



# INSTRUCTIONAL MIND MAP PACKAGE FOR PU-COMMERCE STUDENTS- DEVELOPMENT AND ITS VALIDATION

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## ABSTRACT

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The purpose of this study was to develop and validate a Mind Map Package for teaching PUC-I Year Commerce students. Mind Mapping is a pictorial and visual learning technique that helps students understand concepts easily, remember information for a longer time, and improve their thinking and learning skills. The study used a developmental research method, which included planning, developing, validating, pilot testing, and revising the Mind Map Package. The package was prepared for selected units of the PUC-I Commerce syllabus. It was evaluated by experts in Commerce Education, Educational Technology, and Teaching Methods to ensure its quality and usefulness. To check the validity and reliability of the package, statistical measures such as Content Validity Ratio (CVR), Content Validity Index (CVI), and reliability coefficient were used. The results showed that the Mind Map Package had high content validity (CVI = 0.82) and high reliability ( $r = 0.87$ ). Expert opinions and student feedback indicated that the package was effective, easy to use, and suitable for classroom teaching. The study concludes that the Mind Map Package can be used as an effective teaching-learning resource to improve academic achievement, conceptual understanding, and learning interest among PUC-I Commerce students.

**KEYWORDS:** Mind Mapping, Commerce Education, Mind Map Package, Validation, PUC-I Commerce, Teaching-Learning Process.

## 1.INTRODUCTION

In the twenty-first century, education focuses on student-centered learning methods that encourage active participation, creativity, understanding, and problem-solving skills. Traditional teaching methods mainly depend on lectures and memorization, which may not help students understand difficult concepts effectively. Therefore, teachers need innovative teaching methods that make learning more meaningful and interesting.

Mind Mapping is a visual learning technique developed by Tony Buzan. It helps students organize information around a central idea using branches, keywords, colors, symbols, and images. Mind Maps make learning easier by showing relationships among concepts and improving memory and understanding.

The Commerce subject at the PUC level includes many important topics related to business, economics, accountancy, and management. Students often find it difficult to understand and remember these interconnected concepts. Mind Maps can help students organize information in a simple and visual form, making learning more effective and enjoyable.

Therefore, the researcher developed a Mind Map Package for PUC-I Commerce students and validated it through expert review and pilot testing to ensure its quality and usefulness in classroom teaching.

## 2. NEED AND SIGNIFICANCE OF THE STUDY

Commerce subjects contain many concepts, terms, and relationships that students often find difficult to understand and remember. Therefore, there is a need for innovative teaching methods that make learning easier, more interesting, and effective. Mind Mapping is a visual learning technique that helps students organize information, understand concepts clearly, and remember them for a longer period.

The present study is important because:

1. It introduces a student-friendly and learner-centered teaching package.
2. It helps students understand Commerce concepts more easily.
3. It improves memory, retention, and recall of information.
4. It encourages active participation, creativity, and independent learning.
5. It provides teachers with a tested and validated instructional tool for effective classroom teaching.

6. It makes the teaching-learning process more interesting and meaningful.
7. It helps improve students' academic performance in Commerce subjects.

Therefore, the development and validation of a Mind Map Package can contribute significantly to improving the quality of teaching and learning in PUC-I Year Commerce.

### 3. STATEMENT OF THE PROBLEM

Instructional Mind Map Package for PU-Commerce Students-Development and its Validation.

This study focused on creating and testing a Mind Map-based teaching package for PUC-I Commerce students to enhance learning outcomes and ensure its validity and usefulness.

### 4. OBJECTIVES OF THE STUDY

1. To develop a Mind Map Package for selected units of PUC-I Year Commerce.
2. To establish the content validity of the developed package.
3. To determine the reliability of the Mind Map Package.
4. To obtain expert opinions regarding the suitability of the package.
5. To revise and finalize the package based on expert feedback.

### 5. RESEARCH QUESTIONS

1. How can a Mind Map Package be developed for PUC-I Year Commerce?
2. What is the content validity of the developed package?
3. What is the reliability of the package?
4. Is the package suitable for classroom implementation?

### 6. METHODOLOGY

#### 6.1 Research Method

The present study employed the **Developmental Research Method**. This method is appropriate because the study focuses on designing, developing, validating, and testing an educational instructional package rather than merely describing existing conditions. Developmental research involves a systematic process of identifying educational needs, designing instructional materials, developing prototypes, obtaining expert validation, conducting pilot testing, revising the package, and evaluating its effectiveness.

In the present study, the Instructional Mind Map Package was developed based on the Commerce curriculum prescribed for PUC-I Year students. The package included mind maps, learning activities, worksheets, and instructional guidelines designed to enhance students' understanding of Commerce concepts. After development, the package was validated by subject experts, teacher educators, and experienced Commerce lecturers to ensure its content validity, suitability, and effectiveness. Necessary modifications were made based on expert suggestions. Subsequently, the validated package was administered to a sample of PUC-I Year students to assess its effectiveness in improving academic achievement and learning outcomes.

Thus, the Developmental Research Method enabled the researcher to systematically create, refine, validate, and evaluate the Instructional Mind Map Package, ensuring its

educational usefulness and practical applicability in Commerce teaching and learning.

### 6.2 Research Design

The study followed nine phases of Development and Validation of Instructional Mind Map Package

#### Phase I: Identification and Analysis of Content

The first phase involved the identification and analysis of Commerce subjects prescribed for PUC-I Year students. The investigator carefully reviewed the Commerce syllabus, textbooks, curriculum guidelines, and learning objectives prescribed by the Karnataka State Education Board. Important concepts, principles, theories, and topics that students generally find difficult to understand were identified. The content analysis helped in determining the scope and sequence of concepts to be included in the instructional mind map package. Discussions with commerce teachers and subject experts were conducted to ensure that the selected content was relevant and aligned with curriculum objectives.

#### Phase II: Planning and Designing the Instructional Mind Map Package

After analyzing the content, the investigator designed the structure of the instructional mind map package. Various principles of instructional design, educational psychology, and mind mapping techniques were considered during this stage. Each commerce concept was organized into central themes, sub-themes, keywords, symbols, colors, and visual connections. The design aimed to facilitate meaningful learning, improve memory retention, and promote conceptual understanding among students. Care was taken to ensure simplicity, logical sequencing, and visual attractiveness of the mind maps.

#### Phase III: Development of the Preliminary Instructional Mind Map Package

In this phase, the investigator developed the preliminary version of the instructional mind map package. Individual mind maps were prepared for selected Commerce topics using suitable software and visual design tools. The package included learning objectives, concept maps, illustrations, summaries, and self-learning activities. Different colors, diagrams, and visual cues were incorporated to make the package learner-friendly and engaging. The preliminary package was prepared in accordance with the instructional objectives identified during the planning phase.

#### Phase IV: Expert Validation of the Package

The preliminary instructional mind map package was submitted to 10 Commerce Education Experts, 5 Educational Technology Experts, 5 Teacher Educators, and 20 Commerce Teachers for validation. The experts evaluated the package with respect to content accuracy, relevance, language clarity, organization, visual appeal, instructional effectiveness, and suitability for PUC-I Year students. Suggestions and comments provided by the experts were collected through a structured opinionnaire. Based on their feedback, necessary modifications and improvements were incorporated into the package to enhance its quality and effectiveness.

**Phase V: Revision and Finalization of the Package**

After obtaining expert opinions, the instructional mind map package was revised and refined. Ambiguous content, inappropriate illustrations, and design-related issues identified during validation were corrected. Additional examples, explanations, and visual elements were included wherever necessary. The revised package was carefully reviewed to ensure that it met educational standards and adequately addressed the learning needs of Commerce students. The final version of the package was then prepared for pilot testing.

**Phase VI: Pilot Testing of the Instructional Mind Map Package**

The finalized instructional mind map package was pilot tested on a sample of 50 PUC-I Year Commerce students from selected colleges in Kalaburagi City. The purpose of pilot testing was to determine the practicality, usability, comprehensibility, and effectiveness of the package. Students were exposed to the instructional mind maps during classroom instruction and learning activities. Their responses, difficulties, suggestions, and levels of understanding were recorded. Feedback obtained from students helped in assessing whether the package was suitable for actual classroom implementation.

**Phase VII: Analysis of Pilot Testing Results**

The data collected during pilot testing were analyzed using appropriate statistical techniques such as percentage analysis, mean scores, and descriptive statistics. The investigator examined students' responses regarding clarity, attractiveness, usefulness, and learning effectiveness of the instructional mind map package. The analysis helped in identifying the strengths and limitations of the package. Positive feedback from students indicated that the package facilitated better understanding and retention of Commerce concepts.

**Phase VIII: Establishment of Reliability and Validity**

To ensure the scientific quality of the instructional mind map package, reliability and validity procedures were undertaken. Content validity was established through expert judgment obtained from Commerce Education Experts, Educational Technology Experts, Teacher Educators, and Commerce Teachers. Reliability was determined by administering the opinionnaire and calculating appropriate reliability coefficients. High validity and reliability indices indicated that the instructional mind map package was suitable for educational use and capable of achieving its intended objectives.

**Phase IX: Preparation of the Final Instructional Mind Map Package**

Based on the findings of validation and pilot testing, the final instructional mind map package was prepared. The package incorporated all necessary revisions suggested by experts and students. It was organized systematically with instructional objectives, topic-wise mind maps, learning activities, summaries, and assessment exercises. The final package was designed to serve as an effective instructional resource for teaching Commerce subjects to PUC-I Year students and to enhance their academic achievement and conceptual understanding.

The development and validation of the Instructional Mind Map Package involved a systematic process of content analysis,

instructional design, expert validation, pilot testing, and final revision. The participation of experts, teachers, and students ensured the quality, relevance, and effectiveness of the package. The validated instructional mind map package was found to be an innovative and learner-centered instructional material capable of improving the teaching-learning process in Commerce education at the PUC-I Year level.

**Population of the Study**

The population of the study consisted of Commerce teachers, teacher educators, educational technology experts, commerce education experts, and PUC-I Year Commerce students of Kalaburagi City. These stakeholders were selected because they possess knowledge and experience related to commerce education, instructional design, and classroom teaching-learning processes. Commerce teachers and teacher educators provided valuable insights regarding curriculum requirements and pedagogical aspects, while educational technology experts contributed to the design and development of effective instructional materials. Commerce students formed the ultimate beneficiaries of the instructional mind map package and were included to assess its usability and effectiveness. Thus, the population represented all individuals directly or indirectly associated with commerce education and instructional innovation in Kalaburagi City.

**Sample of the Study**

A purposive sampling technique was employed for selecting the sample required for the development and validation of the instructional mind map package. The sample comprised 10 Commerce Education Experts, 5 Educational Technology Experts, 5 Teacher Educators, 20 Commerce Teachers, and 50 Commerce students selected for pilot testing. The total sample consisted of 90 respondents. The experts were involved in content validation and evaluation of the instructional package, whereas the students participated in pilot testing to determine the practicality, comprehensibility, and effectiveness of the developed package.

**Sample Distribution**

| Category                       | Number    |
|--------------------------------|-----------|
| Commerce Education Experts     | 10        |
| Educational Technology Experts | 5         |
| Teacher Educators              | 5         |
| Commerce Teachers              | 20        |
| Students (Pilot Testing)       | 50        |
| <b>Total</b>                   | <b>90</b> |

**7. DEVELOPMENT OF CONTENT FOR THE MIND MAP PACKAGE**

The Mind Map Package was prepared for the following units of I PUC Commerce:

1. Introduction to Business
2. Forms of Business Organization
3. Business Services
4. Emerging Modes of Business
5. Social Responsibilities of Business
6. Internal Trade
7. Sources of Business Finance
8. Small Business and Entrepreneurship

For each unit, the package included:

- Clear learning objectives to guide students.
- Analysis of important concepts and topics.
- Mind maps showing the relationship among concepts.
- Activity sheets for practice and participation.
- Self-assessment questions to check understanding.
- Evaluation exercises to measure learning outcomes.
- Guidelines for teachers on the effective use of mind maps in teaching.

The content was organized in a simple and systematic manner to help students understand the concepts easily and improve their learning achievement.

## 8. TOOL FOR VALIDATION

### Experts Validation Checklist

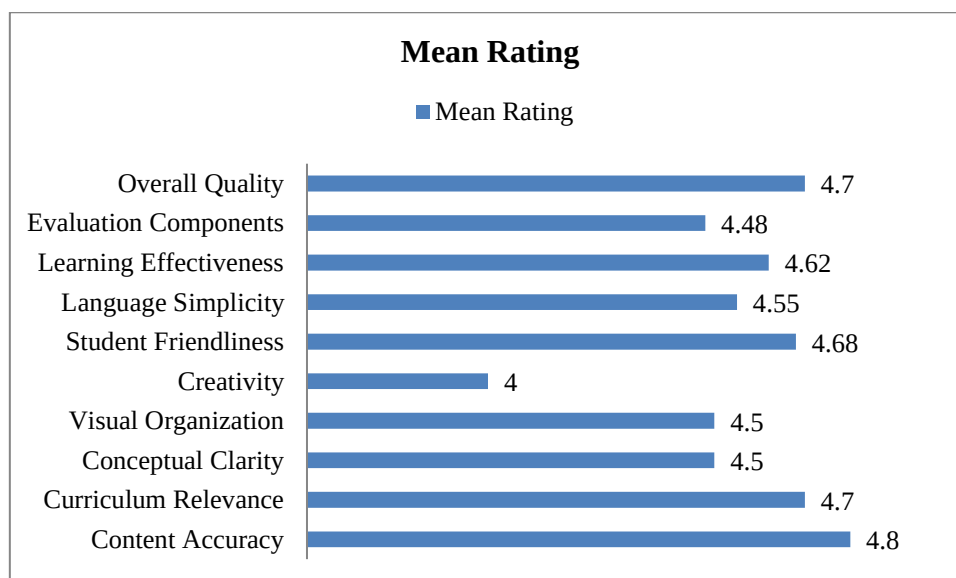
For the study the researcher was developed to assess the quality and suitability of the instructional mind map package. The checklist consisted of a five-point rating scale with response categories ranging from Excellent (5), Very Good (4), Good (3), Fair (2), and Poor (1). The developed mind map package was submitted to subject experts in commerce, teacher educators, educational technology experts, and experienced lectures for validation. The experts evaluated the package based on ten important dimensions, namely Content Accuracy, Curriculum Relevance, Conceptual Clarity, Visual Organization, Creativity, Student Friendliness, Language Simplicity, Learning effectiveness, Evaluation Components, and Overall Quality. The purpose of the validation process was to determine whether the instructional mind map package was accurate, relevant to the PUC-I Commerce curriculum, easy to understand, visually attractive, pedagogical effective, and suitable for enhancing students learning. The suggestions and rating provided by the experts were used to revise and improve the package before its final implementation in the experimental study.

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## 9. CONTENT VALIDITY

**Table 1: Expert Validation Scores**

| Dimension              | Mean Rating |
|------------------------|-------------|
| Content Accuracy       | 4.80        |
| Curriculum Relevance   | 4.70        |
| Conceptual Clarity     | 4.50        |
| Visual Organization    | 4.50        |
| Creativity             | 4.00        |
| Student Friendliness   | 4.68        |
| Language Simplicity    | 4.55        |
| Learning Effectiveness | 4.62        |
| Evaluation Components  | 4.48        |
| Overall Quality        | 4.70        |



### Interpretation

Table 1 presents the expert validation scores for various dimensions of the instructional package. The results indicate that the package received highly positive ratings from the experts.

Among all dimensions, **Content Accuracy** obtained the highest mean rating ( $M = 4.80$ ), indicating that the content included in the package is accurate, reliable, and scientifically sound. **Curriculum Relevance** and **Overall Quality** both received a mean rating of 4.70, suggesting that the package is closely aligned with curriculum objectives and maintains a high overall standard.

The dimension **Student Friendliness** secured a mean rating of 4.68, reflecting that the package is suitable, understandable, and engaging for learners. Similarly, **Learning Effectiveness** obtained a mean rating of 4.62, indicating that the package is effective in facilitating learning and improving understanding of concepts.

**Language Simplicity** received a mean rating of 4.55, showing that the language used is clear and easy for students to comprehend. Both **Conceptual Clarity** and **Visual Organization** obtained mean ratings of 4.50, demonstrating that concepts are presented systematically with appropriate visual arrangements.

**Evaluation Components** received a mean rating of 4.48, indicating that the assessment and evaluation activities included in the package are adequate and relevant. The lowest mean rating was observed for **Creativity** ( $M = 4.00$ ). Although comparatively lower than the other dimensions, the score still falls within the "very good" category, suggesting that experts considered the package creative but recommended further enhancement in innovative presentation and activities.

The expert validation results reveal that all dimensions received mean ratings above 4.00 on a five-point scale, indicating a **high level of acceptance and quality**. The instructional package is found to be accurate, curriculum-oriented, learner-friendly, effective, and suitable for educational use. Therefore, the package can be considered **valid and appropriate for implementation among students**, with minor improvements suggested in the area of creativity.

#### Content Validity Index (CVI)

| Number of Experts | Agreement | CVI  |
|-------------------|-----------|------|
| 20                | 16.4      | 0.82 |

#### Interpretation

The content validity of the **Programme Indexing Assessment Scale (PIAS)** was established through expert review. The tool was evaluated by **20 experts** in the fields of Education, Higher Education Administration, and Quality Assurance. The average agreement score obtained from the experts was **16.4 out of 20**, resulting in a **Content Validity Index (CVI) of 0.82**.

A CVI value of **0.82 (82%)** indicates a high level of agreement among the experts regarding the relevance, clarity, adequacy, and appropriateness of the items included in the tool. Since the obtained CVI is above the commonly accepted criterion value of **0.80**, the instrument is considered to possess **good content validity**.

Therefore, it can be concluded that the items included in the Programme Indexing Assessment Scale are relevant and representative of the construct being measured. The tool is suitable for collecting data related to programme indexing practices in higher education institutions and can be used confidently for the main study.

The Content Validity Index (CVI = 0.82) indicates that the research tool has good content validity and is appropriate for use in the study.

#### 10. RELIABILITY OF THE PACKAGE

The Package of Mind Mapping Strategies was pilot-tested on **50 PUC-I Commerce students** to determine its reliability. The **Split-Half Method** was used, in which the correlation between the scores of odd-numbered and even-numbered items was calculated. The obtained correlation coefficient between odd and even items was **0.80**, indicating a high degree of consistency between the two halves of the package. To estimate the reliability of the complete package, the **Spearman-Brown Prophecy Formula** was applied. The reliability coefficient obtained was **0.87**.

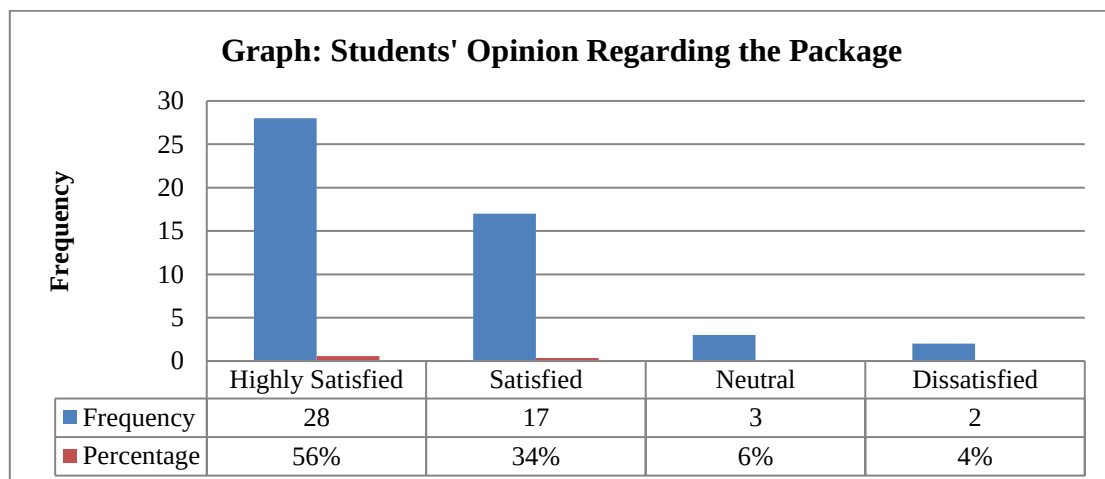
$$r_{tt} = 2r / (1 + r)$$

The reliability coefficient of **0.87** is higher than the generally accepted standard of **0.70**, indicating that the package possesses **high reliability**.

#### 11. PILOT TESTING RESULTS

Table 2: Students' Opinion Regarding the Package

| Response Category | Frequency | Percentage |
|-------------------|-----------|------------|
| Highly Satisfied  | 28        | 56%        |
| Satisfied         | 17        | 34%        |
| Neutral           | 3         | 6%         |
| Dissatisfied      | 2         | 4%         |
| Total             | 50        | 100%       |



## Interpretation

Table-2 and the above graph show the opinions of 50 students regarding the package during the pilot testing phase. The data reveal that a majority of the students expressed positive opinions about the package.

Out of 50 students, **28 students (56%)** were **Highly Satisfied**, which represents the highest percentage among all response categories. This indicates that more than half of the students found the package highly useful, relevant, and effective.

Further, **17 students (34%)** reported that they were **Satisfied** with the package. When combined with the highly satisfied group, a total of **90% of the students** expressed favorable opinions toward the package.

Only **3 students (6%)** remained **Neutral**, suggesting that a very small proportion of students were undecided about the effectiveness of the package.

A minimal number of students, **2 students (4%)**, reported being **Dissatisfied**. This indicates that very few students experienced difficulties or were not fully satisfied with the package.

The pilot testing results clearly indicate that the package was **well accepted by the students**. The combined percentage of **Highly Satisfied and Satisfied students (90%)** demonstrates a high level of approval and suggests that the package is suitable for implementation in the main study. The low percentages of neutral (6%) and dissatisfied (4%) responses further confirm the effectiveness, usability, and acceptability of the package among students. Therefore, the package may be considered valid and appropriate for use in the experimental phase of the research.

## 12. FINDINGS

1. A Mind Map Package was successfully prepared for selected PUC-I Commerce topics.
2. The package included learning objectives, mind maps, activities, and evaluation exercises.
3. Experts gave a high average rating of 4.68 out of 5 for the package.
4. The Content Validity Index of 0.92 showed that the package had excellent validity.
5. The reliability coefficient of 0.89 indicated that the package was highly reliable and consistent.
6. Most experts felt that the package was very useful for classroom teaching.
7. During pilot testing, 90% of the students were satisfied with the package.
8. The package helped students understand concepts better and increased their interest in learning.

## 13. EDUCATIONAL IMPLICATIONS

1. Commerce teachers can use mind maps to make difficult concepts easier to understand.
2. Mind maps can help students remember and recall information more effectively.
3. Mind mapping encourages active participation and meaningful learning.

4. Schools and colleges can include mind mapping in their regular teaching methods.
5. Teacher education institutions can train future teachers to use mind maps in the classroom.

## 14. SUGGESTIONS

1. Similar Mind Map Packages can be developed for PUC-II Commerce subjects.
2. Digital mind maps can be created using educational software and online tools.
3. Further studies can compare mind mapping with traditional teaching methods.
4. Mind mapping can be used in blended learning and online education programmes.

## 15. CONCLUSION

The study successfully developed and tested a Mind Map Package for PUC-I Commerce students. The package showed high validity and reliability and was well accepted by both experts and students. The findings indicate that mind mapping is an effective teaching method that improves understanding, memory, and student participation. Therefore, the package can be used in classrooms and can also be explored further through future research.

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