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Socialization of the Use of Prime, Odd & Even Number Calculation Applications using Visual Basic 6.0

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Abstract

The socialization of Visual Basic 6.0 based applications for calculating prime, odd and even numbers aims to introduce efficient tools for studying and implementing basic mathematical concepts interactively. This application is designed with a user-friendly interface to support mathematics teaching, both at secondary school level and in basic programming training activities. The app's key features include: Prime Number Check: Allows users to identify whether a number is a prime number. Odd and Even Classification: Provides a feature that automatically determines whether a certain number is odd or even. Calculations in a Specific Range: Provides calculation results for numbers within a specified range, supporting the exploration of mathematical patterns. The socialization process is carried out through training and interactive demos for potential users, such as teachers, students and the technology community. Evaluation shows that this application is able to improve understanding of basic mathematical concepts and speed up the manual calculation process. By utilizing Visual Basic 6.0 as a development platform, this application offers flexibility and compatibility with older operating systems, making it accessible to users with limited hardware. It is hoped that this application can be a useful educational tool in studying mathematics practically.

INTRODUCTION

The development of information technology has had a significant impact on various fields, including education. In the world of education, the use of technology can support the learning process by presenting interactive and effective tools. One implementation of technology in learning is the development of applications to support the understanding of mathematical concepts, especially prime, odd, and even numbers. Prime, odd, and even numbers are an important part of basic mathematics taught from elementary to high school. However, understanding this concept is often still a challenge for some students. Therefore, media is needed that can explain the concept interactively and interestingly. Education comes from the word "didik" which then gets the prefix me- so that it becomes the word "mendidik" which means an effort to maintain and provide training. Education is a conscious

and planned effort carried out by an educator to create an atmosphere of learning activities, conduct training, and carry out learning activities according to the level of development, abilities, and potential of students so that they can develop spiritual religious attitudes, intelligence, personality, self-control, noble character, and skills that have been possessed (Widiyanti & Anugraheni, 2022; Diwu et al., 2024; Hidayat & Inayati, 2024).

Mathematics cannot be separated from the development of human civilization. Mathematics is a tool to simplify the presentation and understanding of problems. Many scientists study mathematics to be used in other fields. In physics, economics, chemistry and others, mathematics is often used to analyze real events or phenomena, so that the relationships between various factors can be expressed more briefly and clearly, and the changes are easy to describe and calculate (Dedy Juliandri Panjaitan, 2019; Weidemüller et al., 2021). The use of information technology has become part of the processing, storage and delivery of information in school administration management in order to improve the quality of educational institutions. School administration will be more effective and efficient if supported by human resources who are able to utilize information technology in addition to the availability of adequate equipment in a reliable school administration system to support the achievement of educational goals in schools optimally (Kamala et al., 2022; Lyanda et al., 2023; Vahdat et al., 2023).

Mathematics is a discipline that has unique characteristics when compared to other sciences. In short, it is said that mathematics is concerned with abstract ideas or concepts that are arranged hierarchically and deductive reasoning (Manurung et al., 2022; Armah, 2024; Hoffmann & Egri-Nagy, 2021). Mathematics is also a science that has a deductive and consistent mindset. Until now, mathematics subjects in schools (including elementary schools) are still considered the most difficult subjects compared to other subjects (Rahmah & Ilham, 2022; Boaler, 2022). This is natural, especially for students in schools, if they have difficulty learning mathematics because the nature of mathematics itself is related to abstract concepts, on the other hand, school students are still at the stage of concrete operational cognitive development. This stage is characterized by a student's ability to draw conclusions from real situations or by using concrete objects. In other words, the use of media (including teaching aids) in mathematics learning is still very much needed (Nugraha & Somatanaya, 2018; Muhaimin & Juandi, 2023).

Rapid technological advances have an impact on human life. For example, the use of computers can make it easier for someone to complete a job or in other words, can complete a job more efficiently (George & George, 2023). Several computer programs can also be used in mathematics learning activities. However, to carry out computer-assisted classroom learning, educators are required to have knowledge or skills in using various available programs, and even be able to choose the right program to support learning a particular topic (Auliya et al., 2020; Park & Son, 2022). Meaningful learning in question is learning that is student-centered such as the student-centered learning approach, the use of learning media in the learning process, and the approach to learning with real/everyday life. In Community Service (PKM) activities carried out by lecturers, innovative learning media will be utilized in mathematics learning. The learning media that will be introduced and practiced is the House of Multiplication learning media (Suriyah et al., 2018; Filsafati & Fajrie, 2023; Hasanah et al., 2024).

Visual Basic 6.0, as one of the popular and easy-to-understand application development software, provides an ideal platform for creating educational applications. This application is designed to help users, especially students and teachers, understand and implement the concept of prime, odd, and even numbers quickly and accurately. The socialization of this application aims to introduce and

educate the public, especially in educational environments, about the benefits of the prime, odd, and even number calculation application (Cortoni, 2024; Montazami et al., 2022). With a simple interface and intuitive functions, this application is expected to improve the understanding of basic mathematics while accelerating the calculation process. Through this socialization, it is hoped that there will be better integration between technology and education, thus encouraging the creation of a more innovative and enjoyable learning experience. In addition, this activity is also expected to inspire other developers to continue creating similar useful applications.

METHODS

This community service activity was carried out using the Participatory Action Research (PAR) approach. Participatory Action Research (PAR) is a research and empowerment method that combines active community participation (in this case the school such as teachers and students) with real actions (action) to make changes, as well as joint reflection on the process and results of these activities (Khaerul et al., 2022).

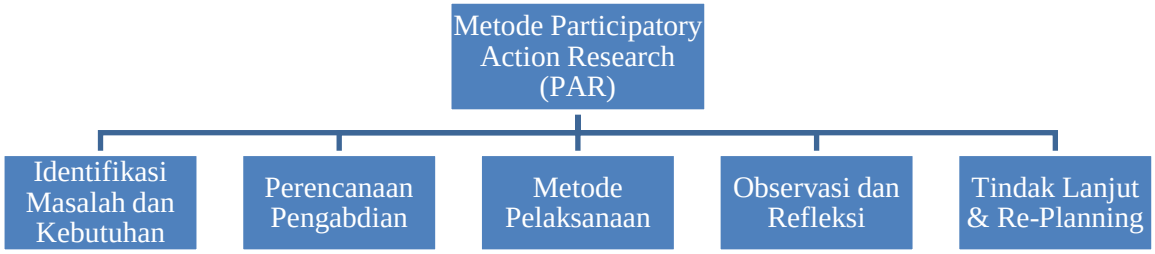

Figure 1. Method of Participatory Action Research (PAR)

Identification of Problems and Needs

The identification of problems in this community service is that in the world of education, especially at the secondary school level, understanding basic mathematical concepts such as odd, even, and prime numbers is still often a challenge for some students. This is caused by: a) Learning methods that are theoretical and less interactive; b) Minimal use of technology media in delivering mathematics materials; c) Lack of student motivation to explore mathematical concepts through an application-based approach; d) Students' unfamiliarity with simple programming logic that can help understand concepts.

In addition, teachers and students tend to be unfamiliar with the use of simple software such as Visual Basic 6.0, which can actually be used to build interactive and easy-to-use educational applications. Identification of needs, based on the problems above, several needs can be identified as follows: a) Technical Needs; b) Educational Needs; c) Participatory Needs (PAR).

Community Service Planning

This activity is designed as a form of community service in order to help students or the general public understand the basic concepts of mathematical numbers through a technological approach. Socialization is carried out using a simple application based on Visual Basic 6.0, which can be used to determine whether a number is prime, odd, or even. This activity uses the Participatory Action Research (PAR) approach so that participants are actively involved in each stage of implementation including: a) Community Service Objectives; b) Activity Targets; c) Device needs.

Implementation Method

Activities are carried out interactively and participatively according to the Participatory Action Research (PAR) approach, which includes: a) Material

Presentation; b) Application Demonstration; c) Direct Practice (Hands-on); d) Discussion & Q&A; d) Reflection (PAR)

Observation and Reflection

Socialization of the Use of Prime, Odd & Even Number Calculation Applications using Visual Basic 6.0. Activity Observation, During the implementation of the activity, observations were made on several important aspects as follows: a) Participant Participation; b) Understanding of Material; c) Technical Constraints; d) Response to Application

Activity Reflection, based on observations and discussions during the activity, the following are reflections obtained: a) Benefits of the Activity; b) Learning from the PAR Approach; c) Proposals for Development; d) Recommendations for Improvement

Evaluation

The evaluation was carried out with the Socialization of the Use of Prime, Odd & Even Number Calculation Applications using Visual Basic 6.0 in several ways as follows: a) Direct Observation; b) Questionnaire; c) Reflective discussion; d) Short interview

From the results of the community service carried out, especially from the evaluation results, this evaluation has produced several notes for further follow-up which are recommended as follows: 1) Developing printed modules or video tutorials as independent learning materials for participants; 2) Provide a more advanced version of the application with additional features (eg: check composite numbers, list of numbers in a certain range); 3) Conduct advanced training for participants who are interested in learning more about Visual Basic 6.0 and programming logic.

RESULTS AND DISCUSSION

This paper will focus on the socialization of a Visual Basic 6.0-based application to compute prime, odd, and even numbers as the tool to improve mathematics learning. This is justified by the fact that many students usually struggle to grasp fundamental concepts of mathematics especially during the secondary school years when the concepts of abstractions in thinking have not been fully specialized. Conventional methods of teaching that are usually more theoretical and non-interactive restrict student participation and inspiration. In order to fill this gap, the researchers developed a simple, easy to use app that could determine whether a number is prime, odd, and even, and be able to generate patterns of numbers within desired ranges.

The research is based on the approach of Participatory Action Research (PAR) where two groups of people, teachers and students, are included in the process of development, testing and reflection. The aim is not necessarily to offer only a teaching aid but interactive learning experiences where technology plays a direct role in the learning support of the concepts. The study aims to socialize the utilization and measure its efficacy via the community service activities through the training, showing, and practical work.

The greater purpose of this project is to show that even the rather out of date technology like Visual Basic 6.0 is still a useful tool able to produce a practical educational tool. Integrating technological innovation and a participatory approach, the project aims at making the learning space more engaging and more open to learning, as well as fuel future work on similar educational tools.

Program Display

This home page is a page that displays a direct display for entering student data.

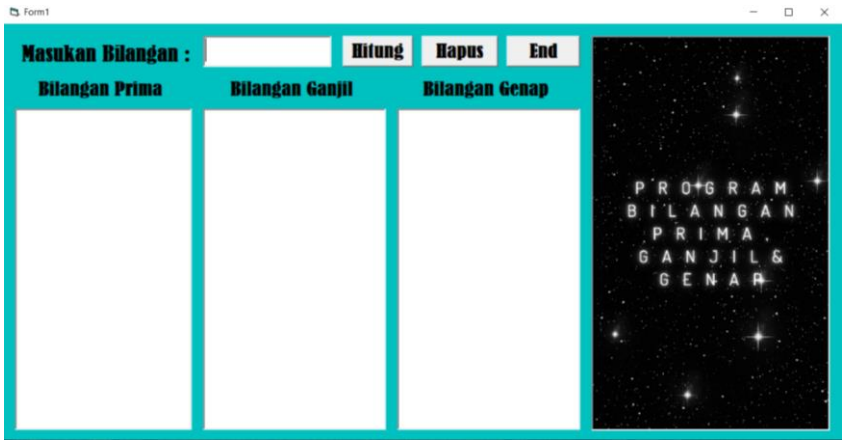

Figure 2. Home Page Display

The opening screen (Home Page) is rather straightforward Graphical User Interface (GUI) design, having text field to input numbers, Calculate, Delete, and End command buttons, and three output fields to indicate the calculated total number classifications (prime, odd, and even). Regarding basic functionality, this design is quite straightforward since each of them has a label allocated to it. This simplifies the application usage to the users particularly the students who do not need excessive directions about the flow.

Nevertheless, when approaching it visually and as an educator, it is possible to criticize it in several points. The first is that the display remains simple and can be considered to be, in most cases, monotone with a single color predominating over the others (it is turquoise green). Students, particularly at the secondary school level may be attracted visually and this may enhance their motivation to learn and, or use the application. There might be more diverse graphics or images, icons, or colors to make the application easier to use.

Second, the arrangement of the result columns (Prime Numbers, Odd Numbers, Even Numbers) looks parallel and balanced, however, the size of the result box is too large which creates the picture of the unnecessary empty space. It can be more useful, e.g. to include some explanations, examples of usage, or visualization of mathematical terms in order to make this application not a mere calculator but an aid to learning.

Third, there is the existence of a right panel with a red background trademark which indicates star and says prime, odd and even number programming. This shows it has made effort to achieve an aesthetic appeal. Nonetheless, the text is poorly readable because of its spacious form and the lack of contrast. Functionally, this panel does not have a direct input in the learning process. This space would be more appropriate to show short user instructions or a concise theoretical explanation of prime, odd, and even numbers, so students would have an opportunity to compare calculation results with the concepts they are learning.

Lastly, under the user experience (UX) point of view, the application is user friendly to some basic uses but lacks full interaction elements to learning. In the example, there is no feedback mechanism as to why a number is deemed as prime, odd and even. Feedback of this kind could enhance the levels of understanding and eliminate the possibilty of using the applicaiton as a calculator without grasping the ideas behind.

Entering Values

This list page displays how to enter values. By clicking the calculate button, the data is automatically input.

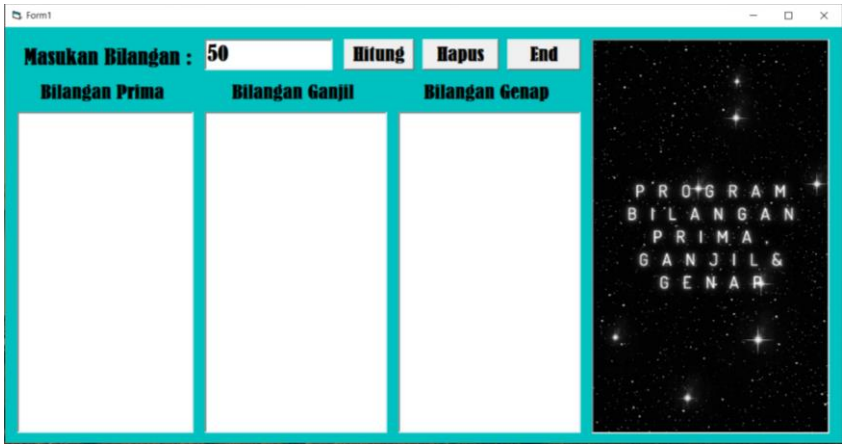

Figure 3. Value Input Page Display

In Figure 3, Value Input Page Display note that the user has actually inserted the number 50 in the "Enter Number" input field. The following display illustrates the second step in the user flow of the application, the one at which the user provides an input number, after which the button labeled Calculate is pressed and the result of the classification (odd, even, prime, or any combination thereof) is shown. Regarding the minimum functionality, it can be described as simple and straightforward as it will adhere to novices or school students. Nevertheless, there are some important points, which should be taken note of.

One is that the interactivity element remains restricted. The display has so far failed to validate inputs, such as when a user inputs negative numbers, decimals and even letters. The number of possibilities of making a mistake or persevering in addition is rather large in the absence of validation. Second, it is not even visualized what will occur after pressing the Calculate button till then. The prime, odd, and even numbers boxes are empty and do not contain any introductory instructions, e.g., to see the results, click on Calculate. This causes a diffuse user experience

Third, the design of those pages still seems rigid and does not change dramatically compared to the opening screen (Figure 2), thus the feel of progress is not that distinct. In a learning application, transition between stages needs to be highlighted in visual cues that underline the switch, like a change in color, process signal or interactive effects. Fourth, this application also lacks in providing a proper form of education. Based on the result of calculation, the only numbers that come out are the categories they fall into, and this is done without any explanation on why they are in their category.

Lastly, the input area is fairly small as compared to the blank space right below it. This blank area can be realistically filled with some more information, say, definition of what a prime number, odd, even numbers are, or even basic simplified illustrations that can be used to reinforce the concepts in the minds of students. Accordingly, despite the fact that the display of Figure 3 already serves a basic purpose of ingesting the number, this application still requires considerable refinement in the form of transforming it into not just a classification engine but also an interactive, instructive learning device that works not only to ensure scope of information as input but also a deeper understanding of concepts.

Program Results

This page displays the value data that has been input.

Figure 4. Program Pag

Figure 4, Program Page Display, displays what is shown after the user types the number 50 and clicks the Calculate button. The user set program automatically classifies numbers between 1 to 50 into three categories such as prime, odd and even. In terms of functionality, this screen is already presenting results congruent with the purpose of the application, i.e., classification of numbers in terms of their mathematical properties. The presented list is rather explicit since it is divided into three separate columns with category names above the list.

Nevertheless, a number of very serious aspects may be mentioned. First, the results of the classification are nothing more than a list of the numbers with no further explanation. As an example, we see the presentation of prime numbers such as 2, 3, 5 and 7 but do not see a reason as to why they are prime. Equally, the odd and even numbers are just a list of numbers without explaining why. This is more mechanical than educative on the part of the application. As a learning tool, the provision of such a brief explanation would be recommended, e.g. "A prime number is a positive number not equal to 1, that can only be divided by 1 and itself."

Second, concerning interface design, the list of numbers appears in the long format and the users have to scroll to view the full list of results. This may be inefficient, particularly where the input numbers are more than 50. A more convenient idea would be to introduce a search or a filter option, according to which a user could quickly trace whether a specific number can be called prime, odd, or even.

Third, visually the page has not been overcrowded and there is still comfortably enough empty space beneath the list of results. This area might be utilized to exhibit simple graphs, Venn diagram, or interactive visual display showing the building between prime, odd and even numbers. Such visualizations would make students better comprehend the notion of mathematics in the more entertaining manner.

Fourth, there is yet to be a higher level of interactivity within the application. No extra options are available when users display the results, including saving the results in a file, copying the data, and showing summary (e.g., how many prime, odd and even numbers there are in a given range). Actually, such a summary as the following may be quite useful, say, as follows: "There are 15 prime numbers in the numbers 1 to 50, 25 odd numbers, 25 even numbers."

Altogether, the output in Figure 4 is evidence of the effectiveness of the program to group the numbers into categories. But to make it more educationally powerful and helpful to the user, a step must be undertaken to create the application, in adding explanatory tools, visualizing the object, and making the interactive functions deeper. In such a way, the program will not only be a mere automatic calculator tool but a nice informative and interesting teaching tool.

Program Coding

```
Private Sub Command1_Click()
batas = Val(Text1.Text)
For x = 2 To batas
z = 0
For y = 2 To x
Hasil = x Mod y

If Hasil = 0 Then
z = z + 1
End If

Next y
If z <= 1 Then
List1.AddItem x
End If

Next x
Dim Ganjil, i As Long
For i = 1 To Val(Text1.Text)
      If i Mod 2 <> 0 Then
          List2.AddItem i
      End If
Next i

Dim Genap, r As Long
For r = 1 To Val(Text1.Text)
      If r Mod 2 = 0 Then
          List3.AddItem r
      End If
   Next r
End Sub

Private Sub Command2_Click()
   Text1.Text = ""
   List1.Clear
   List2.Clear
   List3.Clear
End Sub

Private Sub Command3_Click()
   End
End Sub
```

Figure 5. Program Coding

An example of such a very basic Visual Basic program is represented by the figure, where even a basic implementation of the classification of numbers as prime, odd and even is faulty in both logic and design. The inefficient aspect of the number prime check is that it requires completion of a complete loop and up to the number itself yet it can be minimized to complete at an extent of square root of the number in order to ease the computation work. Moreover, it does not have any input validation in the program and thus, it enables errors where a user can put in blanks, letters or a negative number, and this may produce errors or give faulty results. The code is also not modular since there are no separate functions such as IsPrime(), IsOdd, or IsEven() and all processing is placed within a long procedure and thus more challenging to be maintained and developed. Interface output is just a list of numbers without any summary or other information, hence, not so educational as to communication. That is, on the one hand, this program meets its fundamental purpose, but it does not correspond to the efficiency, convenience, and strength indices of ideal learning programs at all.

Critical Evaluation of a Visual Basic 6.0–Based Calculator as an Educational Tool for Number Concepts

Results and discussion section gives the findings of research study and interprets their meaning regarding research objectives. It is possible to have tables, figures, or

any other graphic material to depict important findings. Results are to be shown in a rational order, giving descriptive headings and labelling the results to enable the reader to follow. Results must be interpreted as their analysis within the context of the previous literature, theory, or hypotheses and any patterns, trends, or associations that manifest can be mentioned. It must also give the implications of the findings and any limitation of the study, and it must propose areas in which a research may be conducted in future.

The results of this research point to the fact that the calculator application, created on the basis of Visual Basic 6.0, has shown its effectiveness as a tool of student sociability of the concept of prime, odd, and even numbers in the course of the socialization exercise. Encouraging as these findings may be, their meaning has to be viewed critically due to the bigger picture of the educational technological environment and methodological limitations of the given study. A discussion which is more than a description is significant as the contribution of the study is not just to report positive responses, but also in terms of evaluating sustainability, scalability and pedagogical value of the intervention.

Among the more eye-opening contributions of the calculator application is the fact that even an older program, such as Visual Basic 6.0 is capable of being used to develop worthwhile teaching tools. This is in agreement with the findings of Adeoye & Otemuyiwa (2024) and Plate & Hutson (2025), who explain that the relevance of educational technology has little to do with the platform being advanced; rather, its drift comes down to its adherence to learner needs. The calculator enabled students to avoid some basic calculations performed manually, and to directly see the patterns in numbers, which helped them to move into a procedural to a conceptual way of thinking. This is in agreement with constructivist approaches of pedagogy where engagement of tools is believed to maintain knowledge retention and promotion of enhanced understanding. The study therefore indicates that technological innovation with regards to education does not necessarily demand sophisticated technology, but essential element is the ability of the technology to fit in the local learning conditions.

Although such strengths can be attributed to the use of Visual Basic 6.0, there are also valid issues of sustainability that one should consider. The future of digital learning is directional towards mobile applications, web-based applications, and cross-platform functionality as highlighted by Kaarlela et al. (2023). When it is a tool that is limited to older, desktop systems, there is risk that the tool becomes irrelevant, especially within an environment where students are used to mobile devices as part of their daily lives. Although the present application is successful in fulfilling its role in the socialization program, its future and large-scale applicability in education is doubtful. Since this may be a shortcoming of the tool, future development ought to take into consideration the porting of the tool into more recent programming languages, including Python, Java, or even web-based platforms that can be accessed more widely. Such adaptation can help prevent the risk that the role of this tool will be limited to ad hoc actions instead of leading to sustainable changes in the system.

Evaluation of the effectiveness of the application is another dimension that also needs critical thinking. The main tools used in the study were descriptive observations and responses given by the participants. Although these were helpful in explaining student intrinsic motivation and perceived utility, the fact that it did not include pre and post-assessment measures limits its capability of asserting that there were any learning improvements. At that, as Bordbar et al. (2025) has warned, participant excitement is not synonymous with an improved performance at the academic level. Absent systematic evidence of subsequent performance improvement, the results are at risk of being excessively impressionistic. The

inclusion of quantitative elements, i.e., testing the student knowledge prior and after the exposure to the application, would enable a stronger statement about the pedagogical effect of the application. Furthermore, it could be assessed longitudinally to examine whether the increased engagement that will be noted during socialization will bear any perception in the long term in terms of retention of knowledge.

The wider meaning and relevance of this project is its contextual one. Many may accuse educational technology of being imported without contextualization leading to inappropriate tools that do not reflect local reality. This paper goes against such a tendency by developing a tool that can address a particular classroom in a low-resource setting. In this way, it resonates with Freire (1970/2000) demand for education systems that build on the context of the learners instead of being dictated by the outsiders. The Visual Basic calculator is technologically rather simple, but is an example of how innovation can be achieved out of responsiveness to local issues. It shows that, simple and affordable tools can provide students and educators with immense power in the environment where the expensive technology is either not available or not convenient.

However, it is impossible to disregard its small functional range of the application. It can only be used to discriminate between prime, odd and even numbers at present. Such simplicity may help the usability, but it can also narrow down the tool into little more than a calculator instead of an integrated learning tool. Extensions to incorporate such factors as factorization, divisibility tests, or modular arithmetic would make it much more pedagogically useful. This way, the application would be able to be extended to a more resourceful educational tool, other than temporary solution to the problems of only one limited use. The latter also indicates the value of iterative design in the field of educational technology, in which the tools can constantly be added to and changed due to the feedback of both educator and learners.

Of great concern is that of teacher preparedness. Any of the most inventive education tools will work to produce the desired effects without successful integrating into the classroom. Most of the time, superficial or inconsistent use of using digital tools can be seen in the lack of training of teachers on how to use them. The existing study did not solve this issue in detail, and the questions are raised whether the teachers can integrate the calculator into the pedagogy on their own outside the socialization session. This gap illustrates one of the challenges of educational technology research in general, namely that the emphasis on development of tools tends to dominate, at the expense of attention that must be given to the capacity building of teachers. Technological innovation will not be sufficient to ensure that the impact is sustained unless the teachers have further developed as professionals to use these tools creatively.

Theoretically, the study presents the dilemma of equity in education and technological innovation in the results of this research piece. On the one side, the calculator application shows the capability of locally produced tools in opening up access to learning resources, particularly in resource-starved learning institutions. Conversely, use of obsolete technologies poses a threat of enforcing digital divides because students in better funded schools can be left behind in the more advanced platforms. A fine balance is needed to arbitrate this tension: on one hand, take advantage of the available technologies, but at the same time organize modernization in such a way that the students could not stay at their current level in the future.

CONCLUSION

The socialization of the application for calculating prime, odd, and even numbers using Visual Basic 6.0 has made a positive contribution in supporting the process of learning basic mathematics. This application is designed to make it easier for

students and teachers to understand and apply mathematical concepts interactively, quickly, and accurately. With a user-friendly interface and functional features, this application not only improves students' understanding of prime, odd, and even numbers, but also speeds up the calculation process that is usually done manually. In addition, this application shows that simple technology such as Visual Basic 6.0 remains relevant in the development of useful educational tools, especially for devices with low specifications. This socialization activity also opens up opportunities for broader integration between technology and education, encourages learning innovation, and inspires other developers to create applications that support education. This success shows that the application of the right technology can be an effective solution in facing learning challenges. It is hoped that this application will continue to be developed and implemented widely, and can be one of the initial steps to build a better technology-based learning ecosystem in the future.

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