

International Journal of Multidisciplinary Comprehensive Research

Content Analysis of Life Skills in the 8th Grade Mathematics Textbook of NCERT

Dr. JN Baliya ¹, Seema Rani Thappa ^{2*}, Parinka Sharma ³, Mohd. Asif ⁴, Sarvesha ⁵

¹ Head, Department of Educational Studies, Central University of Jammu, Jammu & Kashmir, India

^{2,3} Research Scholar, Department of Educational Studies, Central University of Jammu, Jammu & Kashmir, India

^{4,5} M.Ed. Students, Department of Educational Studies, Central University of Jammu, Jammu & Kashmir, India

* Corresponding Author: **Seema Rani Thappa**

Article Info

ISSN (online): 2583-5289

Volume: 02

Issue: 03

May-June 2023

Received: 25-04-2023

Accepted: 10-05-2023

Page No: 01-06

Abstract

Life skills Mathematics is the study of mathematical concepts as they are used in the real world. It seeks to give students the mathematical tools they will need in their personal and professional life by concentrating on issues like money, statistics, data management, length, and angles. The present study explored the life skills reflected in the content of the mathematics textbook for grade 8th as prescribed by NCERT. The content analysis was done mainly from six broad units i.e., Arithmetic, Algebra, Discrete Mathematics, Statistics and Geometry. According to the findings, the mathematics textbook may have a hole in its coverage of self-awareness as a life skill. Also, it can be seen from the textbook's introduction, illustrations, examples, and exercise questions, some units do place an emphasis on empathy, critical thinking, problem-solving, and creative thinking. However, coping with stress is one of the least reflected skills in the textbook, receiving only a little amount of coverage throughout a small number of sections. Hence, the textbook must include content and examples that are pertinent to the topic at hand in order to assist students in developing good techniques for life skills in students' personal and professional life.

DOI: <https://doi.org/10.54660/IJMCR.2023.2.3.01-06>

Keywords: Drafting of Qanun, Implementation of Public Order, Security and Peace

Introduction

The key objective of mathematics education in school is to mathematise child's mental processes (NCERT, n.d.). As per David Wheeler (1982), Mathematics is an important subject in our life. Its use can be found in every subject or career. Mathematics is the study of the logic of shape, number, and order (Edeh Samuel Chukwuemeka ACMC). Modern life consistently necessitates having solid mathematical skills. For our daily lives and from every study angle, mathematics is a crucial tool that promotes overall personal development. However, in order to receive a high moral education, students need to be aware of the knowledge in specialised branches of mathematics. Mathematics plays an important role in how students are influenced and achieve better results in the educational system. Making use of mathematics makes life simpler and more organised, preventing confusion and disorder. Problem-solving, creativity, critical thinking, reasoning ability, and effective communication are some of the traits, attributes, and skills that mathematics fosters. There are numerous uses for mathematics in the natural world, in business, in finance, in technology, especially in the sciences, and elsewhere. In genetics, mathematics is also applied, and hypothesis tests are used in statistical analysis. We created an interest in mathematics to preserve the standard of schooling. We always use mathematics in our daily lives because it is the key to success in all fields. For technical approaches, it is vital to guide and train all types of people, including pupils. The basic knowledge of mathematical abilities and the study of technical domains will enable students and people to find appropriate professions and be a member of the success market. Those who participate in contests and learning processes have a solid knowledge and skills in mathematics, which is required and the base for technical studies education (Khan & Salman, 2020) ^[6].

Math is present in everything we do. It is the foundation for everything we use every day, including mobile devices, computers, software, ancient and modern architecture, art, money, engineering, and even sports. Most people think of mathematics as calculations and complex formulae used in school. Mathematics, on the other hand, is clearly one of the most widely used languages, with applications in virtually every part of our lives. The study of technical subjects and proficiency in mathematics can help students succeed in the job market and obtain employment. It is crucial to encourage primary school students and secondary school students to actively seek out new information when learning mathematics. Participants in the learning process will have a better understanding of mathematics, which is the foundation for the study of technical subjects (Hodaňová & Nocar, 2016) ^[5]. The majority of pupils are curious as to why they must master certain mathematical principles. Most of the time, teachers struggle to relate their lessons to real-world situations because their examples are too advanced for most students. Most people consider mathematics to be the driest subject in school since it consists of repetitive, challenging, dull, obscure, and irrelevant calculations that have nothing to do with creativity or imagination (Dahiya, 2014) ^[3].

The teaching of these general life skills is the foundation of life skills education. Life skill education is a value-added curriculum that teaches students how to make healthy decisions that lead to a meaningful life. Adolescents can use it to evaluate their abilities, skills, and developmental areas

and to better understand who they are. The primary goal of life skill education is to help students build a sense of themselves as valuable individual.

The Central Board of Secondary Education (CBSE) in India has made life skill education a required component of its curriculum in recognition of the need to enhance both co-scholastic and academic areas. Thus, life skills are essential to our personal, as well as social and emotional, development. Additionally, it must be made available to all young people in order for them to live happy and fulfilling lives.

Life skills refer to the abilities and knowledge that individuals need to effectively manage daily tasks and challenges. Mathematics plays a crucial role in developing life skills as it enables individuals to make informed decisions, analyze data, and solve problems. Mazrouei and Hajri (2016) explored the relationship between mathematics and life skills and how mathematics education can promote the development of life skills. The authors argued that mathematics education provides individuals with important life skills such as problem-solving, critical thinking, logical reasoning, and decision-making. These skills are necessary for individuals to succeed in their personal and professional lives. For example, individuals need to be able to analyze data and make informed decisions when managing their finances, planning a trip, or purchasing a home. In conclusion, the introduction of life skills in terms of mathematics is essential as it helps individuals develop the skills and knowledge necessary to effectively manage daily tasks and challenges.

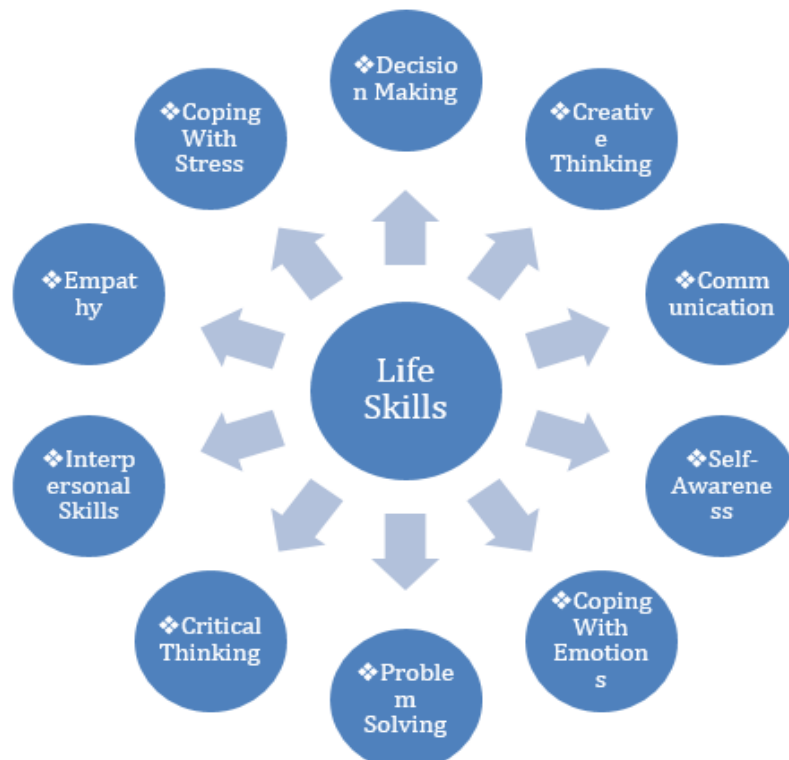


Fig 1: Depicting the ten different life skill

Mosvold (2005) ^[9] in their study found for teaching of mathematic teachers are still using conventional method by referring to the basic textbook. Such methods of teaching have not been encouraged within the teaching of mathematics that solves the real-life problems. Life skills are the abilities that help us to refine/enhance our thoughts and ideas and develop optimistic attitude in our personality. Life skills are

aptitudes and abilities that enable people to tackle challenges head-on and carry out daily tasks efficiently. Life skills are important to improve and strengthen life so that potential is used fully and effectively (Meenu & Rani, 2021) ^[8]. The goals and content of life skills education vary from nation to nation and from locality to locale. Nevertheless, across cultures Education in life skills is comparable in three crucial

areas. First, mastering life skills is at the core of life skills education. Second, life skills education is focused on a child-centered and activity-oriented model to help kids learn and practise skills. Finally, life skills instruction is grounded in the idea that youth should be enabled to take on more responsibility. Life skills have been defined as "abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life" (WHO 1993). The creation of educational curricula for schools has made it easier for people to learn life skills. The analysis of multiple interventions based on this methodology has shown key life skills that are being taught to support children's and adolescents' health and wellbeing. These skills are:

Hodanova and Noear (2016) in their research work indicated that mathematics is a crucial subject that deserves more attention and importance in education. In general, the study offers valuable insights into the importance of mathematics in modern society. On the other hand, in other research study it is revealed that most students scored below average on the test Pandey (2017).

Szabo *et al* (2020) in their study explored how to support the development of sustainable 21st-century skills using problem-solving strategies in mathematics education. The study found that problem-solving strategies in mathematics education can help students develop sustainable 21st-century skills, such as critical thinking, creativity, and collaboration.

Bani and Al-khataybeh (2022) ^[1] found that the content of the English language books for seventh grade included all areas of life skills but with varying percentages as the effective communication achieved the highest percentage of 35.82% and the lowest (empathy) with a percentage of 5.38%. Whereas, Manimozhi (2021) ^[7] discovered that teaching competency dimensions more impact the 6th standard mathematics school textbook.

In one of the studies, Prajapati, Sharma & Sharma (2017) ^[11] suggested that life skills education should be integrated into the regular school curriculum and delivered daily by a life skills trainer/teacher/counsellor to improve students' mental health, equip them with better adapted skills to face the challenges of changing life situations, and empower them to become fully functioning contributors to the host society and the world in general.

The age group of 8th class students lies between 12-14 years. This is the period of starting of teenage, a stage of growth and

development, characterized by rapid physiological changes and psychosocial maturation. They are now capable of abstract thinking, better articulation and of developing an independent ideology. But it a period of conflicts also. The inability to tackle emotional pain, problems, negative thoughts, and attitude, how to maintain healthy interpersonal relationship and anxieties about the future are often the driving force for high-risk behaviour. So, life skills are important for students so that they become aware about their potential, about their strengths and weaknesses. They have ability to make decision independently and rightly. They get aware how to tackle with stress and problems whenever they face effectively. Thus, considering the significance as discussed above, the researcher chooses life skills as a field of study to analyse whether these life skills are implemented in the content of textbook of 8th grade of Mathematics prescribed by NCERT. The reason being choosing mathematics subject as a field of study as mathematics plays a vital role in all aspects of life, whether in everyday matters such as time tracking, driving, cooking, or jobs such as accounting, finance, banking, engineering, and software. These functions require a strong mathematical background. Without numbers and mathematical evidence, we cannot resolve any issues in our daily lives.

Research Question

The research question of the present research study is as under:

To what extent the content of Mathematics textbook of grade 8th prescribed by NCERT reflects life skills in it.

Objectives of the Study

The following are the objectives of the present research study as under:

1. To study the representation of following life skills:

- 1) Self-awareness
- 2) Empathy
- 3) Critical thinking
- 4) Creative thinking
- 5) Problem solving
- 6) Coping with stress

In the content of 8th grade mathematics textbook prescribed by NCERT.

3. To suggest the educational implications from the findings of study.

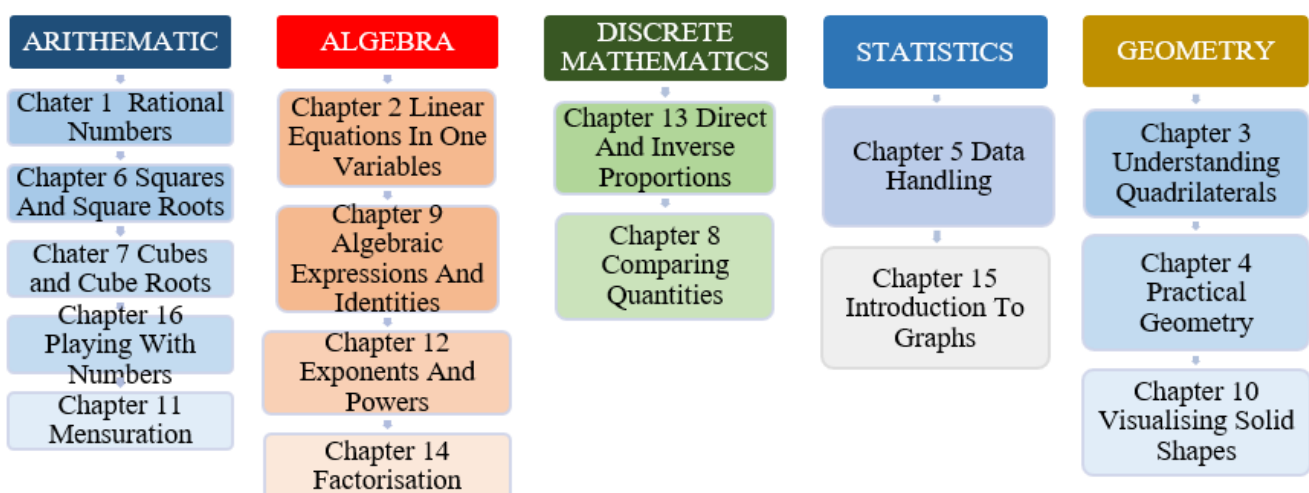


Fig 2

Methodology

Criteria for the selecting content

For the selection of content, the investigator has randomly selected minimum one chapter from each broad section of the 8th grade mathematics textbook prescribed by NCERT which is describe as below:

Method Adopted for Analysis of Data

Manifested Conceptual Content Analysis method was adopted for analysis of content present in the mathematics textbook of 8th.

Scheme of Analysis

Since the goal of the study is to examine how the content of eighth-grade mathematics reflects the application of life skills, content analysis is carried out by breaking it down into manageable categories i.e., introduction, definition, picture, example question and exercise question and each category was analysed based on definitions of each life skill defined by WHO based for the aim of examining their reflection in the content of the mathematics textbook. Then, each section and question were examined and assigned to a category. The data acquired following a systematic and detailed assessment and analysis of the content of the NCERT Mathematics textbook for class 8th was determined to be solely qualitative in character.

Analysis and Interpretation of Data

Table 1: Representation of 'self-awareness' in Mathematics textbook of 8th grade

Unit No.	Name of unit	Frequency
13	Direct & inverse proportion	2
Total		2

As per the data reflected in table 1 revealed that the content of textbook is less focussed towards life skill of self-awareness as only two times in one unit no. 13 out of five selected units has manifested within the content of mathematics textbooks for the skill of self-awareness among students.

Table 2: Representation of 'empathy' in Mathematics textbook of 8th grade

Unit No.	Name of unit	Frequency
1.	Rational numbers	8
5.	Data handling	7
10.	Visualising solid shapes	2
13.	Direct & inverse proportion	11
14.	Factorisation	8
Total		36

The data shown in the table 2 reflects that the skill of empathy is more manifested in the arithmetic and discrete mathematics having unit number 1 and unit number 13 in various things like introduction, pictures, examples, and exercise questions in various aspects of empathy such as understanding others, accepting other point of view, social interaction etc.

Table 3: Representation of 'critical thinking' in Mathematics textbook of 8th grade

Unit No.	Name of unit	Frequency
1.	Rational numbers	44
5.	Data handling	35
10.	Visualising solid shapes	19
13.	Direct & inverse proportion	25
14.	Factorisation	26
Total		149

As per the Table 3, the critical thinking life skill is reflected almost in all units of the selected units under five different broader section of the 8th grade mathematics. It is evident that the content analysis supports critical thinking and is the third most frequently indicated life skill with respect to all other five selected life skills. So, it is discovered that numerous chances are given to students to objectively study facts and experiences, to identify and evaluate the elements that affect attitudes and behaviour, such as values and peer pressure, in the eighth-grade mathematics textbook.

Table 4: Representation of 'CREATIVE THINKING' in Mathematics textbook of 8th grade

Unit No.	Name of unit	Frequency
1.	Rational numbers	14
5.	Data handling	5
10.	Visualising solid shapes	5
13.	Direct & inverse proportion	5
14.	Factorisation	7
Total		36

The data shown in table 4 reflects that the maximum creative thinking has been shown in the content of Rational numbers in the mathematics textbook of 8th grade. The other units like data handling, visualising solid shapes, direct & inverse proportion and factorisation are also focusing on the creativity task in the introduction, pictures, examples and exercise questions.

Table 5: Representation of 'PROBLEM SOLVING' in Mathematics textbook of 8th grade

Unit No.	Name of Unit	Frequency
1.	Rational numbers	46
5.	Data handling	41
10.	Visualising solid shapes	34
13.	Direct & inverse proportion	39
14.	Factorisation	58
Total		218

The data shown in Table 5 reflects that the textbook material is more heavily weighted towards problem-solving as a life skill in all the units that were selected through some pre-formulated criteria. Further, this also discovered that it is the most reflected life skill in the content of the mathematics textbook of 8th grade. Moreover, it is also conclude that the problem solving life skill has mostly manifested in the factorisation unit of the content of 8th grade mathematics textbook.

Table 6: Representation of ‘COPING WITH STRESS’ in Mathematics textbook of 8th grade

Unit No.	Name of unit	Frequency
5.	Data handling	1
13.	Direct & inverse proportion	2
14.	Factorisation	2
Total		5

Table 6 reflects that a few units of the content of the mathematics textbook is focussing on the life skill of coping with stress as it is only reflected five times in the selected units. There is less focus given to life skills of coping with stress in the Mathematics textbook of class 8th.

Table 7: Cumulative Frequency Percentage of Selected Life Skills

S.no	Specific Life Skill	Frequency	Percentage
1.	Self-Awareness	2	00.45

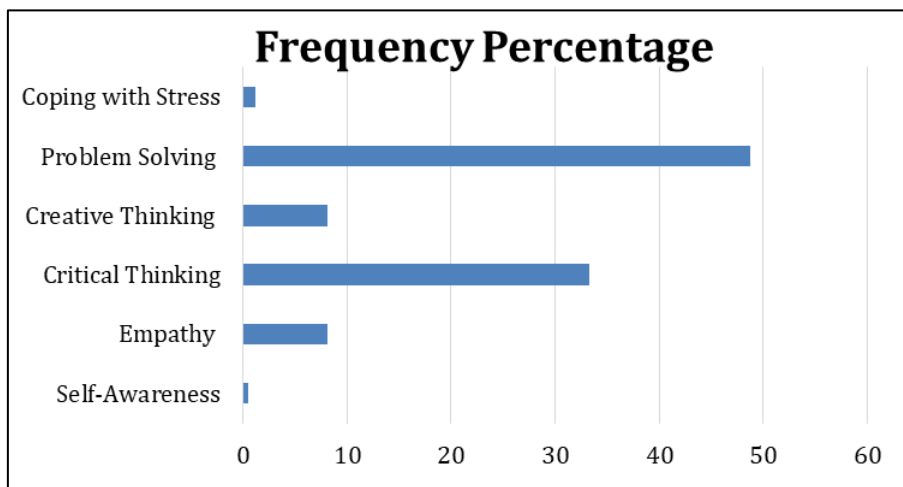


Fig 2: Representing the cumulative percentage of frequency of selected life skills

Findings and Discussion

The findings of the study revealed that the content of the mathematics textbook is less focused on the life skill of self-awareness and empathy which indicates that a potential gap in the coverage of these two life skills in the content of 8th grade mathematics textbook. Furthermore, it also discovered that the content of 8th grade mathematics textbook emphasised on the life skill of problem solving and critical thinking. The findings indicated that the textbook prioritizes creative thinking as a life skill in one unit, with examples in the introduction, pictures, and exercise questions. However, overall, the other units have less emphasis on creative thinking, with limited opportunities to appreciate student creativity. With the insights from the data, the findings of the suggest that coping with stress as a life skill is given less attention within the content of the textbook with only a few occurrences in the selected units. It is also one of the least reflected life skills in the mathematics textbook, indicating limited focus on this skill in the selected units.

Suggestive Recommendations and Conclusion

On the basis of the main findings some of the suggestive recommendations of the present research work includes:

- Increase focus on self-awareness, empathy, critical thinking, and creative thinking in the mathematics textbook through relevant content, examples, and

2.	Empathy	36	08.05
3.	Critical Thinking	149	33.33
4.	Creative Thinking	36	08.05
5.	Problem Solving	218	48.77
6.	Coping with Stress	5	1.12
Total		447	

In the Table 7, the data of the content analysis discovered that problem solving is one of the most reflected life skills among other five life skills which is followed by critical thinking in the 8th grade mathematics textbook. On the other hand, both creative thinking and empathy are third most cited life skills as per frequency analysis of the various aspects within the chapter like introduction of the content or topic, examples, exercise questions and pictures. Further, other two life skills namely self-awareness and empathy are two life skills which are least cited in the content of 8th grade mathematics textbook.

exercises.

- Prioritize problem solving as a life skill in all units of the textbook and provide diverse opportunities for students to develop their problem-solving abilities.
- Incorporate relevant content and examples to help students develop effective coping strategies for dealing with stress in the content of mathematics.
- Motor skill based pedagogical transaction to be

The study indicates that the mathematics textbook lacks comprehensive coverage of self-awareness as a life skill, potentially indicating a gap. The textbook does emphasize empathy, critical thinking, problem solving, and creative thinking in some units, as evident from the introduction, pictures, examples, and exercise questions. However, coping with stress receives minimal attention, with limited occurrences in the selected units, making it one of the least reflected skills in the textbook. These findings highlight discrepancies in the coverage of various life skills in the mathematics textbook, suggesting room for improvement in certain areas.

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