2026 Volume: 02 Issue: 01 www.ijrpa.com ISSN 2456-9995 Research Article

International Journal Research Publication Analysis

Page: 01-17

DESIGN AND IMPLEMENTATION OF METRIC UNITS' CONVERTER

Adejumo, Samuel Olujimi*[1], Alade, Samuel Mayowa[2], Akawuku I. Godspower[3], Nwalieji O. Maureen[4], Ruphin Kusinza Byamungu[5]

Department of Cybersecurity, Nnamdi Azikiwe University, Awka, Nigeria.[1]

Department of Computer Science, Nnamdi Azikiwe University, Awka, Nigeria.[2]

Department of Software Engineering, Nnamdi Azikiwe University, Awka, Nigeria.[3]

Department of Computer Science, Nnamdi Azikiwe University, Awka, Nigeria.[4]

Article Received: 09 December 2025

Article Revised: 29 December 2025

Published on: 17 January 2026

***Corresponding Author: Adejumo, Samuel Olujimi**

Department of Cybersecurity, Nnamdi Azikiwe University, Awka, Nigeria.

DOI: https://doi-doi.org/101555/ijrpa.1820

ABSTRACT

Unit conversion occurs on daily basis in different fields of human endeavour, ranging from science, engineering, social sciences, medicine, business, building technology, education and daily tasks. The imperial system uses old-fashioned units like Inch, Yard, Foot, Mile, Pound, Ounce, Gallon, etc. to measure quantities. International System of units (SI) established a decimal system on which metric system is anchored. Conversion charts are usually consulted to manually convert from one unit of measurement to the other. These charts contain lists of equivalent measures which the user needs to memorise or keep handy. The manual unit conversion method is prone to errors, tasking and does not produce timely results. This paper aims to create a versatile and user-friendly software solution that facilitates seamless unit conversions across a spectrum of measurement domains. The system is designed to address the challenges posed by diverse unit systems, enabling users to effortlessly convert units of quantities like length, mass, volume, temperature, time data size. Object-Oriented System Analysis and Design methodology was adopted and the system was implemented using Visual Basic.net. The system's interface features input fields, dropdown menus, and buttons that simplify the user experience, making the conversion process accessible to users of all levels of expertise. The layout is designed to ensure ease of navigation and a visually pleasing experience.

KEYWORDS: Metric Units, Converter, Conversion charts, International System of Units.

INTRODUCTION

The forces driving toward a change from diverse and essentially unrelated customary systems of measurement such as the imperial system includes rapidly growing international commerce and the changing political structure of the countries of the world. Within the new national structures, it has become necessary to eradicate many incompatible ways of doing business. Moreover, the growth of scientific investigation not only created new demands for accuracy and uniformity in measurements, it also provided the vision for a universally acceptable scientific basis for a system of measurements. According to Adam (2022), Greeks, Romans, Babylonians and Egyptians made available customary systems established on unrelated objects and phenomena, with no consideration for uniformity within states, integrated communities or aggregated nations.

The modern metric system of units and standards of measurement find its root in the 17^{th} and 18^{th} century. It involved efforts to establish a simple, easily used system of measures universally acceptable to the countries of the world. The guiding principles from these efforts are: first, there were many who hoped for the definition of a single unit of measurement that could serve as the basis for the logical construction of a complete and consistent system of units of measurement; in the second place, there was a growing number of people favouring decimal relationships for the necessary units of the same quantity. That is, multiples by factors of ten or submultiples by factors of one-tenth were considered to be the desirable means of obtaining systematic units of measure that would be a convenient size for all needs (Steadman, 2022). Decimal System, Scalability and One unit of measurement for each physical quantity are the three major areas of improvement the metric system focused on compared with the imperial system.

Another problem people encounter in conversion of different units of measurement is that it does not allow a common “language” that everyone understands. As a result of this, when one person talks about length of an item using one unit, it becomes difficult for the listener to picture the actual length that is being talked about (Richer & Katharina, 2022).This can be illustrated by the following scenario: when a person from the US or another country that makes use of the imperial system says that an item weighs a 100 pounds, it is difficult for a person from Nigeria, which is used to the measurement of weight in kilogram to actually grasp the actual weight of the item under consideration. The manual procedures involved in calculating Standard Units of measurement are tedious and prone to errors.

The system defines seven fundamental units: kilogram, meter, candela, second, ampere, kelvin, and mole. Nothing inherent in nature dictates that an inch has to be a certain length, nor that a mile is a better measure of distance than a kilometer. Over the course of human history, however, first for convenience and then for necessity, standards of measurement evolved so that communities would have certain common benchmarks.

Literature has revealed that measurement is the cornerstone of qualitative research, particularly in science and other disciplines, However, little or nothing is being done in the conversion of units to various new format. This is because the existing systems are error prone, lack efficiency in unit conversion, and time consuming. The need for a metric unit conversion arises in the upsurge for efficient conversion of unit measurement in the context of finding solutions to measurement inadequacies.

The aim of this paper is to design and implement a user-friendly unit conversion system that can efficiently handle the conversion of imperial units of measurement to metric units and vice versa. While the objective of the metric-unit conversion system was designed using Unified Modeling language tools, implemented using Visual Basic programming. This paper is organized into sections. Section 2 presented the review of related works, while Section 3 described the system analysis and the methodology adopted. Section 4 presented the modules and finally, the conclusion is discussed in Section 5.

REVIEW OF RELATED WORKS

Hansen (2019), in his publication titled "Recommendations on Measurement Units: Why and How" opined that measurement unit is a well-understood and necessary concept in laboratories medicine. Without units, most quantitative laboratory examination values will not make sense and would not be comparable. On daily basis, laboratories produce, communicate, and exchange laboratory examination values to many parties. For most values, measurement units are required to make the numerical values comparable and meaningful. However, a non-systematic use of measurement units can create errors in communication between health-care providers and become a risk to patient safety. On behalf of the Committee of Nomenclature for Properties and Units (CNPU), Hansen (2019) recommended that very clear terminology of measurement units should be used for daily patient care and scientific publications. In this work, CNPU summarized the recommendations on measurement units, explaining the reasons and the principles of the measurement units used in laboratory medicine. However, Hansen's work was more of theoretical concepts and did not recommend any software solution to aid unit conversion in laboratory medicine.

Shodmonova (2021) discussed the origins of units of measurement and how people use them. It is very important from a scientific point of view to know the name, quantity, reasons for various units of measurement, who used them and what names they are called. Measurements are an integral part of human activity, and life cannot be imagined without measurements. As soon as a person wakes up early, he first estimates the time, and while drinking tea, he estimates the temperature, and distance when he goes to work or school. Measurements occur continuously, repeatedly or periodically, sometimes consciously, sometimes unconsciously. The Creator endowed man with such a wonderful, unique quality, that is, a feeling that is an invaluable gift not only for people, but for all living beings. We can understand emotions as a very complex measuring tool. However, it should be noted that knowledge of the world around us and being around us only through the senses is still not enough. For example, it is impossible to know the value of the voltage in the electrical network with the sense organs alone. To do this, we need a tool called a voltmeter and need to know the existing procedures for using this measuring tool. This publication is also more of theoretical background and does provide a software solution for seamless and timely conversion of units of measurements.

Sonali (2019) proposed an exploratory case study that attempts to identify the role of unit conversions for successful preparation for introductory science courses and also to understand how unit conversions are currently taught in schools. Additionally, the article also explored students' readiness for unit conversions in introductory college science. One topic that is a common bridge between mathematics and science is the concept of measurement and unit conversions in the metric system. The author used a mixed-methods research design: interviews, textbook analysis, student and teacher surveys, attempt to highlight the significance of the study to demonstrate scientific literacy and for preparing students to be college ready. Contents of the first chapter from ten different physics and chemistry textbooks from different publishers used in introductory college science courses were analyzed to determine how unit conversions and the metric system were presented. Finally, Sonali (2019) laid emphasis on the need to include and teach unit conversion in introductory college science courses considering the importance of unit conversion in science and related disciplines. It does suggest the design of a unit converter system to aid unit conversion by students.

Physical quantities are expressed in terms of units. However, most students have difficulties in understanding the correct method to perform unit conversion of any physical quantities. To tackle this problem, Siti et al. (2021) examined Students' Perception on Learning Unit Conversion Through a Smart Conversion Card Tool. The use of Smart Conversion Card (SCC) tool was introduced in the teaching and learning process. The paper discussed students' perception towards the effectiveness of using flashcards in Physics courses to give them better understanding of the concept of unit conversion that needs to be applied throughout the syllabus. The flashcards were distributed among students who enrolled during their first semester of study. Based on the results obtained, 84% of students managed to perform unit conversion after using the flashcards, and 70% of them improved their score in post-test questions. This work introduced the use of smart cards to enhance students' capability in unit conversion. However, an alternative solution would have been to design a unit converter application for unit conversion.

Emrah and Aslihan (2020) examined Prospective Science Teachers' Knowledge and Difficulties with Conversion. In the study, 14 questions on measurement units for length, area, volume, and mass were administered to 73 prospective science teachers. Teachers participating in the test were to answer right or wrong to the first 11 questions. The answers of these teachers were analyzed to gain insight into the reasons behind their difficulties. The findings indicated that prospective teachers' performance on unit conversion was not satisfactory because of their difficulties in conversion from ml into cm^3, gram into microgram, dm^3 into mm^3, mg into g, gigameter into nanometer, mm^2 into m^2, and so on. This study shows that prospective science teachers also have difficulties in unit conversion.

Mikula and Heckler (2013) emphasized that essential skills are prerequisite for university-level courses. In their study with engineering students, these researchers discovered that although students were supposed to have acquired basic skills to convert micrograms to kilograms and/or centimeters to nanometers, etc., before admission, they had difficulties with such essential skills. The researchers claimed that engineering students' low performance in unit conversions was worrisome, as they needed to use metric conversions routinely while solving engineering problems. The researchers underlined that as a prerequisite for problem-solving, students should have a high level of unit conversion skills of nothing less than 80% accuracy, otherwise, it will be difficult to ensure their success.

Cebesoy and Yeniterzi (2016), through the use of open-ended questionnaire, gathered data of 129 seventh grade middle school students investigated Seventh Grade Students' Mathematical Difficulties in Force and Motion Unit. The findings revealed that while solving physics problems related to force and motion units, 7th-grade students mathematically struggled with unit conversion.

Bagno et al. (2008) addressed the challenge of students' understanding of formulae in high-school physics, it was found that manipulating units were among students' difficulties in problem-solving.

Birinci and Pırasa (2010) stated that rather than making mistakes related to chemistry content, the participants in their study mostly made mathematical mistakes while answering chemistry questions as they had a lack of knowledge of mathematical concepts, including unit conversion.

In Aydın (2011) discovered that 1st year science students made mathematical mistakes in a General Chemistry II course as they had a deficient knowledge of mathematics including unit conversion. More specifically, it was identified that some of the participants made mistakes in converting milligram into gram while trying to solve a proportion/ratio problem.
Hallagan (2013) conducted another study in North-Eastern United States on prospective teachers' ability to solve conversion problems using the metric system. She highlighted that those prospective teachers had more difficulties when they encountered prefixes such as Nano and Giga, because they could not rely on their memorized prefixes. Hallagan (2013) underlined the necessity of the use of multiple methods to be able to solve the problems with confidence and to verify the solutions. She concluded that within the metric system, studying prospective teachers' solution methods of conversion problems might be a good step to achieve this. Knowing and converting between units are ability needed to be comprehended by students (Ford and Gilbert, 2013). Finally, Hallagan (2013) stated further that one of the major concerns of mathematics and science curriculum is learning the metric system.

METHODOLOGY AND SYSTEM ANALYSIS

The proposed metric unit converter was developed using the Object-Oriented Analysis and Design Methodology (OOADM), which is an approach for designing high-quality Information Systems that combine information technology, people, and data to satisfy business requirements. The system architecture and flowchart was designed to gives the ideal representation that defines the structure and views of the system as shown in Figure 2 and 3.

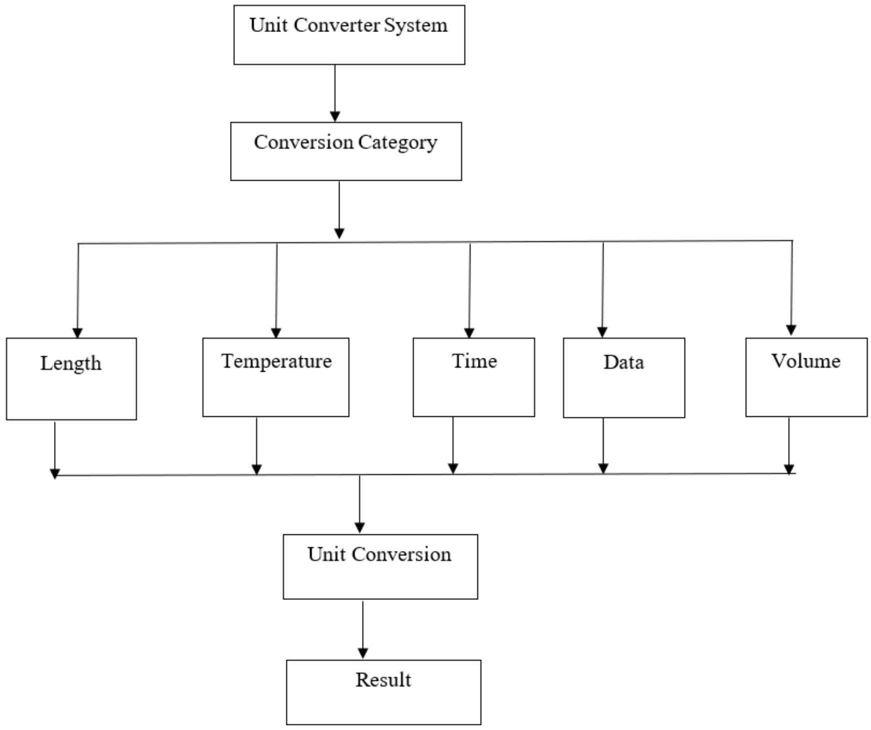

Figure 2. Proposed Model

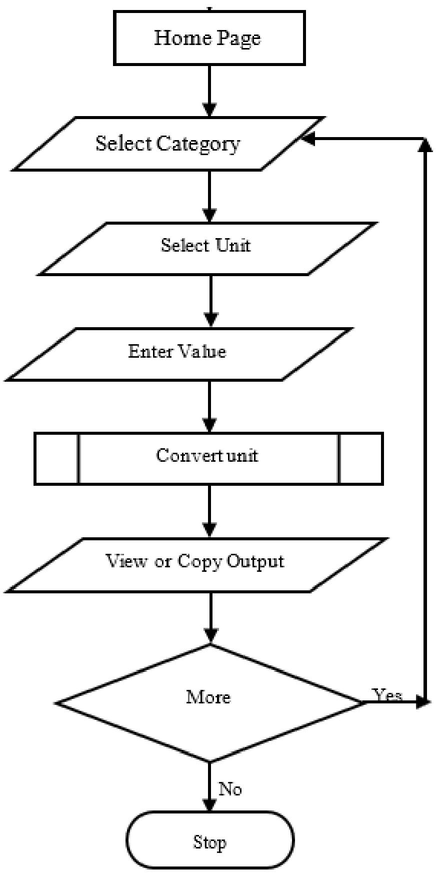

Figure 3. Flowchart for the proposed System.

Table 1. Use Case specification for the metric unit converter.

S/N	Use Case name	Use Case Description	Participating Role
1	Log in.	The staff logs in to the system using a username and password to gain authorized access.	user
2	Select conversion category	module where values related to Length are converted from one unit to another	user
3	Result	Module the supplies the result of the metric unit conversion	user

The requirements for the metric conversion system were specified using Use case as depicted in Table 1. The System specifications were designed using Unified Modelling Language (UML) tools namely Use case, Activity diagram, and Class diagram showing the design of the proposed system as shown in Figures 4, 5, and 6 respectively. The use case diagram in figure 4 illustrates the system, its typical users and the roles user perform such as login, convert, view result, etc. The activity diagram of the proposed system shows the flow of the essential activities the user is meant to carry out in the process of unit conversion as depicted in figure 5. Figure 5 describes the different activities that a user can perform when he logs into the conversion system. The activities include select conversion category, select conversion unit, perform conversion, and view result. The class diagram illustrated in Figure 6 presents the different object and classes containing its attributes and methods. The classes represented in the diagram are Login, Length, Volume, Data, Temperature, Mass Time. The class diagram provides two visibility types namely public and private. The class diagram shows the attributes and methods of the classes of the Unit Converter System. The login class handles users login while length, time, temperature, data, volume and mass classes handle unit conversion processes. Class members with parenthesis are methods while members without parenthesis are attributes (data fields).

The proposed system is Unit Converter Application (UCP) that seamlessly perform conversion of units involving both metric units and imperial units. The system abstracts a robust algorithm that performs the conversion calculations and generate accurate results in real time, without the need to consult conversion charts. The system's user-friendly interface guides the user on what type of unit conversion he intends to carry out, the user makes his choice and enters his input data, the system generates the required result at a fantastic speed. This new system Unit conversion is developed in that conversion occurs on daily basis in different fields of human endeavour, ranging from science, engineering, social sciences, medicine, business, building technology, education, etc. Unit conversion made in these various fields requires an application that will guarantee prompt and accurate results. The advantages of the proposed system far outweigh the advantages of the existing system and so it is a better solution for unit conversion in the various domains of human endeavour.

The proposed metric unit's conversion system designed was implemented using a Visual Basic.Net Programming Language. The input and output interface forms were created using the tools contained in the tool box of the IDE, while the Visual Basic code editor and debugger were utilized to code and debug the program modules and procedures. It consists of the client interface, a computer software that offer service to software application.

The metric unit conversion system was evaluated using Alpha and Beta test. This was subsequently followed by a quantitative method using a statistical approach (descriptive approach) to provide both detail and generalized analysis, which serves as the basis for result presentation.

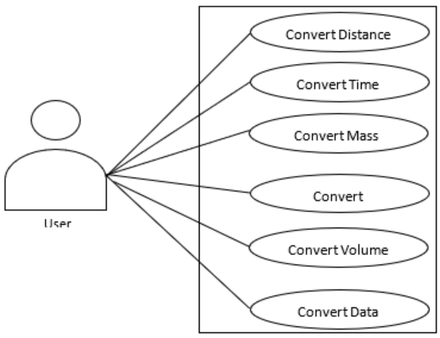

Figure 4. Use Case diagram for the metric Unit Converter

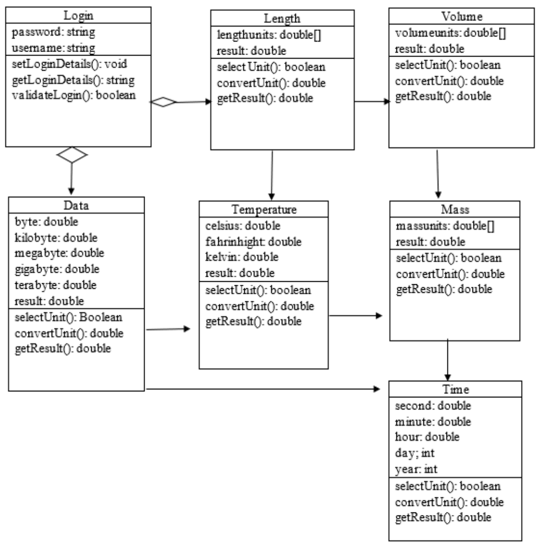

Figure 5. Class diagram of the Metric Unit Converter.

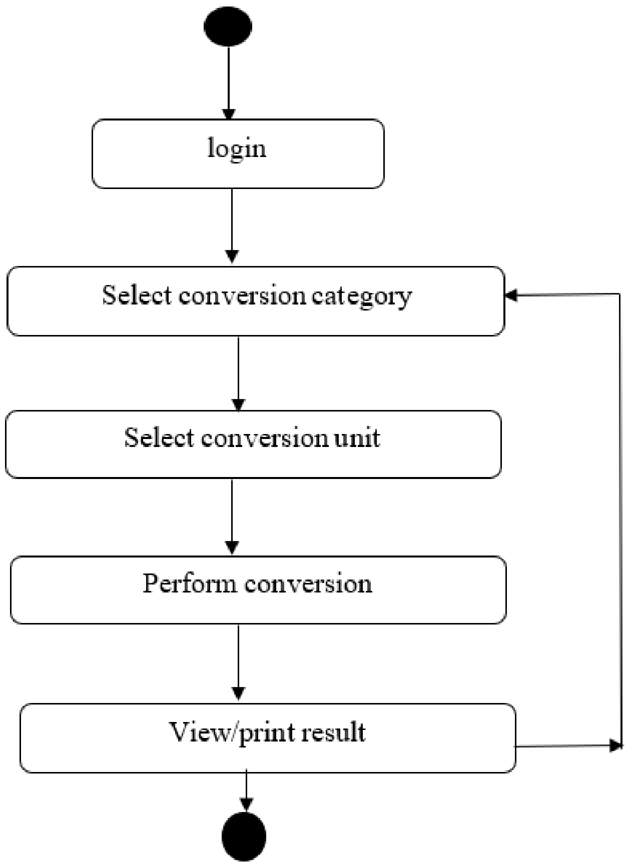

Figure 6. Activity Diagram of the Metric Unit Converter.

3.1 PROTOTYPE IMPLEMENTATION

The system design interface is discussed here and results of the proposed system will be provided using sample data to test the system result output. This was designed to be captured and viewed by the different users. The system was designed to capture different users (students, teachers, scientists, sales persons, etc) carrying out conversion task. The system consists of six program modules: Login, Home Page, Length Conversion, Temperature Conversion, Time Conversion, Mass Conversion, Volume Conversion and Data Conversion.

3.1.1 The Login page form

Figure 7 displays the Login page of the unit converter. The system will authenticate using the username and password before gaining authorized access to the application module. In the same vein, this module provides the interface for users to log in to the system and connect to the home module.

Figure 7. Login module Interface.

3.1.2 The Home Page form

Figure 8 shows the home page (main menu) of the converter system that contains buttons that link to the other modules of the system. It also contains a label that describes the title of the system and an exit button.

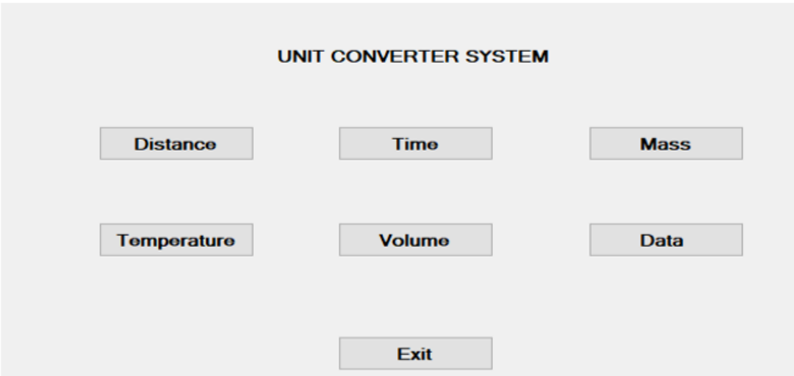

Figure 8. Home Page Module Interface

3.1.3 Length Conversion Module

This is the module where values related to Length are converted from one unit to another as depicted in Figure 9. It contains combo boxes that enable the user to select the desired units and text boxes for input value and output.

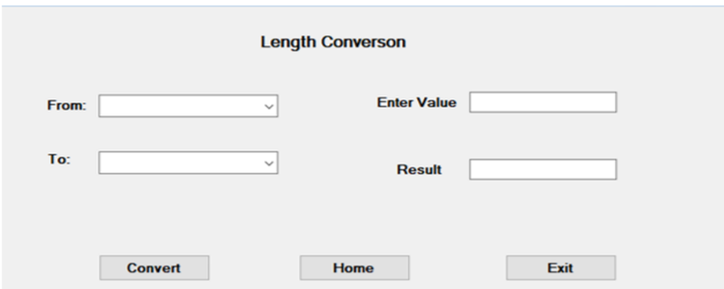

Figure 9. Length Module Interface

3.1.4 *Mass Conversion Module*

This module is a module where values related mass are converted from one unit to another. It contains combo boxes that enable the user to select the desired units and text boxes for input value and result. This is depicted in Figure 10.

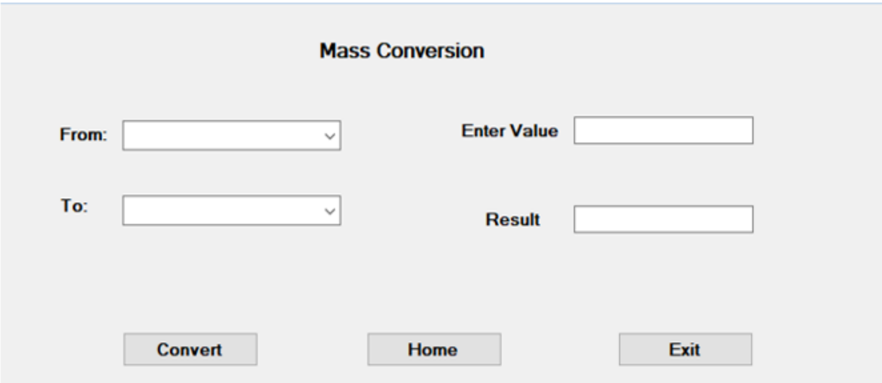

Figure 10. Mass Conversion Module

3.1.5 Temperature Conversion Module

This is the module where values related to temperature are converted from one unit to another. It contains combo boxes that enables the user to select the desired input units and textboxes to enter value and receive the desired output.

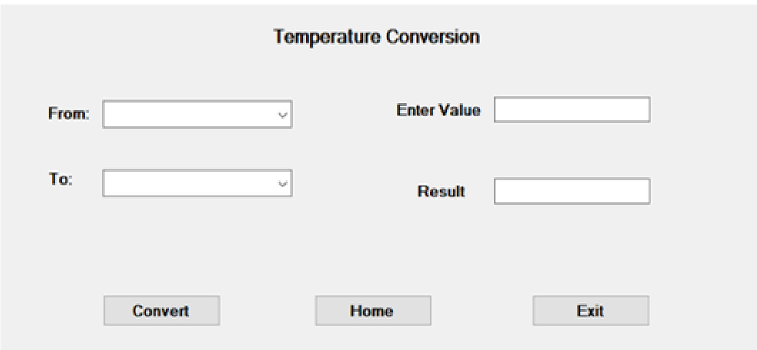

Figure 11. Temperature module

4. RESULT AND DISCUSSION

4.1 System Evaluation

The metric unit conversion system was tested using Alpha and Beta Test, and evaluated for performance based on Likert scale form. Using Decision Analysis Spreadsheet (DAS) tool and metrics such as service quality, user satisfaction, information quality, and net benefit, the system checked for performance accuracy and effectiveness. DAS is a subjective evaluation analysis technique that measures the score of the different categories of a parameter used in the assessment of the developed metric system. The tool employed is expressed as a single number in the range 1 to 5, where 1 refers to the lowest perceived quality and 5 is the highest perceived shown in Table 2. Respondents' responses are presented in Table 3.

Table 2. Rating Scheme of the Decision Analysis Spreadsheet

No.	Weight	Quality
1.	5	Excellent
2.	4	Good
3.	3	Poor
4.	2	Fair
5.	1	

The respondents' evaluation of the quality of the system is reflected in the frequency features. Table 4 showed that 30% of respondents used the system well, while seven (7) respondents, or almost 70%, used it excellently. But none of the respondents assigned scores according to the other ratings. 78.33% of all respondents, however, stated that they intended to use the metric unit converter system. After using the system, 73.33% of the respondents provided a reliability score, indicating that it consistently yields reliable findings. According to the evaluation, the system created is usable, as evidenced by the 83.33% availability rate. When respondents used the designed system, their response rate was 76.67% as shown in Table 3. This demonstrates that when users (students, tutors, scientists) use the metric system, it is deemed appropriate and sufficient to fulfill the requirements.

Table 3. Evaluation ratings of the Usability

Features	Excellent	Good	Fair	Poor	Bad	SoR	SoP	Avg	CWP
Usability	7	3	_	_	_	10	47	4.70	78.33%
Reliability	4	6	_	_	_	10	44	4.40	73.33%
Availability	10	_	_	_	_	10	50	5.00	83.33%
Response Time	8	1	_	_	_	10	47	4.70	78.33%
Satisfaction	6	4	_	_	_	10	46	4.60	76.67%
Average	7	2.8	-	-	-	10	46.80	4.68	77.99

In a similar vein, 78.33% of respondents who used the system said that it was better than using a manual conversion chart. Overall, respondents gave the metric unit converter quality an average rating of 76.67%. This indicates that standard criteria and requirements were met by the designed system. Furthermore, Cumulative Weighted Percentage (CWP) vs the rating parameters is shown in figure 12. The frequency of the metrics indicates the degree of system quality as judged by the users.

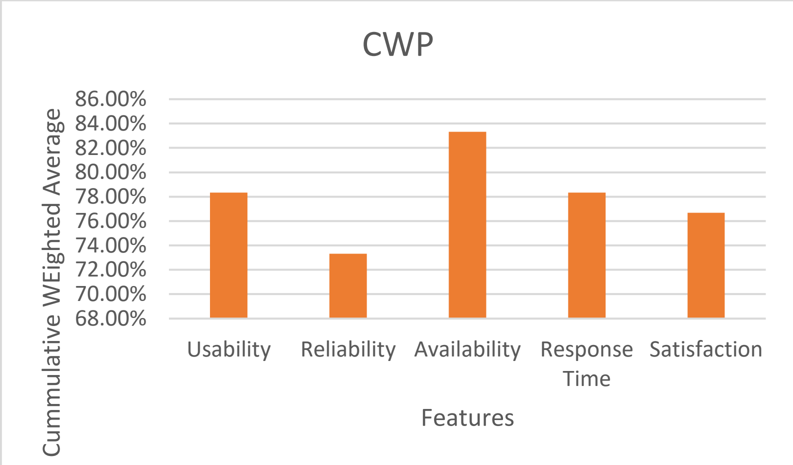

Figure 12. Chart showing the quality of the Metric Unit system.

Table 4. System Evaluation Rating of the Information Quality

Features	Excellent	Good	Fair	Poor	Bad	SoR	SoP	Avg	CWP
Accuracy	7	2	1	_	_	10	49	4.9	81.67%
Timeliness	8	2	_	_	_	10	46	4.6	76.67 %
Trustworthiness	8	2	_	_	_	10	48	4.8	80.00%
Completeness	1	9	_	_	_	10	41	4.1	68.38 %
Easy to Understand	9	1	_	_	_	10	47	4.9	81.67 %
Relevance	8	2	_	_	_	10	48	4.8	80.00%
Average	6.83	3.00	0.17	_	_	10	46.50	4.68	78.05%

According to the evaluation scheme presented in Table 4, information quality assesses the content problem so that the generated application system is accurate, secure, comprehensive, relevant, personalized, and simple to understand. Table 4 presents the findings from the assessment of the constructed system with respect to information quality. The score table is shown to support each respondent's unique viewpoint and attitude on the calibration of the data in the metric unit system that was created as illustrated in Figure 13.

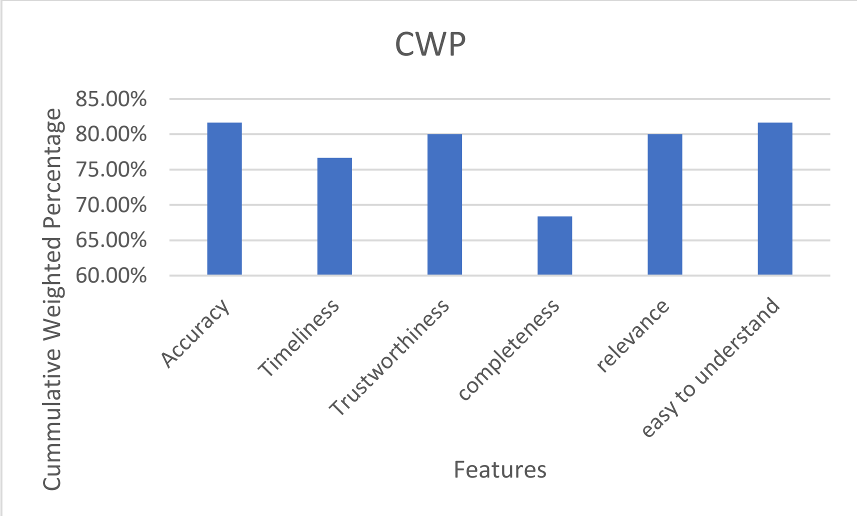

Figure 13. Graph showing the information quality rating of the Metric unit converter.

System and information quality can have a separate or combined impact on system usage and user satisfaction. Table 5 illustrates the extent of use of the developed metric unit system, which is 94.80%. This procedure demonstrates how well the users in need has adapted the suggested metric unit converter. Nonetheless, a noteworthy system rating of 78.05% is obtained from the respondent's usage of the system. This shows that the quality of the system affects how it is used. As a result, the evaluation illustrates, user happiness is directly tied to the degree of metric unit converter utilization. Furthermore, 94.80% of the results gathered using the proposed system indicated a pleasant experience.

Table 5. System Evaluation Rating of the Usage

Features	Excellent	Good	Fair	Poor	Bad	SoR	SoP	Avg	CWP
Ease of Retrieval	8	1	1	_	_	10	47	4.70	94%
Ease of Navigate	9	1	_	_	_	10	49	4.90	98%
Nature of Use	7	3	_	_	_	10	47	4.70	94%
Number of Transaction	7	3	_	_	_	10	47	4.70	94%
Responsive	9	1	_	_	_	10	49	4.90	94%
Avg	7.80	1.80	0.20	_	_	10	47.40	4.74	94.80%

5 CONCLUSIONS

Computers play a vital role in the development of any work. It is a fact that computer can tackle many complex problems faced by man and process very voluminous task within a small period which otherwise could be complicated and result to time wastage. Computerization allows dissemination of information to the appropriate people. Thus, the application of computer in any system helps in the rapid processing of its data.

In this paper, a computer-based Unit Converter System called the metric unit converter has been developed for public use. The application of an automated system for measurement conversion provides a solution to human error due to miscalculations, delay, time consumption and untimely result, which is inherent in the current conversion. The system will be relevant for application in various fields of human endeavour, ranging from science, engineering, social sciences, medicine, etc. The computer-based unit converter System should be adopted for unit conversion in our schools. Further work on the system could be web-based for global access. However, the metric unit converter is limited to unit conversion involving length (distance), time, mass, temperature, volume, and data size. There is therefore need for further research on this work covering other areas of measurements.

REFERENCES

1. Adam, A. (2022).Imperial Units: History, Measurements and Facts. *www.britannica.com*.
2. Steadman, G. (2022). History of the Metric System. *www.metricmetal.com*.
3. Richter, F., & Katharina, B. (2022). Imperial vs. Metric. *www.statista.com*.
4. Aydın, A. (2011). Fen Bilgisi ogretmenligi ogrencilerinin bazi matematikkavramlarina yonelik hatalarinin ve bilgi eksiklerinin tespit edilmesi [Identifying Science Teaching students' misconceptions and knowledge deficiencies regarding some mathematical concepts]. BAU Fen Bilimleri Enstitusu Dergisi [BAU Journal of Institute of Science], 13(1), 78-87.
5. Bagno, E., Berger, H., & Eylon, B.S. (2008). Meeting the challenge of students' understanding of formulae in high-school physics: A learning tool. Physics Education, 43(1), 75-82.
6. Birinci, K.K., & Pırasa, N. (2010). Sinif ogretmenligi adaylarinin mol kavramindaki islem becerilerinin belirlenmesi [Determination of the process skills of the prospective primary teachers' regarding mole concept]. Cukurova University Faculty of Education Journal, 38(3), 150-161.
7. Cebesoy, U.B., & Yeniterzi, B. (2016). 7th grade students' mathematical difficulties in force and motion unit. Turkish Journal of Education, 5(1),18-32.

8. Mikula, B.D., & Heckler, A.F. (2013). The Effectiveness of Brief, Spaced Practice on Student Difficulties with Basic and Essential Engineering Skills. In 2013 IEEE Frontiers in Education Conference (FIE). pp. 1059-1065.
9. Hallagan, J.E. (2013). Preservice mathematics teachers' solutions to problems: Conversions within the metric system. Systemics, Cybernetics and Informatics, 11(7), 15-20.
10. Emrah, O.D and Asliham, O. (2020). Dealing with Metric Unit Conversion: An Examination of Prospective Science Teachers' Knowledge of and Difficulties with Conversion. International Council of Association of Science Education, 29(3);174-182.
11. Hansen, Y.B.L. (2019) Recommendations on Measurement Units - Why and How. EJIFCC. 2019 Oct 11;30(3):250-275. PMID: 31695584; PMCID: PMC6803776.
12. Shodmonova S.B. 92022). Thoughts on the origin of units of measurement and their use by humans. EPRA International Journal of Research & Development (IJRD),7 (2):40-43. DOI: 10.36713/epra2016 .
13. Sonali, R. (2019). Utility of Metric Conversion for Success in Introductory College Science Courses. Journal of Curriculum and Teaching, 8 (2);32-42. http://jct.sciedupress.com.
14. Siti N. R, Azlina B and Dzeelfa, Z. A. (2021). Students' Perception on Learning Unit Conversion Through a Smart Conversion Card Tool. Proceedings of the International Conference on Applied Science and Technology on Social Science (ICAST-SS 2020). Series: Advances in Social Science, Education and Humanities Research. 448-451. https://doi.10.2991/assehr.k.210424.087.