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Designing Problem-Solving Module Based on Computational Thinking in Mathematics Education: Nominal Group Technique Approach

Shivaraj Subramaniam
National University of Malaysia, Education Department, Bangi, Selangor, Malaysia

Siti Mistima Maat, Muhammad Sofwan Mahmud
National University of Malaysia, Research Centre of Teaching and Learning Innovation, Faculty of Education, 43600 Bangi, Selangor, Malaysia.

Abstract
This article examines the Nominal Group Technique (NGT) as an alternative strategy for designing a module in problem-solving in mathematics education based on computational thinking for teachers. Researchers have used this strategy to address the issue of teaching methods for resolving issues in the area of measurement among teachers. The expert recommendations' summary results have determined 24 elements and three components that should be integrated into the module on solving problems teaching. Additionally, the study's results demonstrate how the NGT approach assisted researchers in obtaining element validation swiftly and effortlessly because the elements were created through literature reading, followed by discussion and expert consensus voting. It is recommended to conduct future research with specific model approach experts to solve problems with teaching methodologies.
Keywords: Nominal Group Technique, Mathematics, Computational Thinking, Problem-Solving Skills

Introduction
Mathematical problem-solving skills are crucial in the modern 21st century world as they help individuals solve problems in engineering, finance, computer science, physics, etc. Moreover, mathematical problem-solving skills are essential in everyday life since they help individuals make personal finances, shopping, and even health-related decisions (Marquez, 2022). In recent research studies, it has been presented that students with excellent mathematical problem-solving skills are more likely to excel in their studies than those who lack the same skills (Firmansyah & Syarifah, 2023). Mathematical problem-solving skills are critical in developing critical thinking skills in individuals, which help them analyse problems and develop creative solutions. This statement was proven in the study by Saputra et al (2019), which discovered that mathematical problem-solving skills significantly predicted students' critical thinking abilities.

Besides that, these skills are crucial aspects pertaining to the new mathematics GCSE in the United Kingdom (UK). Hence, we must prepare our students with the skills to engage in such problems, particularly mathematics (Bradshaw & Hazell, 2017). These skills allow students to improve skills that may be employed in diverse contexts, including in mathematics classes and beyond. Primary students must develop these skills to be successful future mathematicians not only in the place where they study but in the future regarding their workplace. Employers value individuals who possess advanced mathematical problem-solving skills. For example, a study by the National Association of Colleges and Employers (NACE) concluded that analytical and problem-solving abilities were qualities that employers demanded the most in the workplace (National Association of Colleges and Employers, 2018). Therefore, it is clear that mathematical problem-solving skills are essential in various areas of life, from academics to the workplace.

Developing mathematical problem-solving abilities also requires the development of sub-skills like computational thinking skills (Su & Yang, 2023). Hence, to succeed in solving mathematical problems, students need to concentrate on and develop these supporting abilities to stay competitive in the current world. There is a substantial relationship between problem-solving skills as well as computational thinking skills (Doleck et al., 2017). Problem-solving skills guide students in understanding and solving problems using mathematics. On the other hand, computational thinking skills assist students in utilising the pattern of thinking as a computer. Together, these skills allow students to solve problems in various contexts. As per Wing (2006), computational thinking is "an approach of solving problems, designing systems, as well as considering human behaviour that draws on concepts fundamental pertaining to computer science. Moreover, computational thinking involves using patterns of thinking as computer and mathematics to solve problems (Benakli et al., 2017). Students need to establish computational thinking skills because they will apply them in many areas of their lives, including their careers. Additionally, computational thinking skills are significant for students because they help them to

1. Think critically and solve problems using mathematics.
2. Think creatively and solve problems using computers.
3. Think outside the box and solve problems using mathematics.
4. Think strategically and solve problems using computers.

The phrase computational thinking is made popular by Wing (2006). In her seminal article with regard to computational thinking, the author opined that computational thinking "resembles a universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use" (p. 33). Furthermore, computational thinking skills aid teachers in helping students to solve problems using skills they have never been able to solve before. This leads students to solve more difficult computational thinking skills better and fast. They also can apply multiple computational thinking skills to engage in computational practices in problem-solving. Note that computational thinking requires students to use thinking as a technological tool to resolve problems using four techniques.

Decomposition
Decomposition in mathematics represents breaking down a problem into smaller, more manageable parts to solve it more effectively. It involves identifying a complex system or

task's key components and breaking them down by functionality or sequence (National Research Council, 2011). This approach is particularly useful for dealing with large or complicated problems, as it allows them to be tackled one step at a time and for identifying the tools and techniques needed to solve each individual part. Overall, decomposition is a crucial aspect with respect to computational thinking and is essential for developing effective solutions to complex mathematical problems.

Abstraction
In mathematics, abstraction refers to removing specific details and generalizing concepts or ideas to create more abstract and universal theories or definitions. This allows mathematicians to work with complex concepts and ideas that may not have direct physical manifestations, providing a framework for understanding and manipulating abstract ideas logically and systematically (Wing, 2006). However, this concept of abstraction is not unique to mathematics, as it is also used in computer science, engineering, and various other fields where complex ideas must be simplified for efficient problem-solving.

Patter Recognition
Finding patterns involves comparing and contrasting small, previously decomposed components of the problem in order to address a more complicated problem more effectively. It is crucial for individuals to have the capacity to recognize patterns since the more patterns they can detect, the simpler and faster it will be for them to solve problems (Alfayez, 2018). Additionally, people might discover patterns in a variety of issues.

Algorithm
The algorithm considers students' aspirations, financial aid, and college choices to make a suitable decision. An algorithm refers to a set of steps students can use to solve problems. Algorithms can be written in a variety of different languages, and they can be applied to solve a variety of different types of problems (Csizmadia et al., 2015). Whatever the talent, if it is not delivered correctly, it cannot accomplish the goal. Based on that concept, teachers are the primary agent in this computational thinking in solving problems. To properly apply computational thinking in problem-solving in mathematics education, teachers should employ a variety of approaches.

This scenario becomes more critical when teachers lack computational thinking abilities (Chalmers, 2018). When teachers lack computational thinking abilities, they cannot effectively incorporate technology into teaching problem-solving in mathematics. Note that computational thinking refers to the ability to assess and resolve complex problems utilising various techniques. The digital toolset has become an increasingly important aspect of everyday life in primary education. Hence, it is essential that teachers possess these skills. Without these abilities, teachers may struggle to integrate technology into lesson plans or provide students with the necessary skills to solve problem-solving questions. Not only that, but teachers will have difficulties if they lack the tools or resources necessary for computational thinking in mathematics. This claim is reinforced by authors stating that teachers who do not prepare students with relevant guidelines or references lead, such as modules, will affect the students understanding (Imberman et al., 2014). This is because the teachers use computational thinking based on their understanding, which may not be accurate. Other than that, students who are required to use a different method of applying computational thinking to mathematics problems will be impacted by this situation. Therefore, teachers must have supportive modules referring to computational thinking with regard to teaching problem-solving in mathematics. The module is also given the term PeMATIK, which stands for Problem Solution in Mathematics. Furthermore, this module will help them improve their teaching using computational thinking skills. It will allow them to employ problem-solving techniques in the classroom and better prepare their students for the future.

Objectives of the Study

This study's objectives are

- What are the main components of the *PeMATIK* teaching module based on computational thinking in solving mathematical problems on the topic of measurement among primary school mathematics teachers based on experts' agreement?
- What are the elements in the main components of the *PeMATIK* teaching module based on computational thinking in solving mathematical problems on the topic of measurement among primary school mathematics teachers based on experts' agreement?

Methodology

Note that the fundamental research approach in this paper refers to the NGT technique. The survey included 13 experts on the topic of mathematics education via meeting face-to-face for two hours. The experts were gathered to collect different teaching strategies and solutions based on expert opinions, and the NGT approach was employed in a brainstorming session. After the session, the researcher used the NGT technique to conduct a specific calculation and obtained data to address the study's objectives.

Nominal Group Technique

An NGT is a structured, small-group discussion to attain a consensus (Van De & Delbecq, 1971). It is also a technique for gathering data for research based on in-person interactions, seeking an agreement among experts on recognising and accepting the components or elements (Varga-Atkins et al., 2017). In studies, NGT is frequently employed to obtain precise results without perceptive viewpoints. This method is semi-quantitative and structured because it allows for blending qualitative methods (Perry & Linsley, 2006). It is encouraged by O'Neil and Jackson's process, ranking the significance of ideas referring to the order of numbers after the process pertaining to "acceptance of ideas without judgment" (qualitative) (Perry & Linsley, 2006). The core component and additional PeMATIK module parts in this research were created using NGT. Note that they were based on mathematical problems related to the measurement that primary school mathematics teachers encountered.

Implementation of NGT

Experts chosen based on the study's scope participated in implementing NGT. This session at the District Education Office adopted an official, systematic workshop format. Consequently, the moderator supervised the physical workshop and was responsible for the NGT session's engagement (Perry & Linsley, 2006). The NGT workshop lasts around two hours (O'Neil & Jackson, 1983). The NGT session should be implemented throughout this period. In this research, the researcher followed the five steps of a specific guide for adopting NGT. The fundamental stages of implementing the proposed NGT procedure are shown in Table 2 [32].

Table 1
Steps of specific guide to implementing NGT

Steps	
1	The moderator will conduct the study's description
2	Process of triggering ideas by study participants (experts)
3	Sharing ideas between study participants (experts)
4	Components and elements' discussion pertaining to the issues examined
5	Study participants' voting process

During this workshop, all the experts discussed the core elements and components needed with respect to the module. As a first step, the researcher presents the main topic or problem to the group and asks them to brainstorm related ideas. Subsequently, each group member writes down their ideas on a separate paper. After that, each expert asks to read their ideas individually and record them on a whiteboard. The moderator will ask the group to identify duplicate ideas, combine them into a single item, and categorise them according to the main component and module elements. Consequently, all the experts were asked to vote on the crucial ideas and prioritise them. Finally, the data was collected, and the results were analysed. To ascertain the percentage of agreement, a descriptive analysis using metrics like score and percentage was performed. Note that the percentage of agreement should be more than or equal to 70% so that it may be considered for inclusion in this study's subsequent evaluations.

Participants of NGT

NGT may be employed in a sizable group or a single cohort, according to some researchers (Dobbie et al., 2004). It can be divided into smaller groups depending on the needs of the study to conduct effective communication. According to Van (1971) (Van De & Delbecq, 1971), the ideal number of experts or participants should range from 5 to 9. Meanwhile, Horton (1980) proposed that the range should be 7 to 10 (Horton, 1980), and Harvey and Holmes (2012) suggested 6 to 12 (Harvey & Holmes, 2012). On the other hand, Abdullah and Islam (2011) recommended 7 to 10 (Abdullah & Islam, 2011), and Carney et al (1996) advised that the minimum should be 6 (Carney et al., 1996). Based on the references above, the researcher chose 13 experts to participate in this study's NGT process. Given the present circumstances, which limit interactions, this quantity is regarded as appropriate for this research. Hence, 13 experts participated in this NGT session is the result. The list of experts in the field who engaged in the problem-solving module based on computational thinking in mathematics education is presented in Table 2.

Table 2
List of experts involved in NGT

Expert	Level of education	Field of expertise	Years of experience
E1	Master in Mathematics education	Pedagogical Expert District level School Improvement Specialist Coach (SISC+)	9 years
E2	Degree in Mathematics education	Pedagogical Expert District level School Improvement Specialist Coach (SISC+)	10 years
E3	Degree in Mathematics education	Pedagogical Expert District level School Improvement Specialist Coach (SISC+)	10 years
E4	Master in Mathematics education	Pedagogy and content expert State level main coach in Mathematics	20 years
E5	Master in Mathematics education	Pedagogy and content expert State level main coach in Mathematics	12 years
E6	Degree in Mathematics education	Pedagogy and content expert State level main coach in Mathematics	16 years
E7	Master in Mathematics education	Pedagogical expert Excellent teacher in primary school	10 years
E8	Master in Mathematics education	Pedagogical expert Excellent teacher in primary school	20 years
E9	Degree in Mathematics education	Pedagogical expert Excellent teacher in primary school	12 years
E10	Degree in Mathematics education	Pedagogical expert Excellent teacher in primary school	21 years
E11	Degree in Mathematics education	Pedagogical expert Excellent teacher in primary school	21 years
E12	Degree in Mathematics education	Pedagogical expert Mathematics teacher in primary school	25 years
E13	Degree in Mathematics education	Pedagogical expert Mathematics teacher in primary school	26 years

Data analysis of NGT
Since NGT analysis is based on the percentage of agreement value, it is essentially a reasonably simple method. When the percentage level of agreement is 70% or higher, it

means that all of the components and elements are accepted. In this study, the researcher applied Microsoft Excel, which is based on the provided template and aims to calculate a percentage score value. With respect to NGT, Table 3 presents five data analysis steps.

Table 3
The steps of data analysis for NGT

Steps	
Step 1	Ensuring the participants' number (experts) involved with the study
Step 2	The formation and calculation of score value is based on the NGT templet data analysis
Step 3	Convert score values into percentage form to obtain the percentage of the agreement value. Percentage (%)= $\frac{\text{Total of score x 100(AxB)}}{(AXB)}$. A=Total of experts B=Likert scale used, i.e., 5 points
Step 4	Determining the acceptance of components and elements based on the percentage of agreement
Step 5	Establish the position of the element according to the highest to lowest percentage of agreement

The modified NGT technique, which was used to gather information, enabled researchers to obtain the necessary data quickly. This technique does not require multiple rounds of expert evaluations, making it faster and more efficient. Consequently, the final phase in data analysis was determining where each element should belong within each component's module. The primary section determined its relevance by ranking the components and other factors required for the module. On the list of each primary component, the component and element with the greater number would have the highest precedence. Thus, this specific section will aid the researcher in designing and developing the PeMATIK module.

Finding

The PeMATIK module's primary elements and components were designed utilising pedagogical skills, constructivism theory, problem-solving, and computational thinking. Three common components—the role of teachers, the involvement of children, and the assessment of activities—were chosen from the four primary components to construct the PeMATIK module. In addition, the objective aspect of the activities, teacher practices, and training preparation, as recommended by the literature, were incorporated. The goals and objectives to create the PeMATIK module as a comprehensive manual and reference for primary school teachers to use in teaching problem-solving activities in mathematics education are the argument's emphasis for including the objective activity and teacher training.
(i) Research results with respect to the primary component and elements' design pertaining to the *PeMATIK* module

Table 4
The result of Nominal Group Technique

	Components / Elements	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	Total item score/ vote	Percentage	Rank priority	Voter consensus
1	A clear description of computational thinking (4 types of techniques)	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
2	Questions on problem-solving at various levels	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
3	QR Code	3	3	3	3	3	3	3	3	3	3	3	3	3	39	60	10	Not Suitable
4	The settings of the questions connected to daily life	4	3	4	5	4	4	4	4	4	4	4	3	4	51	78.46	8	Not Suitable
5	Arrangement and questioning with steps of solving problems according to 4 techniques	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
6	A computational thinking-based lesson plan for teaching problem-solving (topic: measurement)	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
7	Lesson plan based on DSKP year four	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
8	Problem-solving based on HOTS	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
9	PLC element (pair teaching)	4	5	5	4	3	5	5	4	3	4	5	5	5	57	87.69	5	Suitable
1	PLC element (Video/TSS)	4	5	4	5	4	5	5	5	4	5	5	5	5	61	93.85	3	Suitable
1	Assessment-based (fun-learning/Kahoot/quizzes-link)	5	5	3	3	4	3	4	3	4	3	4	3	4	48	73.85	9	Suitable
1	Answer with a step of working	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
1	Graphical problem-solving questions	4	5	4	3	4	4	3	3	4	4	4	3	3	48	73.85	9	Suitable
1	Evaluation instruments for each learning standard	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
1	Questioning techniques (Guide/Example questions)	5	5	4	5	5	4	5	5	5	5	4	4	5	61	93.85	3	Suitable
1	Use of mathematical terms	5	5	3	5	5	4	5	5	5	3	5	5	4	59	90.77	4	Suitable
1	Practice identifying mathematical sentences	1	1	1	1	1	2	2	2	2	1	1	1	1	17	26.15	12	Not Suitable
1	Construction of e-module (website)	4	3	4	2	4	5	5	4	5	5	4	5	5	55	84.62	6	Suitable
2	Practice (drilling system) according to 4 techniques	5	4	4	4	4	4	4	4	4	4	4	4	4	53	81.54	7	Suitable
2	Self-assessment	1	2	2	2	2	1	1	1	2	2	2	2	1	21	32.31	11	Not Suitable
2	Content	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
2	Introduction	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable

	Components / Elements	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	Total item score/ vote	Percentage	Rank priority	Voter consensus
2	Objective	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
2	Aim	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
2	Title / Themes	5	5	5	5	5	5	5	5	5	5	5	5	5	65	100	1	Suitable
2	Module execution procedure	5	5	5	5	5	5	5	4	5	5	5	5	5	64	98.46	2	Suitable
2	Teaching strategies (Times)	1	1	1	1	1	1	2	2	1	2	1	1	1	16	24.62	13	Not Suitable

The elements and components that have been given importance in the module are separated into two groups (Tables 5 and 6), namely content and face:

Table 5
List of components and elements of the module on the content

Category	Main component	Elements
Content of Module	Computational thinking Skills	• Description (four techniques in Computational thinking in Problem-Solving) • Notes, questions, and problem-solving according to 4 computational thinking techniques • Assessment instruments for each learning standard • Use of mathematical terms
	Problem-Solving Skills	• Multi-level problem-solving questions (low, medium, high) • Situation Questions based on/related to students' daily experiences • Construction of QR code (Notes/Description of how to solve/teaching video/youtube link) • Problem-solving questions for KBAT elements • Complete answers and solutions • Practice (drilling system) following four techniques
	Pedagogical Skills	• Rph based 21st Century learning • Rph guided by (DSKP) Curriculum for Primary School year 4 • Professional Learning Communities – activities (pair teaching/Video) • Game-based learning (Kahoot/quizzes-link) • Various types of questioning techniques (Guide/Example questions) • Examples of student mistakes

Table 6
List of components and elements of the module

Category	Main component	Elements
Face of module	Contents	• Content of the module • Introduction • Objectives • Target • Title / Theme • Module implementation procedures
	Technological elements	• Formation of e-module (website) • Graphical problem-solving questions

According to the objective of this study, the PeMATIK module, a problem-solving module in mathematics education based on computational thinking, should be evaluated based on different components and elements. Table 3 presents the total scores that experts in the field recommend. The study's results propose that the majority of the evaluated main components and elements are at an appropriate level for use. This is consistent with previous studies by (Deslandes et al., 2010; Dobbie et al., 2004).

After analysing the data, the researcher concluded that of the 28 points obtained from discussions with experts, 24 elements and three components could be used to effectively solve problems in teaching problem-solving skills. As a result, the experts strongly recommend using these 24 elements and three main components, which are computational thinking skills, problem-solving skills, and pedagogical skills. These are vital to creating a module for teaching problem-solving skills based on computational thinking for mathematics education.

Discussion

All the components and elements shown in Table 3 are relevant models, and the experts approved the literature during the NGT session. Furthermore, each component's elements are appropriate for the study's setting. As a result, several components were altered regarding sentence structure and language for further investigation after reaching a consensus in expert conversations. Based on the findings, the elements and components were categorised according to the priority's acceptance percentage. This finding will be described in the ensuing article and utilised to construct the elements for each *PeMATIK* module's primary components. Teachers must be aware of the activity's goals and be clear about them to promote successful learning. Apart from that, good learning objectives should, among other things, be more specific, clearly combine information and skills, be quantifiable, subject to testing, and be evaluated through observation.

The findings of this study demonstrate that the components and elements of the activity's aim align with the stated objective of computational thinking and the students' knowledge. Hailikari et al (2008) agree with this idea and believe that a lesson plan should have the same objectives and goals and be tailored to the students' knowledge levels. On the other hand, the NGT experts prioritised these significant factors when designing this module. To guarantee that the outcomes of the discussion may only list the important ideas that are components and elements in the context of this study, the experts have ensured that all the proposals made by the experts have been thoroughly examined. Before using the design in the classroom, mathematics teachers should deeply comprehend the design's content.

Teachers must understand the objectives of the exercise and be explicit about them to facilitate good learning. This claim is backed by strong learning objectives having the following characteristics: they should be more precise, incorporate information and abilities explicitly, be measurable, and be subject to test and observational evaluation. Computational thinking development, a teaching framework or model, requires the preparation of objectives, information selection, organisation, determining of learning experiences, and preparation of learning activities (Nachiappan et al., 2019). According to the statement, a guide's elements must be related to one another for it to affect the teaching and learning process.

Therefore, the experts discussed and came on 24 elements and three main components, which were then employed in the design of the *PeMATIK* module for teachers. The three primary parts comprise three crucial elements, which are computational thinking, problem-solving, and pedagogical skills.

The teachers will employ this module to train themselves on computational thinking before teaching their students. The findings for establishing the computational thinking component parallel the previous research. Yadav et al. (2016) explore key constructs, such as algorithms, abstraction, and automation, and their relation to educational reforms. Moreover, it offers suggestions for teachers and instructional technologists on integrating computational thinking into other subjects. The research concludes that these concepts are essential for students to progress in mathematical problem-solving with computational tools. Hence, as the experts mentioned, the explanation of four computational thinking problem-solving approaches should be well-explained. Each approach must provide teachers with clear knowledge through various examples and working steps. A small group assignment should also be included, allowing students to practice computational thinking independently and in groups.

The next finding, the module's next component, is problem-solving skills for teachers. Previous research supported this finding as it can greatly enhance teachers' ability to teach and guide their students in critical thinking and decision-making. According to Ebiendele Ebosele Peter (2012), they discovered that teachers who used problem-solving modules and had good problem-solving abilities were more successful at fostering their pupils' problem-solving abilities. In conclusion, a problem-solving skills module in teacher training and classroom activities can significantly impact student learning outcomes. It can create a more dynamic and help teachers in an engaging learning environment that promotes computational thinking, critical thinking, and decision-making skills, preparing students for real-world challenges. Thus, it is essential to include the problem-solving skill in this module. Additionally, multiple-level (low, medium, high) problem-solving questions should be made available to teachers. This puts teachers at ease while they provide lessons to pupils. Additionally, the questions must be developed with Higher-Order Thinking Skills (HOTS).

Consequently, pedagogical skills should also be included in the curriculum, where plans for the teacher's lessons will be appended to this section. These lesson plans will train teachers on measurement-related problem-solving methods. Enhancing teachers' knowledge and skills should include using Professional Learning Communities (PLCs) to study together, share material, and conduct professional dialogues. Based on the discussion and the collected result, the teacher needs to learn about computational thinking skills and their implementation before using them in the classroom. Note that this technique emphasises teachers learn by doing, the main element in the Constructionism Theory by Seymour Papert

(1980). The expert's findings are consistent with the constructionism theory's justifications. Note that constructionism encourages student-centered, discovery learning in which students build on their knowledge to learn new things. Students gain knowledge through project-based learning activities where they link various concepts and subject areas. This was the main theory employed in designing this module. Each activity and note were designed according to Constructionism Theory, where teachers will use this module by doing and following given activities.

Overall development conclusions with regard to the *PeMATIK* module's components and elements are validated by prior studies, where the usage of modules for teachers pertaining to the teaching process can increase the quality level in the teaching style of teachers.

Conclusion

No	Categorize	Sub-points
1.	Utilization of the Nominal Group Technique (NGT) and Expert Consensus:	• The study utilized NGT to design a problem-solving module in mathematics education. • Expert consensus was obtained to identify the main components and elements of the module. • The use of NGT facilitated the design of a comprehensive module.
2.	Importance of Computational Thinking and Problem-Solving Skills:	• The study highlighted the importance of incorporating computational thinking and problem-solving skills in mathematics education. • Computational thinking skills (decomposition, abstraction, pattern recognition, and algorithmic thinking) are crucial for effective problem-solving in mathematics. • The module developed based on these skills can help teachers enhance their teaching methodologies and equip students with necessary problem-solving skills.
3.	Benefits for Teachers and Students:	• Teachers can benefit from the module by learning how to integrate computational thinking skills into their teaching practices, leading to improved student engagement and performance. • Students can develop critical thinking skills and apply computational thinking techniques to solve complex mathematical problems.
4.	Contribution to Existing Knowledge and Future Research:	• The study contributes to the existing knowledge on effective teaching strategies in mathematics. • It emphasizes the importance of preparing students with 21st-century problem-solving and computational thinking abilities. • The research findings provide insights for future research on teaching methodologies and the development of students' problem-solving abilities.

The study focused on the use of the Nominal Group Technique (NGT) to design a module for problem-solving in mathematics education based on computational thinking for teachers. The research aimed to identify the main components and elements of the module through expert consensus. The results of the study provided valuable insights into the design of the module and highlighted the importance of incorporating computational thinking and problem-solving skills in mathematics education.

The significance of this study lies in its contribution to the field of mathematics education. By utilizing the NGT approach, the researchers were able to obtain expert recommendations and consensus on the essential components and elements to be included in the module. This not only provided a comprehensive framework for teaching problem-solving in mathematics but also validated the relevance and applicability of computational thinking skills in solving mathematical problems.

The findings of the study demonstrated that computational thinking skills, such as decomposition, abstraction, pattern recognition, and algorithmic thinking, are crucial in developing effective problem-solving strategies in mathematics. The module developed based on these skills can help teachers enhance their teaching methodologies and equip students with the necessary skills to excel in problem-solving tasks.

The practical implications of this research are significant for both teachers and students. Teachers can benefit from the module by gaining a better understanding of how to integrate computational thinking skills into their teaching practices. This, in turn, can lead to improved student engagement and performance in problem-solving activities. Students, on the other hand, can develop critical thinking skills and apply computational thinking techniques to solve complex mathematical problems.

The theoretical contribution of this study lies in its emphasis on the integration of computational thinking and problem-solving skills in mathematics education. By providing a structured framework for the module design, this research adds to the existing body of knowledge on effective teaching strategies in mathematics. It also highlights the importance of preparing students with the necessary skills to succeed in the 21st-century world, where problem-solving and computational thinking abilities are highly valued.

In conclusion, this research demonstrates the significance of incorporating computational thinking and problem-solving skills in mathematics education. The use of the NGT approach facilitated the design of a comprehensive module that can assist teachers in effectively teaching problem-solving in mathematics. The findings of this study contribute to both theoretical and contextual research in the field and provide valuable insights for future research on teaching methodologies and the development of students' problem-solving abilities.

Corresponding Author
Shivaraj Subramaniam
Faculty of Education, National University of Malaysia.
Email: subramaniam.shivaraj@gmail.com

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