# Review on Error Analysis in Mathematics

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**Abstract**: *This paper looks at a review of error analysis for problem solving. Data was gathered through a paper and pencil test as well as an interview with the student. The sort of error that the learner made in addressing the applying level problem was operational error, according to the error analysis. A mistake is a miscalculated or wrong action. In some contexts, an error is interchangeable with a mistake. The discrepancy between the computed value and the correct value is referred to as "error" in statistics. Failure or a variation from the planned performance or behavior experimental outcome could occur from an error. A perfect measurement of a physical quantity is impossible to achieve; there will always be some error or ambiguity. There are an unlimited number of circumstances that can cause an experimentally acquired value to differ from the correct (theoretical) value for any measurement. The majority of these variables have a minor impact on the outcome of an experiment and can usually be overlooked. However, some influences can create a major change in the experimental result, or an error.*

## I. INTRODUCTION

Mathematics education has a significant role, because mathematics is a fundamental science that is used widely in various areas of life. Which demonstrated how first and second language learners advance an independent system of language? Therefore, the analysis of errors has turned to be an imperative arena of linguistics. This arena of language teaching value from the outcomes of linguistics in various cases comprising error analysis. The study would provide a clear linguistic feature analysis on term papers based on students' own research interest for educators and researchers

## II. BACKGROUND

Teachers providing correctly worked example exercises as models for pupils to follow while completing their own exercises has been a staple of mathematics education pedagogy for decades . Incorrect activities have been established in recent years for the goal of student-led error analysis . The Standards of Mathematical Practice and the Mathematics Teaching Practices both encourage error analysis. When these activities are combined with a combination of successfully and incorrectly done exercises, researchers claim that greater mathematical knowledge occurs

## III. WHY IS ERROR ANALYSIS IMPORTANT?

Students who struggle with math typically lack important conceptual knowledge for a variety of reasons, including an inability to process information at the instructional pace, a lack of adequate opportunities to respond (i.e., practise), a lack of specific feedback from teachers regarding misunderstanding or non-understanding, anxiety about math, and visual and/or auditory processing difficulties.

## IV. DIFFERENT TYPES OF ERRORS

Students who struggle with math typically lack important conceptual knowledge for a variety of reasons, including an inability to process information at the instructional pace, a lack of adequate opportunities to respond (i.e., practise), a lack of specific feedback from teachers regarding misunderstanding or non-understanding, anxiety about math, and visual and/or auditory processing difficulties.

1. **INHERENT ERRORS:** Inherent mistakes are errors that are already present in the issue statement before it is solved. These errors occur as a result of either imprecise data or restrictions in mathematical tables, calculators, or the digital computer.
   By collecting better data or applying high-precision computational assistance, inherent mistakes can be reduced. The number of significant digits in a value is referred to as accuracy.
   EXAMPLE – 53.965 is accurate to 5 significant digits.
   Precision refers to the number of decimal position or order of magnitude of last digit in the value...Eg. In 53.965, precision is 10 raise to power -3.

2. **ROUNDING ERRORS:** They arise from the process of rounding off the numbers during the computation. It is also called **Procedural Errors or Numerical Errors**. Such errors are unavoidable in most of the calculations due to limitations of computational aids.

3. **TRUNCATION ERRORS:** They are caused by using approximate results or on replacing an infinite process by a finite one.
   If we are using a decimal computer having a fixed word length of 4 digits; rounding off 13.658 gives 13.66 whereas truncation gives 13.65.

4. **ABSOLUTE ERRORS:** Absolute is the numerical difference between the true value of a quantity and its approximate value.
   Thus if X is the true value of a quantity and X' is its approximate value then | X – X' | is called the absolute error.
   $e_a = | X - X' | = | Error |$

5. **RELATIVE ERROR:** The relative error is denied by,

   $E_r = | Error | / True value = | X - X' | / X$

   Where, X is true value and X – X' is error.

6. **PERCENTAGE ERROR:** Percentage error is defined as

   $E_p = 100 \, E_r = 100 \, | X - X' | / X$

## V. GENERAL ERROR FORMULAE

In general,

$$y_{n+1} = y_n + h \, f(x_n, y_n),$$

$n = 0, 1, ..., N - 1$

$Y(x_{n+1}) = Y(x_n) + h \, Y'_0(x_n) + h^2/2 \, Y_{00}(\xi_n)$

$= Y(x_n) + h \, f(x_n, Y(x_n)) + h^2/2 \, Y_{00}(\xi_n)$

with some $x_n \leq \xi_n \leq x_{n+1}$.

We will use this as the starting point of our discussion of the error in Euler's method.
In particular
$Y(x_{n+1}) - y_{n+1} = Y(x_n) - y_n + h \, [f(x_n, Y(x_n)) - f(x_n, y_n)] + h/2 \, Y''_{00}(\xi_n)$

## VI. CAUSES OF OCCURRENCE IN ERRORS
The sources of errors were poor attention and carelessness. Other possible cause of student error is poor attention. To address this issue, teacher should first consider the alignment between the instruction, student ability and the task.

## VII. REMEDIES TO MINIMISE ERRORS
1. Be careful with minus signs – the single most common source of error.
2. Check to see whether you've made a mistake if your calculations grow extremely intricate.
3. Always use your calculator to double-check any calculation.
4. Using estimations and common sense, ask yourself, "Does this solution look right?" If this is the case, double-check your work. This will significantly reduce the number of foolish mistakes in your math paper.

## VIII. CONCLUSION
The analysis of errors made by the IEC students in their term paper writing provides insights into how the academic language proficiency of students reflects important issues in academic writing namely their writing challenges and progress made in learning various academic English Skills.

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