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Impact Analysis of Technical Education in Medium of Instruction as Gujarati: A Comprehensive Study of MCA and PGDCA Programs at Gujarat Vidyapith

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ABSTRACT

This comprehensive study examines the impact and effectiveness of technical education delivered in the mother tongue (Gujarati) at the Computer Science Department of Gujarat Vidyapith (GV). Based on analysis of survey data from 400 respondents who completed MCA/PGDCA programmes between 1989 and 2025, this research provides empirical evidence on the advantages, challenges, and long-term outcomes of technical education in regional language. The findings reveal positive impacts including reduced mental stress, high academic success rates, and global career opportunities, with graduates now settled across multiple countries. The founder father of GV, i.e., Mahatma Gandhi had advocated education in mother tongue, this study also supports India's New Education Policy of Government of India that emphasis on mother tongue education while highlighting the need for strategic resource development and pedagogical innovations.

1. Introduction

1.1 Background

The argument regarding imparting education at various levels has always remained a debatable issue worldwide. Although a consensus among educationists has supported imparting education in one's own mother tongue, the influence of English has remained dominant in almost all the countries that achieved political independence in the second half of 20th century. Asian countries like India, Pakistan, Malaysia; African countries include Kenya, South Africa, Zimbabwe: Caribbean countries include Barbados, Guyana etc. accepted importance of English because of a number of reasons.

The language of instruction in technical education is an ongoing debate in multilingual societies. While English has traditionally dominated technical education globally, there is growing recognition of the cognitive, psychological, and social benefits of learning in one's mother tongue. Mahatma Gandhi established GV for two reasons. One, for political independence and two, to prepare ideal citizens to serve the nation. For second purpose, he strongly emphasized imparting education in mother tongue as early as in 1920. After a century, the National Education Policy, 2020, emphasized education in vernacular languages, but empirical studies on the effectiveness of technical education in regional languages remain limited.

Gujarat Vidyapith has been a pioneer in providing technical education in Gujarati. The Department of Computer Science at Gujarat Vidyapith, established in 1987-88, started offering a Post Graduate Diploma in Computer Applications and introduced the Master of Computer Application program in the medium of instruction as Gujarati since 1994, the first of its kind in the country.

Departmental Profile

Table.1: Departmental Profile

Serial No	Year of Establishment	Course	Intake
1	PGDCA	1987–88	30-45-60
2	MCA	1994-95	30-45-60
3	BCA	2022-23	60
4	M.Sc.-IT	2025-26	60

1.2 Research Objectives

- Analyze the demographic profile and educational background of students who pursued technical education in Gujarati as the medium of instruction

- Evaluate the impact of mother-tongue instruction on the academic achievement, conceptual understanding, and psychological well-being of students
- To investigate the professional outcomes, including employment trends and access to international opportunities, of technical graduates with a medium of instruction as Gujarati
- Identify challenges and opportunities in technical education in regional languages
- To propose a set of policies and practical guidelines based on the findings of the study

1.3 Significance of the Study

This research provides crucial empirical evidence for educational policymakers, institutions, and stakeholders considering the implementation of mother tongue-based technical education. The findings contribute to the global discourse on multilingual education and offer insights into successful models of technical education in regional languages.

2. Literature Review

2.1 Theoretical Framework

The cognitive load theory suggests that learning is more effective when conducted in a language in which the learner is proficient. Research in multilingual education indicates that mother tongue instruction can enhance comprehension, reduce cognitive burden, and improve learning outcomes. However, limited studies have specifically examined these effects in technical education contexts.

2.2 Global Perspectives

Evidence from Finland, Germany, and China demonstrates the viability of implementing technical education through native languages without compromising either technical competence or international competitiveness. These models indicate that the medium of instruction in local languages can be effective, provided that appropriate pedagogical resources and institutional support structures are established. Macaro (2018) further argues that, in the absence of adequate language support. The use of English as the primary instructional medium may impede content learning, exacerbate inequities, and ultimately fail to achieve the intended academic and institutional outcomes.

3. Methodology

3.1 Research Design

This study used primary data using a survey to collect quantitative and qualitative information from MCA/PGDCA program alumni of Gujarat Vidyapith.

3.2 Sample and Data Collection

The total number of alumni of the Department is approximately 800. Out of this population size, questionnaire was sent to 650 alumni. The response rate was about 62 percent. The respondents include the alumni since the inception of the department, i.e., 1989 to March 2025.

The data was primary in nature. A detailed and structured questionnaire was developed. It covered important quantitative variables like demographic information, educational experiences, career outcomes, and qualitative aspects like societal perceptions.

Response Rate: Comprehensive coverage across different graduation years and geographical locations.

3.3 Data Analysis

The data was analyzed using descriptive statistics, cross-tabulation analysis, and thematic analysis for qualitative responses was used to identify patterns and correlations in the dataset.

4. Results and Analysis

4.1 Demographic Profile

Gender Distribution: Of the 400 respondents, 256 were male (64%) and 144 were female (36%). The gender split reflects a historical patriarchal society which has been characterized to favour men also in education in general and technical education in particular.

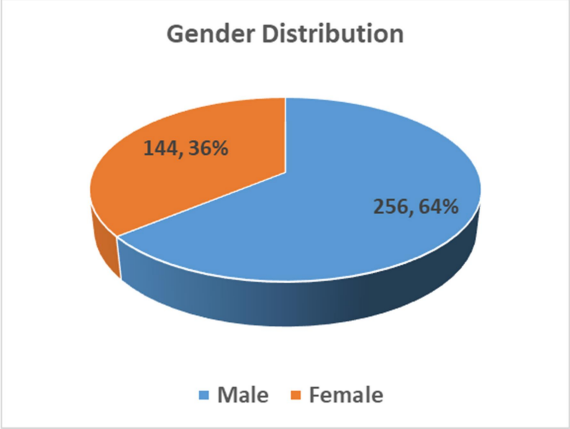

Fig.1 Gender Distribution

The gender split reflects a historical patriarchal society which has been characterized to favour men also in education in general and technical education in particular. Science and engineering were supposed to be male bastion. Over the years, the trend has been changing; especial after policy change of 1991. However, policy of encouragement for female education and exposure to outside world, literacy rate among female has started increasing. The percentage of female in technical field has also started going up.

Geographical Distribution: The study reveals a remarkable global reach of the program. With 14% of graduates settled outside India, Gujarati-language technical education does not restrain international mobility.

Table.2: Geographical Distribution

Detail	Developing	Developed	Total
Number	135	84	400
Percent	84	16	100

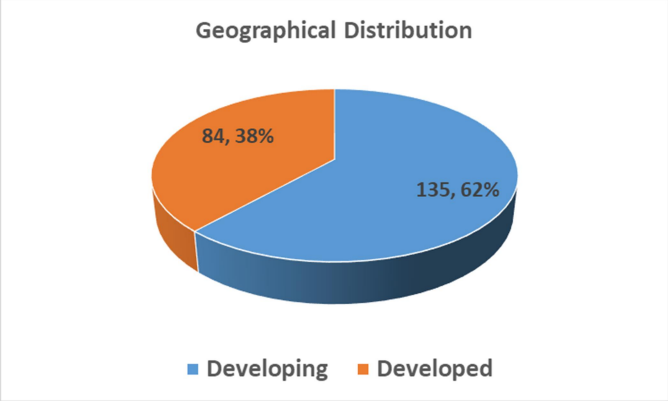

Fig.2 Geographical Distribution

Fig.2 shows with 14 per cent of graduates settled outside India, Gujarati-language technical education does not restrain international mobility. However, except India and Kenya; all the countries are high income and/or with high level of Human Development Index. USA and Canada are primary destinations. One should keep in mind that the basic objective of spreading education in rural India has still to be fulfilled.

Urban-Rural Distribution: Participation spans varied socio-economic contexts. A strong urban representation (including urban and peri-urban categories) is visible, alongside notable rural participation, underscoring access across backgrounds.

Table.3: Urban-Rural Distribution

Detail	Urban	Rural	Total
Number	252	148	400
Percent	63	37	100

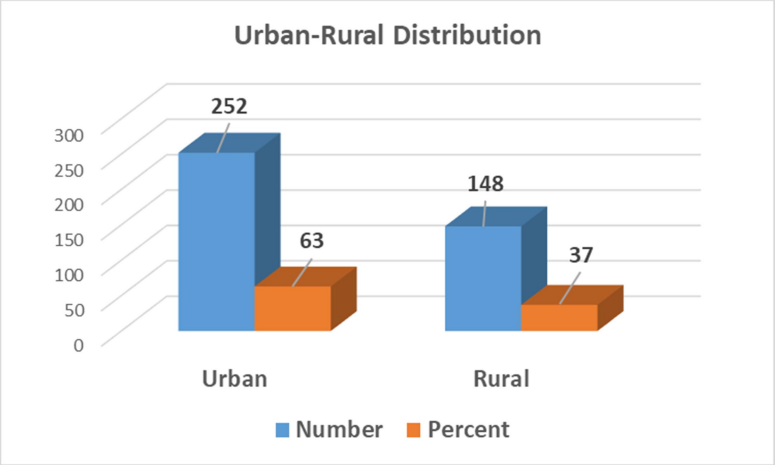

Fig.3 Urban–Rural Distribution

4.1.Educational Background Analysis

Educational profile of the parent indicates awareness, importance of education and accessibility of diversity in opportunities of employment.

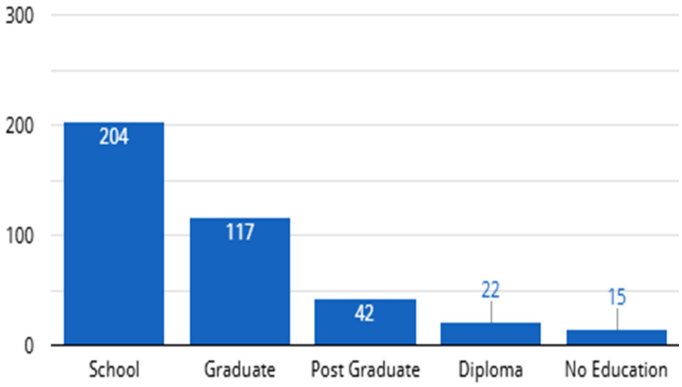

Fig.4 Education of Father

Father: Over half of fathers have schooling as the highest qualification. However, it is encouraging to find that the illiterate fathers were also encouraged the child to go for higher technical education

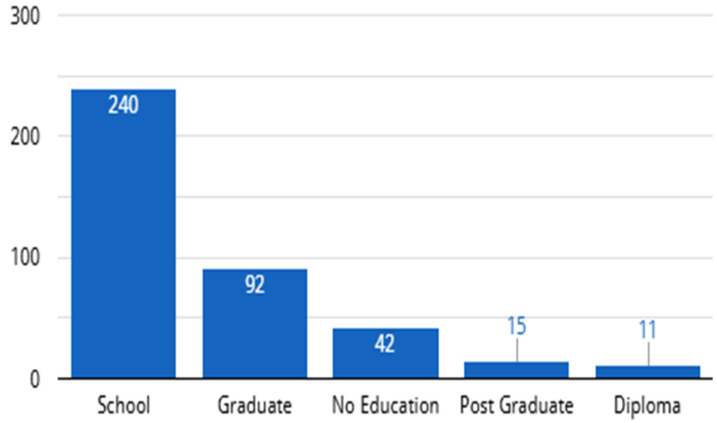

Fig.5: Education of Mother

Education level of mother shows a higher share at school level, but the number of illiterate mothers was high. Yet a meaningful proportion had achieved graduation, reflecting evolving educational opportunities Course Distribution by Passing Year shows concentration in recent cohorts (notably 2020–2022).

Table.4: Distribution by Passing Year

Duration	Number	Percent
Till 2000	72	18
2001-2010	88	22
2011-2020	116	29
2021-2025	124	31

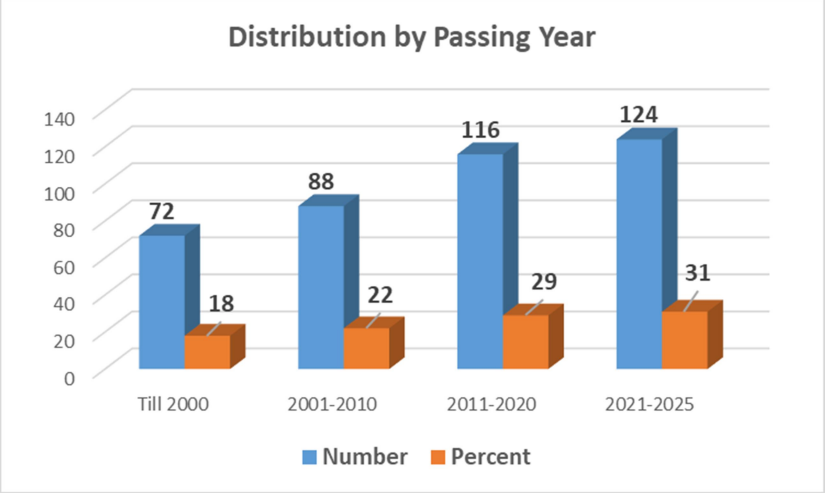

Fig.6 Distribution by Passing Year

The figure reflects recent years contribute a sizable share of the sample, aligning with expanding intake and improved alumni tracking.

5. Discussion

5.1 Impact Assessment

Psychological Benefits: A majority reported reduced mental stress with language conducted in Gujarati.

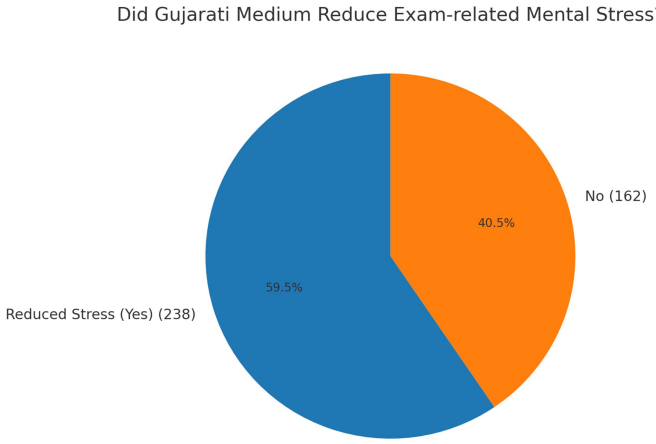

Fig.7: Psychological Benefits

Fig.7 shows nearly acceptance of cognitive load theory. The theory predicts that by streamlining mental effort, stress should decrease. This data also to an extent, does accept reduction in external load by learning in a familiar language.

Career Outcomes and Entrepreneurship:

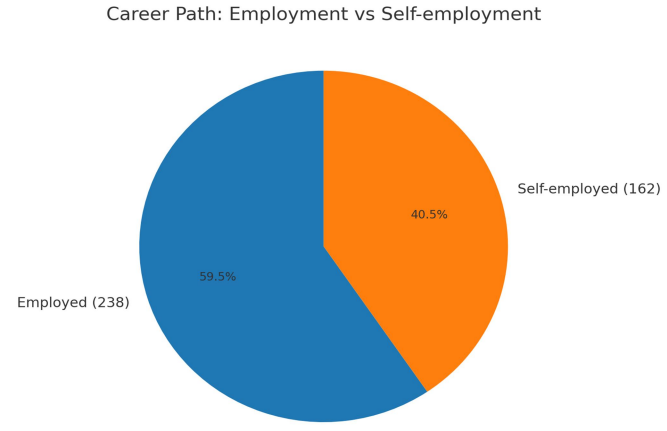

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Fig.8 Employment vs Self-employment distribution

The vision of Mahatma Gandhi and the mission of GV has been self-reliance. The above chart shows that about two fifth of the respondents were self-employed. Suggests OECD consistently reports graduates in fields like medicine, law, engineering, and computer science have the lowest self-employment rates immediately after graduation. The human capital theory states it is an outcome of strategic investment in education, work experience, skills, and confidence, potentially nurtured by ease of comprehension and stronger conceptual grounding.

Language Proficiency Profile:

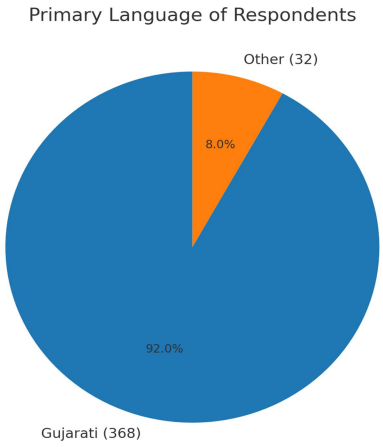

Fig.10 Language Proficiency Profile

Majority of the alumni are Gujarati speakers; mother tongue instruction fits the linguistic profile of the learner population.

5.2 Comprehensive Overview

Table.5: Comprehensive Impact Analysis

Sr. No	Area of Impact	Percent	Observations	Interpretation
1	**Global Competitiveness**	14%	Presence of graduates mainly in Developed countries	Limited constraint on pursuing global careers and opportunities.
2	**Psychological Well-being**	59.5%	In consistence with cognitive Load Theory	Using Gujarati as the medium of instruction

				reduces level of anxiety among students.
3	**Entrepreneurial Spirit**	40.5%	Reflection of Human Capital Theory	high levels of confidence, initiative, and practical skill application.
4	**Access**	Diverse	Participation spans genders, geographies, and parental education levels	Shows the program has reached a diverse student population, promoting equity.

7. Comparative Analysis

7.1 International Benchmarking[i]

Sr No	Indicator	Int'l Benchmark	Result	Conclusion
1	Graduate Outcomes and Employability	>90 % employment rate; <5% unemployment; strong industry link	40.5 % self-employed. limited global mobility	Good
2	**Teaching and Learning Quality**	Curriculum aligned with international frameworks High student-to-faculty ratio; Use of innovative pedagogies; Strong pass rates		Good
3	**Access and Inclusivity**	Gender parity; participation from diverse socio-economic, geographic, and ethnic backgrounds	The program has reached a diverse student population, promoting equity.	Excellent
4	**Student Well-being and Support**	Reflection of Human Capital Theory	**59.5% experienced reduced exam**	Excellent

			stress (Gujarati medium)	
5	**Internationalization and Global Competitiveness**	Graduate mobility; international faculty/students; curriculum with global perspective.	Limited constraint on pursuing global careers and opportunities.	Good
6	**Research and Innovation**	Faculty and student research output; patents; publications; startup incubators.	Data Not Available	NA

7. Recommendations

7.1 For Educational Institutions

- Instructional Material Repository: Generate comprehensive technical literature in the Vernacular language that would be aligned with global standards, adequate infrastructure with advanced laboratory
- Academic Capacity Building: Faculty skill programs to impart learning in Bilingual, integration of technical training in English to be aligned with international standards, training support staff and assistants, integrated with peer groups and mentoring
- Technology Integration: Adopt digital platforms to promote interactive Vernacular resources. Better Teaching and Learning tool-kit needs to be generated
- Industry Partnerships: Establishing the Institute for University Industry Partnership would ensure practical alignment through internships and projects
- Institutional Framework: An Efficient institutional framework for the efficacy of its operations that would reflect Inspirational leadership and long-term strategy

7.2 For Policymakers

- Scale Success Models: Use Gujarat Vidyapith experience as a template across states with necessary alterations

- Digital and Academic Resource Allocation: Fund regional-language labs to make them state-of-the-art labs for learning
- Quality Assurance: Establish standards and accreditation for such programs
- Research Support: Encouragement for long-term research studies to assess and enhance outcomes

7.3 For Students and Parents

- Informed Choice: Consider mother tongue technical education as a strong option
- Skill Development: Complement with English skills for global readiness
- Awareness: The students should be made aware of the global technology ecosystem before getting admission in technical education
- Entrepreneurship: Use conceptual clarity to pursue start-ups and innovation
- Encouraging Students: It is especially the responsibility of the parent to be emotionally supportive to the student in the initial stage of education

8. Limitations and Future Research

8.1 Study Limitations

1. **Measurement Bias:** There is a danger of Social Desirability Bias and Recall Bias that may affect the validity of the findings
2. **Absence of a Control Group:** In the absence of comparative data, the conclusions may not be so reliable
3. **Inductive Methodology:** As a single-institution case study, the findings are inherently context-bound to the unique socio-cultural and pedagogical environment of Gujarat Vidyapith. The results may not be directly transferable to other institutions with different administrative structures, regional contexts, or student demographics

8.2 Future Research Questions

- What are the most effective pedagogical methods for teaching technical education in regional languages?

- With the control group well defined, how vernacular medium influences outcomes?
- In what ways do career growth and salary progression of graduates change over time, and how are these influenced by the medium of instruction?
- How would the use of a regional language as the medium of instruction necessitate specific pedagogical approaches for technical skill and conceptual mastery?
- Do multi-institutional collaborations act as a powerful mechanism to enhance the market reputation of graduates from regional-language programs?

9. Conclusion

The study of 400 graduates from Gujarati-language MCA/PGDCA programs of the Computer Science Department of Gujarat Vidyapith, a deemed to be university, provides notable evidence for the effectiveness of technical education in the mother tongue. It shows high success rates, international mobility, reduced exam-related stress, positive attitude towards entrepreneurship, and inclusive access. The model supports the GV mission of imparting education in mother tongue as well as one of the objectives of New Education Policy while underscoring the need for resource development, faculty training, and industry alignment.

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Appendix A: Survey Questionnaire

Section 1: Personal and Demographic Information

1. Full Name

2. Address

3. Country

4. Date of Birth (D.o.B)

5. Gender

6. Caste

7. Do you belong to?: (Gujarati family / Non-Gujarati family)

8. Mother tongue: (Gujarati/Hindi/Kukna/Marathi/Marwadi/Punjabi/Sindhi)

9. School Education: (Rural / Urban)

10. College Education: (Rural / Urban)

11. School Medium of Education: (Gujarati / Hindi / English / Other)

12. College Medium of Education: (Gujarati / Hindi / English / Other)

13. Stream of your college education: Arts / Commerce / Science / Other

14. Education of Mother: (No Education / School / Diploma / Graduate / Post Graduate)

15. Education of Father: (No Education / School / Diploma / Graduate / Post Graduate)

16. Medium of Mother's education: (Gujarati / Hindi / English / Other)

17. Medium of Father's education: (Gujarati / Hindi / English / Other)

18. Are you self-employed? (Yes/No)

19. If Yes, type of business: (Software Development & Consultancy / Hardware Maintance / Other)

Section 2: Employment Information

20. Name of the company of your first employment

21. Address of the company of your first employment

22. Size of the company of your first employment: (1 to 10 Employees/11 to 25 Employees/26 to 50 Employees/51 to 100 Employees/>100 Employess/Multinational)

23. Upload first placement offer letter (if available)

24. Name of the company of your current employment

25. Address of the company of your current employment

26. Size of the company of your current employment

27. Current status in job

Section 3: Academic Journey at Gujarat Vidyapith

28. Education in Gujarat Vidyapith (Course pursued): MCA/PGDCA

29. Admission Year: 1990 - 2023

30. Passing Year: 1991 - 2025

31. Reason to join MCA/PGDCA in Gujarat Vidyapith:

32. If you got admission in another university, why did you still choose Gujarat Vidyapith? (Yes/No)

33. Source of information about the MCA/PGDCA course of Gujarat Vidyapith: (Advertisement/Newspaper/Family/Friends/Relative/Others)

Section 4: Experiences in Gujarati Medium Education

34. Difficulties in learning in Gujarati medium: (Availability of Reading Material in Gujarati/Problem in Writing answer in Gujarati in Exam/

35. Your positive experiences in learning in Gujarati medium:

36. Your negative experiences in learning in Gujarati medium

37. Do you believe that a subject like 'English Communication Skill' should be taught in Gujarati medium? (Yes/No)

38. Do you believe that preparing and writing exams in Gujarati reduces mental stress? (Yes/No)

39. Have you ever suggested or will you suggest not to take admission in MCA at Gujarat Vidyapith because of Gujarati medium? (Yes/No/Maybe)

40. Do you believe that every state should have at least one university where technical/higher education is imparted in local/mother language? (Yes/No)

41. Do you believe that education in Gujarati has improved your confidence in your work?; (Increase self-confidence/Doesn't make any difference/Decrease self-confidence)

Section 5: Policy and Feedback

42. As per the New Education Policy (NEP), all kinds of education should be imparted in mother tongue. Do you favor technical education in mother tongue? (Yes/No/Can't say)

43. After considering above criteria, please rate Gujarat Vidyapith education

(Very Satisfied/Satisfied/Neutral/Dissatisfied/Very Dissatisfied)

44. I would like to say (Open-ended feedback)

_____