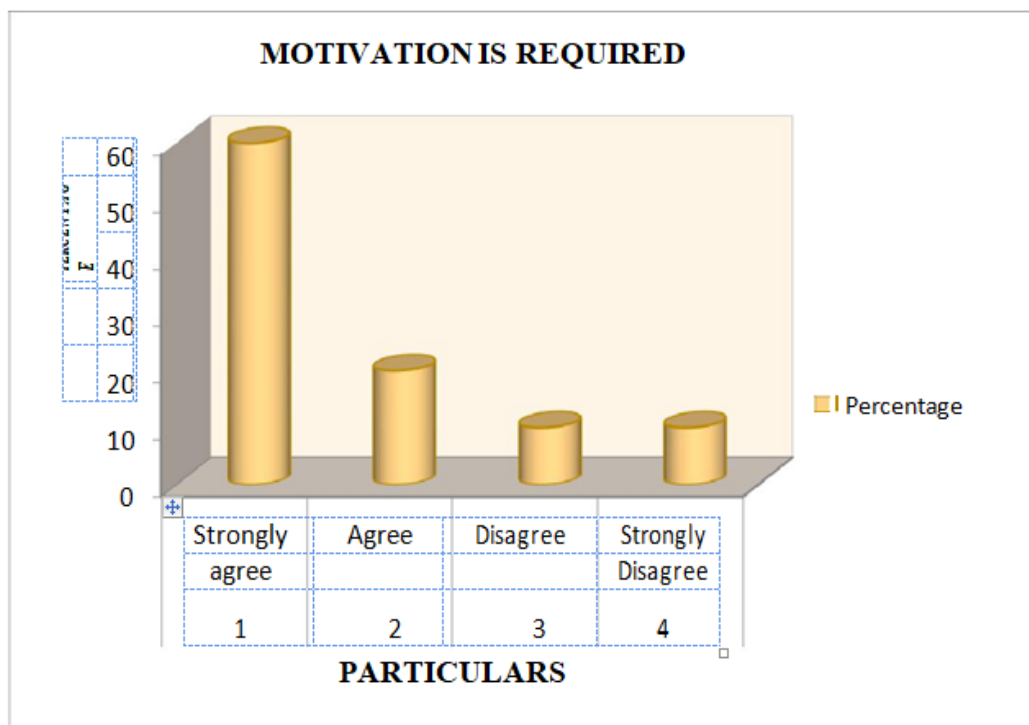**Interpretation**

56% of the employees are strongly agreed, 28% of the employees are agreed, 6% of the employees are disagreed and 10% of the employees are strongly disagreed with that the employees are satisfied with incentives/benefits provided by the electronics corporation of India limited.

- **Do you think motivation is required for the employees in the organization?**

Table 8

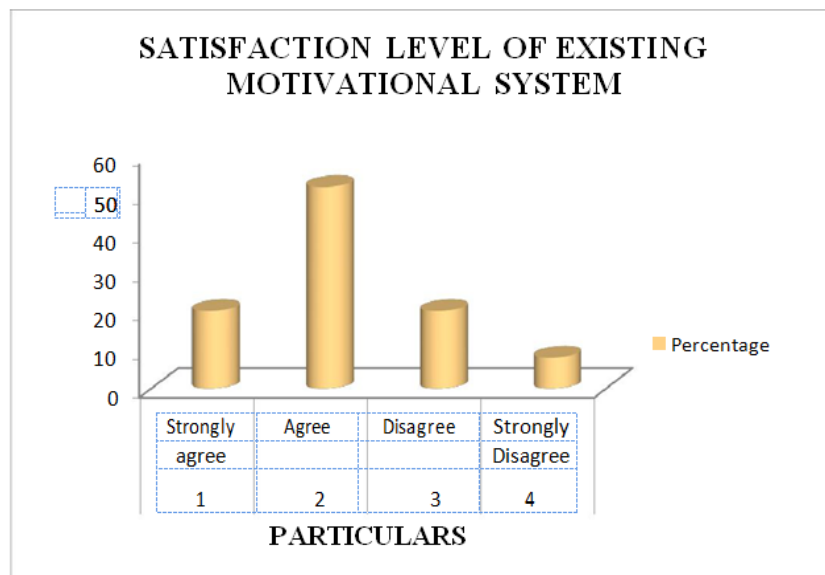| S. No	Particulars	No. of Respondents	Percentage
1	Strongly agree	10	20
2	Agree	25	50
3	Disagree	10	20
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 8

Interpretation

20% of the employees are strongly agreed, 50% of the employees are agreed, 20% of the employees are disagreed and 10% of the employees are strongly disagreed with That the motivation is required for the employees in the organization.

- **Can you specify the satisfaction level of existing motivational system in Electronics Corporation of India Limited?**

Table 9

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	10	20
2	Agree	26	52
3	Disagree	10	20
4	Strongly Disagree	4	8
	Total	**50**	**100**

Figure 9

Interpretation

20% of the employees are strongly agreed, 52% of the employees are agreed, 20% of the employees are disagreed and 8% of the employees are strongly disagreed with that the employee's satisfaction level of existing motivational system in Electronics Corporation of India Limited.

- **Can you specify the satisfaction level of your existing job?**

Table 10

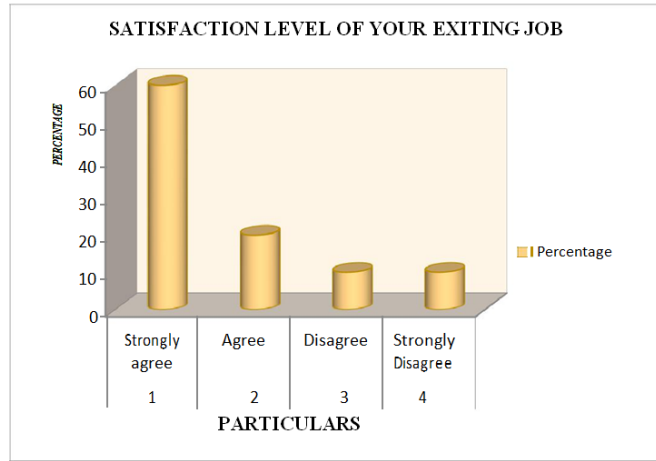| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	10	24
2	Agree	20	40
3	Disagree	12	24
4	Strongly Disagree	8	22
	Total	**50**	**100**

SATISFACTION LEVEL OF YOUR EXITING JOB

Figure 10

Interpretation

24% of the employees are strongly agreed, 40% of the employees are agreed, 24% of the employees are disagreed and 12% of the employees are strongly disagreed with that the satisfaction level of them existing job.

- **Do you feel that there is significant improvement in your performance through motivation?**

Table 11

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	10	20
2	Agree	25	50
3	Disagree	10	20
4	Strongly Disagree	5	10
	Total	**50**	**100**

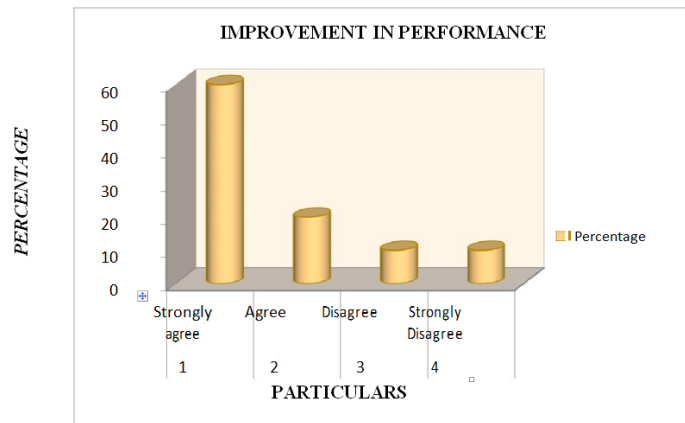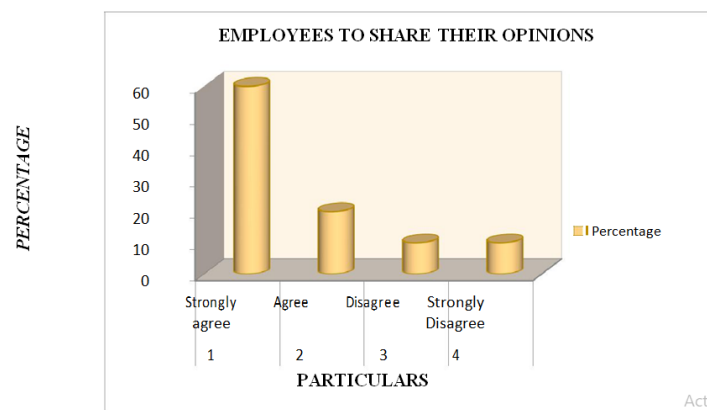**IMPROVEMENT IN PERFORMANCE**

Figure 11

Interpretation

20% of the employees are strongly agreed, 50% of the employees are agreed, 20% of the employees are disagreed and 10% of the employees are strongly disagreed with that there is significant improvement in performance through motivation

- **The communication channel in the organization is open and helps employees to share their opinions.**

Table 12

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	15	30
2	Agree	20	40
3	Disagree	10	20
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 12

Interpretation

30% of the employees are strongly agreed, 40% of the employees are agreed, 20% of the employees are disagreed and 10% of the employees are strongly disagreed with that the communication channel in the organization is open and helps employees to share their opinions.

- **Motivation Tools gives you more satisfaction?**

Table 13

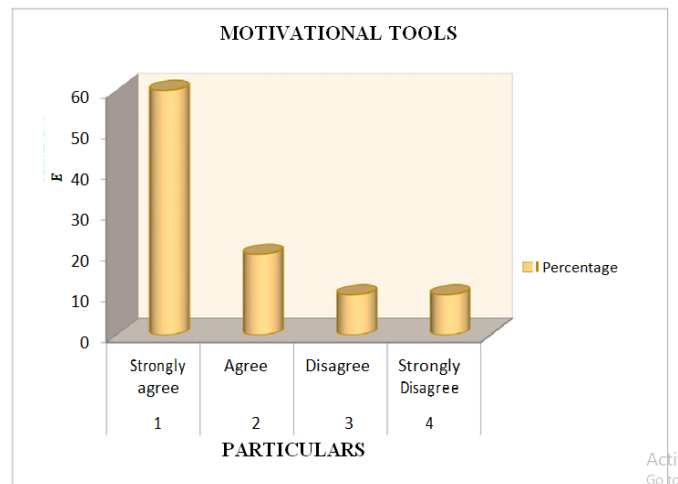| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	13	26
2	Agree	20	40
3	Disagree	10	20
4	Strongly Disagree	7	14
	Total	**50**	**100**

Figure 13

Interpretation

　　26% of the employees are strongly agreed, 40% of the employees are agreed, 20% of the employees are disagreed and 14% of the employees are strongly disagreed with that the companies provides motivation gives them more satisfaction.

- **What is your opinion on motivation in your Organization?**

Table 14

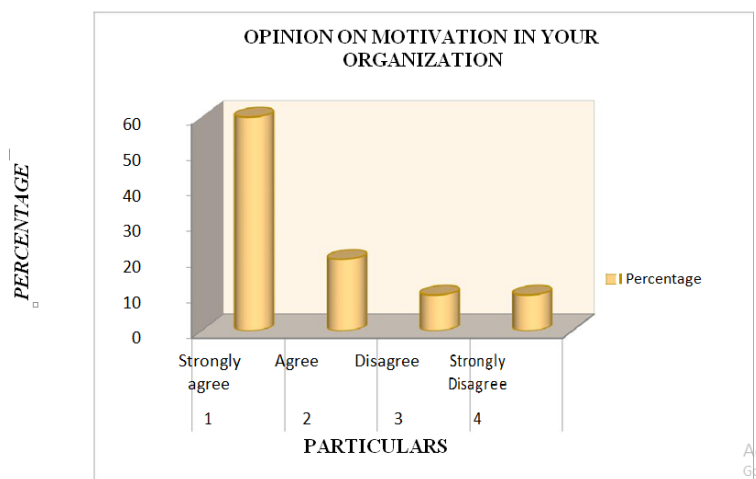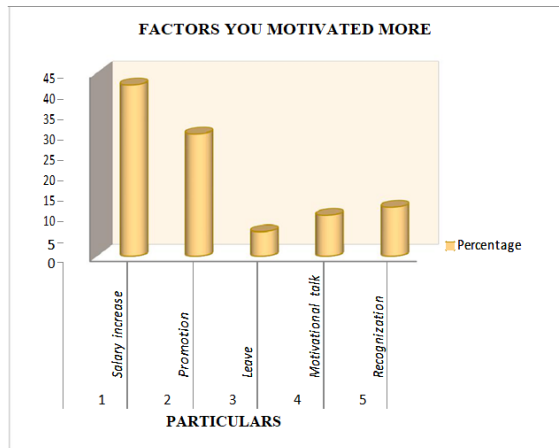| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	20	40
2	Agree	18	36
3	Disagree	7	14
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 14

Interpretation

40% of the employees are strongly agreed, 36% of the employees are agreed, 14% of the employees are agreed and 10% of the employees are strongly disagreed with that the motivation in their organization.

- **Which Factors which motivates you the most**

Table 15

S. No.	Particulars	No. of Respondents	Percentage
1	Salary increase	21	42
2	Promotion	15	30
3	Leave	3	6
4	Motivational talk	5	10
5	Recognization	6	12
	Total	50	100

Figure 15

Interpretation

42% of employees motivated through salary increase, 30% of employees motivated through promotion, 10% of employees motivated through motivational talk and 12% of employees motivated through recognition

- **Do you think you are reaching your goal after motivated**

Table 16

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	30	60
2	Agree	15	30
3	Disagree	5	10
4	Strongly Disagree	0	0
	Total	**50**	**100**

Recent Trends in Commerce, Management and Social Sciences (Edition-II)
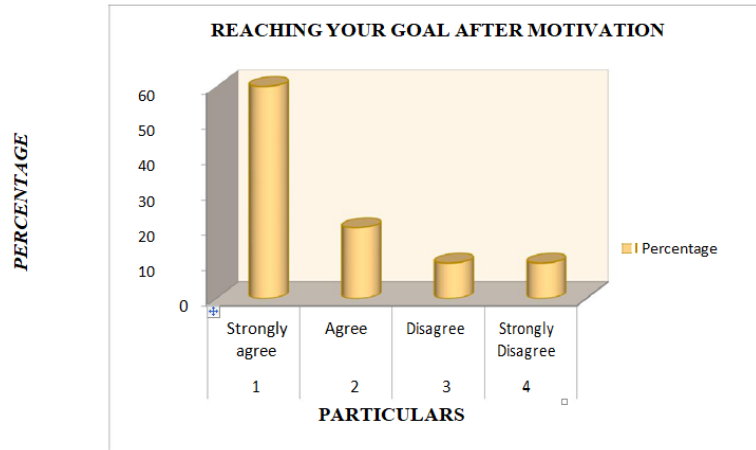

Figure 16

Interpretation

60% employees strongly agree with reaching their goal after motivation,30% of employees agree with reaching their goal after motivation,10% of employees disagree with the reaching their goal after motivation

- **Support from the co-worker is helpful to get motivated**

Table 17

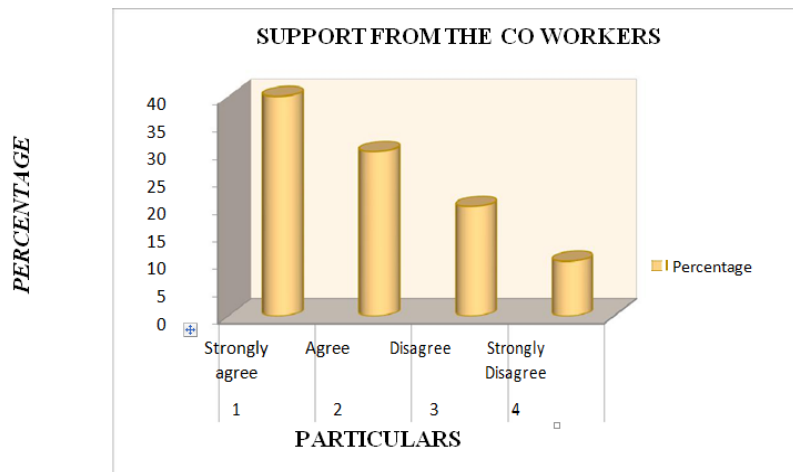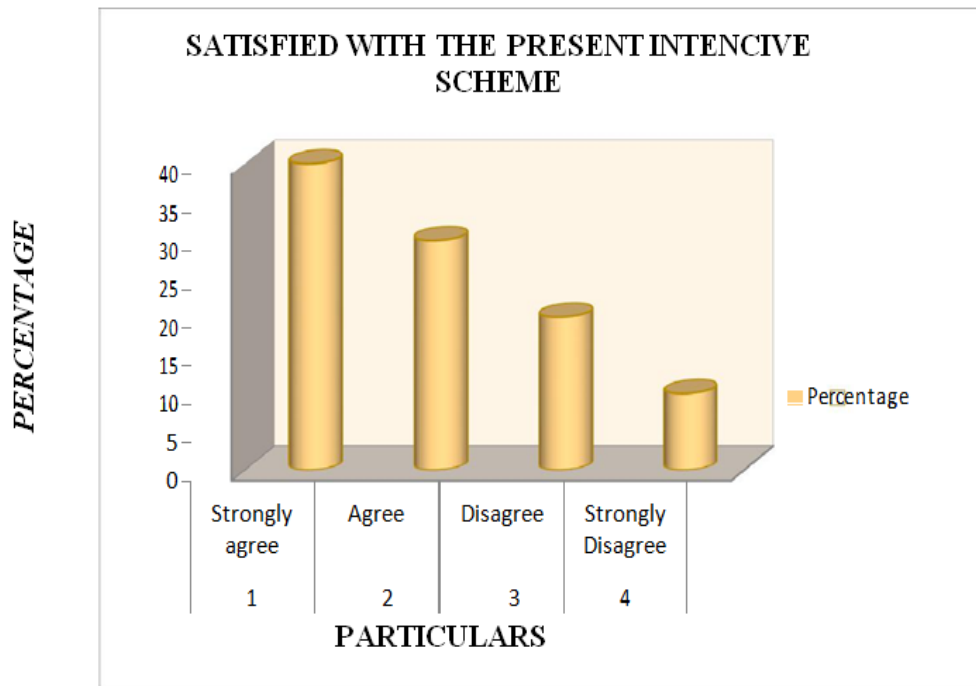| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	30	60
2	Agree	10	20
3	Disagree	5	10
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 17

Interpretation

60% of employees strongly agree with the support from co-workers helps to get motivated, 20% of employees agree with the support from co-workers helps to get motivated, 10% of employees disagree with the support from co-workers helps to get motivated.

- **Satisfied with the present incentives scheme**

Table 18

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	30	60
2	Agree	15	30
3	Disagree	5	10
4	Strongly Disagree	0	10
	Total	50	100

Figure 18

Interpretation

60% of employees strongly agree with the satisfied with the present incentive scheme,30% of employees are agreeing with the satisfied with the present incentive scheme,10% of employees disagree with the satisfied with the present incentive scheme,10% of employees strongly disagree with the with the satisfied with the present in the present scheme

- **Motivated employees show dedication to the organization and they provide better Outputs**

Table 19

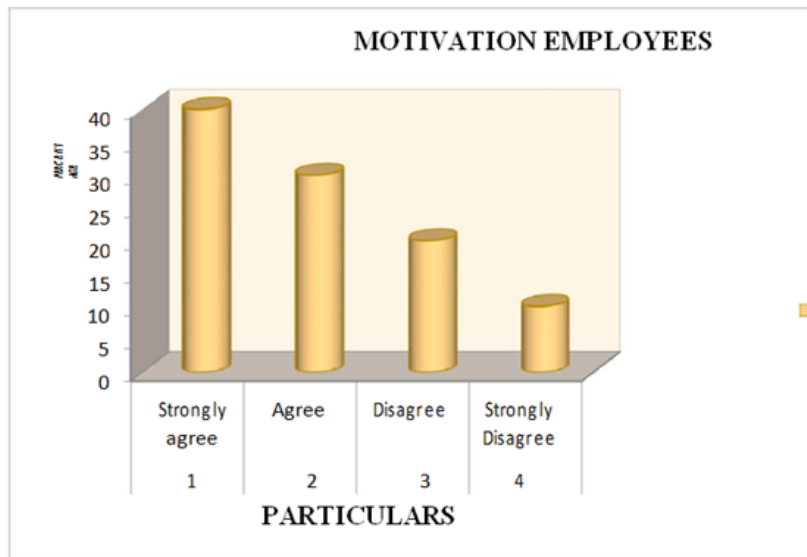| S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	20	40
2	Agree	20	40
3	Disagree	5	10
4	Strongly Disagree	5	10
	Total	**50**	**100**

Figure 19

Interpretation

40% of employees are strongly agree Motivated employees show dedication to the organization and they provide better outputs,40% of employees are agree Motivated employees show dedication to the organization and they provide better outputs.

- **Do you feel Electronics Corporation of India Limited is taking care of your family life?**

Table 20

S. No.	Particulars	No. of Respondents	Percentage
1	Strongly agree	20	40
2	Agree	15	30
3	Disagree	10	20
4	Strongly Disagree	5	10
	Total	**50**	**100**
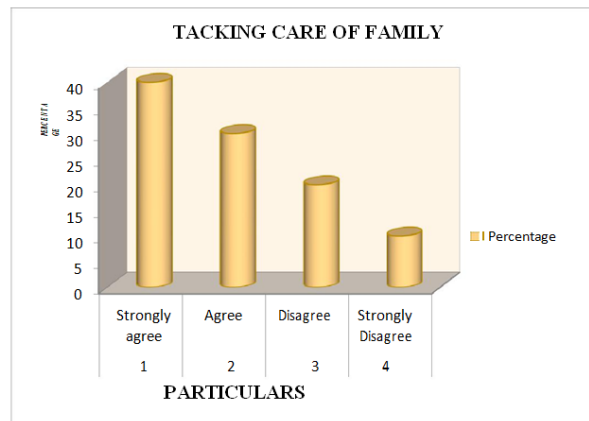
Figure 20

Interpretation

40% of employees strongly agree with the organization tacking care of employees family, 40% of employees agree with the organization tacking care of employees family.

Findings

- There is harmonious relationship in the organization between employees and management.
- The employees are really motivated by the management.
- The employees are satisfied with the present incentives plan of the organization.
- Most of the workers agreed that the organization is eager in recognizing and acknowledging their work.
- Majority of the employees agreed that there is a job security in their present job.
- The organization is providing safety measures to ensure employee safety
- The study reveals that increases in salary will motivate the employees.
- The incentives and other benefits will influence the performance of the employees.

Suggestions

- Non-financial incentive plans should also be implemented; it can improve the productivity level of the employees.
- Organization should give importance to communication between employees and gain co-ordination through it.
- Skills of the employees should be appreciated.
- Better carrier development opportunities should be given to the employees for their improvement.

Conclusion

The study concludes that, the motivational program procedure in lands commission highlighted so many factors which will help to motivate the employees. The study was conducted among 50 employees and collected information through structural questionnaire. The study helped in finding that employee motivational programs are provided in the organizations is very helpful. The performance appraisal activities really play a major role in motivating the employees of every organization. It is a major factor that makes an employee feel good in his work. The organization can concentrate on specific areas which evolve from this study in order to make the motivational programs more effective. If employees are properly motivated, they will work well and the organization will benefit out of it. Steps must be taken to improve motivational programs procedure in the future.

References

Books Referred

1.   Laurie J.Mullins, "management and organisational behaviour", 2008, Pearson.

2.   R.S.Dwivedi, "human relations and organisational behaviour" Macmillan.

3.   David Lepak, Mary Gower, "human resource management", 2010, Pearson.

4.   Kenneth M.York, "applied human resource management", 2010, Sage.

Websites

5.   http://www.scrib.com/

6.   http://www.allbusiness.com/.

❧❧❧

<div style="text-align:center;">

10

</div>

Role of Statistics in Educational Data Mining

Dr. Shilpa Sharma[*]

Introduction

The two most common disciplines used for this purpose are statistics and the relatively new field of Educational Data Mining (EDM) within the larger field of Data Mining (DM). Although Facts and figures is a classical division that developed from practical mathematics, Educational Data Mining is an interdisciplinary field that has managed to grow out of computer science and is used for the same purpose. Data mining and statistics share many methods and techniques, but a data miner can benefit from some statistics-based approaches[1]. Here, we'll introduce Educational Data Mining and Statistics and discuss the similarities and changes between the two fields in order to shed light on the difficulties that exist in both.

The genre of electronic dance music, or EDM, has grown immensely in popularity in recent years. An increase in its use can be attributed to the proliferation of data that can be gathered via the internet and other forms of IT[2]. Investigation into scholarly repositories of school records is growing along with the aid of data mining. EDM can utilized for sophisticated data analysis in the field of education and can glean insights from massive data repositories. Statistics is also fundamental to educational data mining because it provides a framework for evaluating results and distinguishing between insignificant and significant findings. In addition to generating a theory for evaluating the likelihoods of predictions, etc., data warehouses allow us to mine structured and numerical data.[3]

Statistics is both a science and an art form when it comes to learning from data. Data collection planning, data analysis, data interpretation, and data presentation are all covered in detail. Statistics addresses the utmost fundamental human desires, which is the necessity to gain knowledge around the world and how it operates in the face of uncertainty and variation. When the unit of interest is a human being, data collection necessitates the application of both scientific methods and the art of sample management [4].

---

[*]   Department of Computer Applications, Manipal University Jaipur, Jaipur, Rajasthan, India.

The use of statistics in research is crucial. Knowledge refers to the information that we possess. Information is gathered through the use of statistics. "Information" refers to any and all forms of knowledge transmission. It's common knowledge that data is just facts and doesn't constitute knowledge on its own. Information (when the data are applicable to the decision problem) leads to facts (when the data back up the claims made by the information) and the facts lead to knowledge (facts convertto knowledge when they are efficiently devised in the successful completion of the decision process) [5]. Therefore, statistics is necessary to build knowledge on a firm basis of evidence.

This chapter focused on the ways in which EDM and Statistics overlap. Sampling is the first method, and a Bayesian network is the second. Informed use of sampling has the potential to alleviate the challenge of managing large data sets. The statistical method of sampling is quite refined, but it is usually only employed in the preliminary steps of a level-driven modelling process (EDM). The Bayesian Network is ansignificant link amongst statistics and pedagogical data mining. Using a Bayesian network, you can see the probabilistic relationships between various variables. The model works just as well in its EDM implementation [6].

In addition, algorithms for educational data mining seek out unusual and intriguing patterns within the data sets that are provided. Statistical significance testing, also known as hypothesis testing, is useful in these cases because it can reveal hidden patterns in the data that would otherwise go unnoticed in a sample of random observations. While conducting these significance tests, a set of statistical assumptions is taken into account. Data Mining is frequently used in the field of education to perform numerous simultaneous comparisons of multiple hypotheses. Prediction is the process of making educated guesses about the values of some other variables of interest based on the current and future states of other variables. The purpose of a description is to reveal patterns in the data that can be understood by humans[7].

The data is the driving force in both statistics and EDM, but real-time data presents its own unique challenges, such as its ultra-large size, noise, incompleteness, redundancy, and dynamic nature. In EDM, data-driven strategies either employ a data-reduction mechanism to enhance the algorithm's efficiency by restricting the search space, or they rely on heuristics to help them find their way through the infinite permutations of relations between sets of attribute values. Data mining and EDM can make use of a number of statistical analysis techniques. Traditional statistical methods, such as samples and Bayesian analyses, are useful for managing the massive size and dynamic nature of modern data sets. [8].

Background

Data mining in the classroom can take many forms. The feature of the data at hand and the queries we hope to answer with that data often dictate the method we employ[9]. This section describes several of the more common types of statistical analysis employed in EDM. Analytical and Pictorial Methods range from the extremely elementary to the profound, and include descriptive statistics like:

- averages and measures of variation,

- counts and percentages, and

- cross-tabs and simple correlations

These are useful for making sense of the structure of the information at hand. Data discovery and interpretation rely heavily on visualisation techniques like histograms, box plots, scatter diagrams, and multi-dimensional surface plots [10].

Using a set of criteria, Cluster Analysis attempts to classify data into similar groups, or "clusters." In this approach, clusters are both internally homogeneous (their members are all very similar) and visibly diverse (members are not like members of other clusters).

In order to evaluate the connection between two factors, two variables are used. The resulting correlation coefficient indicates whether or not a shift in one variable predicts movement in the other. The point of making a comparison of two variables is to see if shifting one of them will have an effect on the other.

One can better grasp the predictive power of an independent variable with this level of specificity. Correlation results, like regression results, can aid in assessing causal relationships, but they cannot prove causation. To predict membership in two or more mutually exclusive groups from a set of predictors, Discriminant Analysis is used when there is no natural ordering on the groups [11].

Discriminant analysis can be seen as the inverse of one-way MANOVA, with the levels of the independent variable (or factor) in MANOVA becoming the categories of the dependent variable in discriminant analysis, and the dependent variables in MANOVA becoming significant predictors in discriminant analysis [12].

If any want to get to the bottom of what's causing those correlations between variables, factor analysis is a must. Reducing the count of variables and discovering structure in the interactions between variables—that is, classifying variables—are two of the most common applications of factor analysis methodologies. Therefore, you can use factor analysis to simplify your data or discover hidden patterns. An exploratory factor analysis is performed to find or identify a factor structure. Useful for tracking down unknown factors. However, confirmatory factor analysis starts from the premise that the factor structure is already known a priori, and seeks to use data to confirm the validity of this presupposed factor structure.

For the purpose of predicting one quantitative variable (the dependent variable) from another (or others), regression analysis is a statistical method that makes use of the relationship between a number of quantitative variables (independent variables). Although the regression model can provide insight into the strength of the statistical relationships between the variables, it does not guarantee a cause-and-effect relationship. A wide range of regression models are available, from the simplest to the most complex; these include the linear, multiple linear, curvilinear, and multiple curvilinear models, as well as logistic regression, which will be discussed in more detail below.

Logistic regression is utilised when the response variable yields a binary or qualitative result. Logistic regression, like linear regression, can be used to find a "best fitting" equation, but the underlying principles are very different. Maximum likelihood is used in place of the standard least-squares criterion, which maximises the likelihood of achieving the observed results given the fitted regression coefficients. Since it does not assume anything about the distribution of the independent variables, logistic regression is more forgiving of outliers than other regression methods that rely on the normality assumption. Binary regression and multinomial regression are two common types of logistic regression models[13].

The behaviour of objects in a given class can be modelled mathematically with the help of random variables and their associated probability distributions, and this is what a statistical model does. Statistical models are frequently used in data modelling [14]. Data mining tasks like characterization and classification can be used to create statistical models of target classes. Because of this, statistical models can be the end result of a data mining process. Statistics study develops forecasting and prediction methods by utilising collected data and statistical models. Statistical methods can be used to describe and summarise a data set. Extracting patterns from data and comprehending the underlying systems that generate and influence those patterns are both vital tasks for which statistics provides essential support. Inferential statistics (also known as predictive statistics) are used to draw inferences about the process or population of interest based on a sample of the data, while taking into account the inherent randomness and uncertainty of the observations themselves.

The statistical methods can be used to analyse the outcomes of data mining as well. For instance, statistical hypothesis testing can be used to check the accuracy of a mined classification or prediction model. The results of experiments are used in a statistical procedure called a hypothesis test (or confirmatory data analysis). It's not likely that an outcome occurred by chance if it's statistically significant. Model soundness is improved by the descriptive statistics if the classification or prediction model is correct[14].

The challenge of scaling up a statistical method across a large data set can make it tough to use statistical approaches in EDM. The computational complexity of many statistical methods is quite high. Algorithms need to be carefully built and tweaked to reduce computational costs when used on massive data sets spread across a number of logical or physical sites. Online applications, such as online query suggestions in search engines, compound this challenge because they need data mining to manage fast, real-time data streams in real time.

Data Analysis and Handling

Primary data analysis is something that many statisticians take a lot of interest in. In other words, the information is compiled with a certain goal in mind, such as answering a set of related questions. In fact, methods such as experimental design and survey design were developed to facilitate the efficient collection of information needed to address the posed queries. On the other hand, secondary data analysis is where educational data mining really shines. To be more precise, we could say that educational data mining is the practise of performing a secondary analysis of large databases with the intention of identifying undiscovered associations that may be of interest or value to the database owners[15].

Data analysis and interpretation are central to the field of statistics, which aims to help people make informed decisions based on collected information. In the context of educational data mining, statistics play a role, albeit one with a slightly different emphasis than in traditional statistical analysis. In the case of data mining, this means conducting an analysis of past events in an effort to better understand their causes. Data mining may not work well with all experimental designs [15]. Data miners often prioritise interpretability over precision or reliability in making predictions. This has led to a focus on easily interpretable models like rules, trees, graphs, and so on. Data mining is frequently used in applications involving extremely large numbers of variables and/or measurements. Therefore, digital efficiency and accountability are very effective, and concerns over statistical significance may be of secondary concern.

- **Algorithms for Data Analysis in Statistics**

Data collection and analysis have always relied heavily on the use of computers. Imperative computational tools for data analysis in conventional statistics include: efficient estimation via maximum likelihood, least squares, and least absolute deviation estimation; analysis of variance (ANOVA, MANOVA, ANCOVA), and analysis of repeated measurements; nonparametric statistics; log-linear analysis of categorical data; linear regression analysis, generalized additive and linear models, logistic regression, and survival analysis; and many others. The introductory materials for these fields are easily available [16]

- **Handling Massive Data through Sampling**

Even though the cost of memory and data storage has decreased, there are still obstacles to processing massive amounts of data. These include CPU throughput, memory management, and network bandwidth. Information overload prevents business analysts and data scientists from making progress in transforming raw data into actionable insights. To solve this problem, efficient sampling could be used. Although sampling has been around for quite some level as a form of statistics, it is typically only used at the most fundamental levels in EDM [17].

Comparing results from exploring the whole database to those from exploring a representative sample is easier, takes less time, and often yields the same conclusions. A variety of simple models can then be fitted to the original data and assessed. To continue with the data mining project, it will be necessary to evaluate the effectiveness of the preliminary models. While preliminary modelling is important, it is possible that it will reveal additional, more specific issues that will call for additional data exploration.

The ability to quickly and efficiently work with a minor data table that still includes the substance of the complete database is a major advantage of sampling. An ideal world is one in which only essential details are revealed. The problem defines the modelling strategy, which establishes the minimum required amount. Sampling allows analysts to spend less time waiting for modelling results and more time fitting models[18].

Data visualization and its underlying structure are also central to EDM because of the value they add to understanding and drawing conclusions from the data. Nineteenth-century statisticians made significant strides in visualizing quantitative data. Quantitative data visualization has come a long way both conceptually and practically in the past few years. Univariate charts, which show how a variable's values are distributed, are helpful for learning about that variable's range. Graphing the connections between different variables can be done with bar charts and scatter plots (both 2D and 3D). An example of a visualization tool that originated in statistics is the technique of "projection chase," which involves spinning data in order to get a three-dimensional kind of point clouds [19].

Time is often an issue when it comes to data cleansing (the process of discovering, investigating, and fixing errors, anomalies, erroneous values, etc.). It may be a time-consuming and stressful task to clean the entire database. Costs associated with data augmentation and cleaning are reduced when only a subset of data is used.[20]

Conclusion

It has been demonstrated that statistics is very helpful for assessing relationships between a few factors when the associations are linear. Planning for

data collection, managing data, and final tasks like drawing conclusions from numerical facts (data) and presenting results are all taken into account. In a sense, it's satisfying a primal desire.To anticipate student behaviour that is influenced by a number of factors, educational data miners construct a number of complex, predictive, nonlinear models. It helps us find previously unseen connections and correlations in our data, which in turn informs more informed and practical business decisions. For Friedman, "every time the amount of data increases by a factor of 10, we should completely rethink how we evaluate it," further supporting data mining's scientific and economic potential. That's according to some research (Friedman, 1998) The main goal of educational data mining (EDM), in contrast to more conventional statistical data analysis, is "secondary analysis," the uncovering of hidden connections that may have nothing to do with the original goals of data collection. There is a close connection between statistics and Educational Data Mining (EDM) due to the fact that many of the fundamental tasks in EDM can be tackled with the right statistical methods. EDM's emphasis on nonparametric data leaves plenty of room to develop the nonparametric tests described in statistics that can be used in EDM. This is because EDM relies less on traditional statistics.

References

1.   ALFONS, A. 2012. cvTools: Cross-validation tools for regression models. R package version 0.3.2.

2.   BAKER, R. 2010. International Encyclopedia of Education (3rd edition). Oxford, UK: Elsevier, Chapter Data mining in education.

3.   BERK, J. 2004. The state of learning analytics. T&D, 34–39.

4.   BIENKOWSKI, M., FENG, M., AND MEANS, B. 2012. Enhancing teaching and learning through educational data mining and learning analytics: An issue brief. Tech. rep., U.S. Department of Education.

5.   CREDE, M., PHILLIPS, L. A. 2011. A meta-analytic review of the Motivated Strategies for Learning Questionnaire. Learning and Individual Differences 21, 337-346.

6.   DAVIS, J., PENSKY, M., AND CRAMPTON, W. 2011. Bayesian feature selection for classification with possibly large number of classes. Journal of Statistical Planning and Inference 141, 3256–3266.

7.   RAMASWAMI, M. AND BHASKARAN, R. 2009. A study on feature selection techniques in educational datamining. Journal of Computing 1, 7–11.

8.   RAUDENBUSH, S. AND BRYK, A. 2002. Hierarchical Linear Models: Applications and Data AnalysisMethods (2nd edition). Newbury Park, CA: Sage.

9. MCLAREN, B., SCHEUER, O., AND MIKSATKO, J. 2010. Supporting collaborative learning and e-discussions using artificial intelligence techniques. International Journal of Artificial Intelligence in Education 20, 1–46.

10. NSF. 2012. Core techniques and technologies for advancing big data science and engineering. National Science Foundation.

11. NUGENT, G., KUPZYK, K., MILLER, L., MASMALIYEVA, L., SOH, L.-K., AND SAMAL, A. 2011. Learninganalytic approach to identify attributes of learners and multimedia instruction that influence learning. In Proceedings of the World Conference on Educational Multimedia, Hypermedia, and Telecommunications. 2021–2028.

12. WIEDENBECK, S., LABELLE, D., AND KAIN, V. 2004. Factors affecting course outcomes in introductory programming. In 16th Workshop of the Psychology of Programming Interest Group. 97–110.

13. WILSON, B. AND SHROCK, S. 2001. Contributing to success in an introductory computer science course: a study of twelve factors. In Proceedings of the 32nd SIGCSE technical symposium on Computer Science Education. 184–188.

14. YUAN, M. AND LIN, Y. 2006. Model selection and estimation in regression with grouped variables. Journal of Royal Statistical Society 68, 49–67.

15. ZHAO, P. AND YU, B. 2006. On model selection consistency of lasso. Journal of Machine Learning Research 7, 2541–2563.

16. OCHOA, X. AND DUVAL, E. 2009. Relevance ranking metrics for learning objects. IEEE Transactions on Learning Technologies, 34–48.

17. PAPADIMITRIOU, A., GRIGORIADOU, M., AND GYFTODIMOS, G. 2009. Interactive problem-solving supportin the adaptive educational hypermedia system mathema. IEEE Transactions on Learning Technologies 2, 93–106.

18. SEO, D. AND LI, K. 2009. Effects of college climate on students' binge drinking: hierarchical generalizedlinear model. Annals of Behavioral Medicine 38, 262–268.

19. SHUTE, V. AND TOWLE, B. 2003. Adaptive e-learning. Educational Psychologist 38, 105–114.

20. SIMON, N., FRIEDMAN, J., HASTIE, T., AND TIBSHIRANI, R. 2011. Regularization paths for Cox'sproportional hazards model via coordinate descent. Journal of Statistical Software 39, 1–13.

❧❧❧

Dr. Bharati S. Math, employed as Assistant Professor in BLDEA's A.S.Patil College of Commerce (Autonomous), Vijayapur and also working as a Director, IQAC, is a Master in Commerce from Karnataka University Dharwad and also completed her Master's Degree in Philosophy. Further she has been awarded Doctorate (Ph.D) from Bharathiar University in the year 2018. Minor Research Project, funded from UGC is successfully completed by her and in furtherance she is presently working on Research Project from ICSSR for which she has been awarded Rs. 4 Lakh. In her name, around 50 research articles are published in reputed journals at national and international levels. She is totally dedicated in learning higher studies and continuously motivating youngsters to equip their mind through teaching and learning process.

Dr. Modi presently working as Incharge, Faculty of Commerce & Head, Department of EAFM, LBS PG College (*Affiliated to University of Rajasthan*), Jaipur, Rajasthan. He is also working as Associate NCC Officer of 1 Raj. Bn. NCC, Jaipur in his institute since year 2013. He obtained M.Com (Economic Administration and Financial Management) from University of Rajasthan in the year 2010 and awarded Ph.D. from University of Rajasthan in the year 2016. Recently he is awarded young researcher award by Global Quality Excellence in the year 2021. He is also General Secretary of Inspira Research Association-IRA and editor of reputed journals. He has organized so many conferences, seminars, workshops, FDP's as organizing secretary. Dr. Modi has published about 35 research articles in national and international reputed journals.
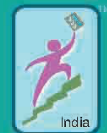
INSPIRA

Reg. No. SH-481   R- 9-V   P-76/2014

Website : inspirajournals.com

₹430/-

ISBN : 978-93-91932-27-5

9 789391 932275