ISSN 2063-5346

# A STUDY ON APPLICATION OF E-LEARNING PACKAGE FOR MENSURATION IN MATHEMATICS

**Dr. Manish Pande[1], Dr. Jay Prakash Tiwari[2]**

**Article History: Received: 01.02.2023 Revised: 07.03.2023 Accepted: 10.04.2023**

**Abstract**

The ability to study whenever and wherever one pleases is only one of the many reasons why online education is gaining popularity in the academic world. When used by qualified instructors, e-learning tools can revolutionise the educational landscape. The FLIP classroom is the most modern instructional approach, and it is gradually gaining traction in India. In this research, we present a tutor (e-learning package) that uses the Flip model to educate students on how to approach and solve problems in the mathematical subfield of mensuration. Students can use this instructor to better grasp the Mensuration principles given in school. There are five main components that make up the tutor's layout: (i) the lessons themselves, (ii) the problem classification system, (iii) the student module, (iv) the teacher module, and (v) the reports.

**Keywords**: E-Learning, Flip classroom, Mensuration, Module etc.

[1]Associate Professor, Oriental University, Indore

[2]Professor & Head of Mathematics Department, Patel group of Institutions, Indore

**DOI:10.31838/ecb/2023.12.s1-B.366**

## I. INTRODUCTION

Education is more than just acquiring facts; it's about empowering students to make sense of the world, provide for themselves, and grow as individuals. E-learning, or distance learning, is a method of education that leverages individual initiative, group effort, technological advancements, and time savings. Students appreciate being able to study whenever and wherever works best for them. When it comes to online education, you can choose from a wide selection of CDs and DVDs. These are some of the things they're lacking:

1., you can only find the CBSE or State Board syllabus.

2. there is no all-levels maths CD for learning a certain subfield.

3. the course materials do not engage the learner in any way.

Only objective tests will be used for evaluation.

5. The instructor has no say over what the difficulties are or how they should be solved.

6., only the textbook's exercise problems are shown with answers.

7. The presentation of worked-out solutions does not address students' concerns.

When assessing a student's progress, even online tutoring platforms like meritnation.com, learnnext.com, and digiclass.in rely solely on objective questions. Also, they cater their content to a specific level of learners. It's possible that a student will only want to focus on improving in the areas where they currently struggle. In mathematics, only a handful of research are done in relation to a certain area [1][8][9]. In this research, we describe a tutor for mensuration that addresses the indicated requirement for software that provides instruction on a certain topic. It also details the methods used to address various problem types.

**The objectives of this tutor are:**

1. to develop a fresh approach to teaching Mensuration (a subfield of mathematics) utilising the Tutoring System.

2.To assist the student grasp the topic and work through the problems at each level.

3.giving students individualised attention and making school fun.

4.Teaching mathematics is a difficult and demanding job that calls for more time, effort, and patience. This guide will aid educators in every way.

## II. THE FIELD OF MEASURATION

Mensuration is the mathematical study of measuring things like line and surface lengths, surface areas, volume, and perimeters. The following knowledge is required: The first topic: defining area, perimeter, and volume. 2) Dimensional, mass, and volumetric standards. Shape-specific formulas, third. 4) An answer to a straightforward issue. Five) The answer to a word problem.

Mensuration is a topic that is notoriously challenging for students to grasp and solve issues in. One explanation is that students have a hard time retaining information about different types of shapes. Second, they need to become familiar with various formulas for measuring. Last but not least, they must use these ideas to solve issues in many different contexts. They frequently need to imagine the circumstances, draw a suitable diagram or map, and then apply the right formulas to arrive at a solution. Students typically struggle the most with word problems.

The most typical causes of wrong answers in high school mensuration are: 1) applying a well-established rule incorrectly to a novel circumstance.

2) Misusing a previously established procedure to address a new circumstance. Thirdly, when solving word problems, it is possible to envision the wrong diagram and make the wrong connections between the information in the problem and the diagram.

## III. INSTRUCTIONAL DETAILS

Measurement topics are explained using text from a variety of textbooks [2–6]. Example problems, practise problems, and test problems are all types of problems drawn from these texts. The study's problem set is structured so that participants work through progressively more difficult problems with increasing intrinsic load (e.g., more than one step) as the experiment progresses (see Figure 2). This section describes the layout of the Tutoring system.

### A. An Overview of the GUI

The system's interface is entirely menu-based. The learner is given a mensurational keypad to enter data, which streamlines the input process and cuts down on input errors. The keypad offers an intuitive icon-based user interface and a viewing window that shows the user's input choices. Keys on the keypad are labelled with the standard alphabet, numerals, and measuring units. A user can quickly and easily make any mensurational expression with only a mouse. A user can utilise the keypad to alter expressions or delete them entirely.

### B. Method of Teaching

This study adopts the 'flip model,' which reverses the traditional teacher-student relationship by placing the teacher in the role of a facilitator. Students in a flipped classroom model study at home and complete assignments in class with the guidance of a teacher. Moving lectures outside of the classroom allows teachers to spend more time with each student on an individual basis, which is one of the main benefits of adopting this methodology.

b) It encourages students to take charge of their own education.

b) It fosters a stimulating, inspiring, and fruitful classroom setting.

Mensuration has been broken down into individual classes during the design phase. Mental (1 word), simple (2–4 steps), and word problems (more than 4 steps) are the categories into which the problems presented in each lesson's study material and subsequent tests fall. Since the project's overarching goal is to make educational resources more accessible to students, it requires that they register with a teacher and be given a special code.

Here, we break out the essential components.

1) Teacher: Here, a teacher can enrol a student along with information about where he is in the learning process and what lessons he should begin with. Each lesson's maximum number of problems assigned can be determined by the instructor. Each lesson can have its own question bank, with the teacher able to submit the required solution processes in the form of examples, exercises, and tests. This is where the project's real muscle lies. The instructor must use the keypad to type the instructions precisely. For each issue, he can draw the corresponding diagram. The instructor can also make changes and updates to the submitted exercises. Figure 1 provides an illustration.

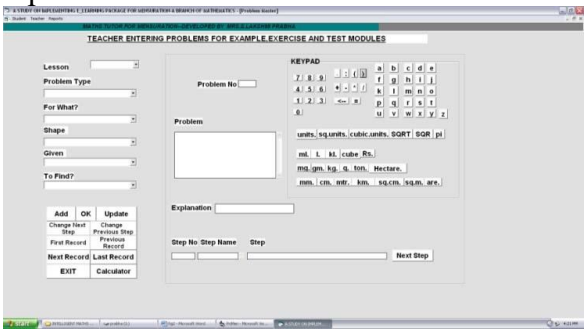


Figure.1. Template for Teacher to enter problems and solution steps

2) Enrolled Student: The student accesses the required e-learning materials and begins the assigned lesson. The student can then use the sample problems to practise what they've learned. The mental disorder only shows the results. If he grasps the concept, he can move on to the next challenge. If not, an explanatory box will appear. Each mouse click on a basic problem will reveal the next step in the solution. Each procedure is briefly described. Word problems are also solved in a similar manner, albeit with additional steps. During a problem-solving activity, a tutor will guide a student through the process of breaking down an issue into its component parts and will provide additional guidance as needed. At each level of the problem-solving process, the student's work is assessed. Students who make mistakes have the option of revising their contribution or requesting help from the system. The student is moving on to the test module after having grasped the concepts presented in the examples and exercise questions. There are three stages to the examination: the conceptual, the simple, and the large-scale. When the user chooses a test, the appropriate problem appears, and they must enter their answer using the number pad in a step-by-step fashion. After completing the quiz, the student will be able to evaluate his results. Students receive no assistance whatsoever at the test level.

3).the report shows the student's grades after he enters his roll number. By entering his name and the class number, a teacher can examine the results for a specific student, and he can view the results for the entire class.

## IV. CONCLUSION

The Flip model and blended learning can both benefit from this program's features. Students of all levels can benefit from this pedagogical resource when studying mensuration. The steps of the problem-solving process are as follows: observational learning, practise, and evaluation. Each component of the solution is illustrated with examples. In this instance, pupils are not contributing in any way. When a learner makes a mistake while entering data for a problem in an exercise, the tool will tell them what they did wrong. If pupils try to complete the tasks in the wrong order, they will receive an error message. The instructor also recommends that the student make advantage of the tips. Each session has three tiers of assessments, and a report detailing each student's progress is provided. The tool is not limited to a specific set of problems as the teacher inserts the problems and steps to solve them. An experiment is presented to determine the tutor's efficiency.

## REFERENCES

[1] Parvati Rajan, Pramod Patil, KSR Anjaneyulu, P Srinivas,"The trigonometry tutor," Narosa Publishing House, New Delhi, 155-166, 1989, doi:10.1007/BFb0018376.

[2] G. Gnanasundaram, M. Palanivasan, P. Nagarajan, T. Kathirvel, "Mathematics," Tamil Nadu Textbook Corporation, 2005.

[3] V. Sriram, T. Kathirvel, P. Nagarajan, T.K. Srinivasan, S.Ramamurthi, M. Srinivasan, "Mathematics," Tamil Nadu Textbook Corporation, 2005.

[4] V.Sriram, K.Arivazhagan, R. Nambikai Jayaraj, S.Vijiya, "Mathematics," Tamil Nadu Textbook Corporation, 2005.

[5] V.Sugantha, R.Hema, "Comprehend Mathematics," Macmillan India Limited, 2006.

[6] K.Rameswari, V. Jayashri, L. Jayashree, "Explore Mathematics," Oxford University Press, 2006.

[7] Kurt VanLehn, "The Behavior of Tutoring Systems," International Journal of Artificial Intelligence in

Education,Volume 16 Issue 3, Aug. 2006, pp.227-265, doi: dl.acm.org/citation.cfm?id=1435353.

[8] Hilbert T. S., Renkl, A., Schworm S., Kessler S., Reiss, K., "Learning to teach with worked-out examples: A computer-based learning environment for teachers," Journal of Computer-Assisted Learning, Vol. 24, 2008, pp.316-332, DOI: 10.1111/j.1365-2729.2007.00266.x.

[9] Kay G. Schulze, Robert N. Shelby, Donald J. Treacy, Mary C. Wintersgill, Kurt VanLehn, Abigail Gertner, "Andes: An Intelligent Tutor for Classical Physics," The Journal of Electronic

Publishing,Vol.6, Issue1, Sept.2000, doi: http://dx.doi.org/10.3998/3336451.0006.110.

[10] Mengping Tsuei,"The G-Math Peer-Tutoring System for Supporting Effectively Remedial Instruction for Elementary Students," Ninth IEEE International Conference on Advanced Learning Technologies , Riga, Latvia, July 2009, pp.614-618, doi: 10.1109/ICALT.2009.119. [11] Marco Ronchetti,"Using video lectures to make teaching more interactive," International Journal of Emerging Technologies in Learning, Vol. 5, No. 2, 2010, pp. 45-48, doi:10.3991/ijet.v5i2.1156.

[12] Johan Jeuring, Wouter Pasman. "Strategy Feedback in an E-learning Tool for Mathematical Exercises," In Proceedings of 5th Workshop on e-Learning, HTWK Leipzig, Germany, Oct. 2007, pp. 7–26, doi: UU-CS-2007-007.

[13] Gwo-Jen Hwang, "A conceptual map model for developing intelligent tutoring systems," Computers & Education, Vol. 40, 2003, pp 217–235, doi:10.1016/S0360-1315(02)00121-5.

[14] John R. Anderson, Albert T. Corbett, Kenneth R. Keodinger, Ray Polletier, "Cognitive tutors: Lessons learned," The Journal of Learning Sciences, Vol.4, 1995, pp.167–207, doi:10.1207/s15327809jls0402_2.

[15] Johan Jeuring, Harrie Passier, Sylvia Stuurman. "A Generic Framework for Developing Exercise Assistants," In Proceedings of the 8th International Conference on Information Technology Based Higher Education and Training, ITHET 2007, Kumamoto City, Japan, July 2007, doi:uu-cs-2007-017.

[16] K. VanLehn," The behavior of tutoring systems," International Journal on Artificial Intelligence in Education, Vol. 16.No.3, 2006, pp. 227–265, doi: http://dl.acm.org/citation.cfm?id=1435353.

[17] Siemens, G. Connectivism. "A learning theory for the digital age," International Journal of Instructional Technology & Distance Learning, Vol. 2, No. 1, 2005, pp. 3–7, doi:http://www.itdl.org/Journal/Jan_05/article01.htm.

[18] Scotty D. Craig, Michelene T. H. Chi, Kurt VanLehn, " Improving Classroom Learning by Collaboratively Observing Human Tutoring Videos While Problem Solving," Journal of Educational Psychology, Vol. 101, No. 4, 2009, pp. 779–789, doi: 10.1037/a0016601.

[19] Mohammad Issack Santally,Alain Senteni, "Reconceptualisation of the Teaching and Learning Process through Computer-Mediated

Frameworks," International Journal of Instructional Technology and Distance Learning, Vol.2,No.1,2005, pp.23–38, doi:http://www.itdl.org/Journal/Jan_05/article03.htm.