DIJEMSS: Dinasti International Journal of Education Management and Social Science
E-ISSN: 2686-6331
P-ISSN: 2686-6358
https://dinastipub.org/DIJEMSS dinasti.info@gmail.com +62 811 7404 455
DINASTI PUBLISHER

DOI: https://doi.org/10.38035/dijemss.v7i1
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Received: 10 July 2025 | **Revised:** 19 September 2025 | **Accepted:** 03 October 2025

Pascal and HTML Programming Extracurricular Activities at Budi Mulia High School

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Abstract: The extracurricular programming program focusing on Pascal and HTML at Budi Mulia High School represents a strategic initiative to equip students with foundational skills in information technology, addressing the rapid advancements in this field. Designed to introduce structured programming principles through Pascal and static web development using HTML, the program employs a blended theoretical-practical pedagogical approach, emphasizing project-based learning (PBL) to foster creativity and problem-solving competencies. Conducted from January to February 2025, the program yielded significant improvement in students' proficiency. In Pascal programming, 85% of participants demonstrated mastery of fundamental syntax, conditional structures (e.g., IF-ELSE and CASE statements), and iterative constructs (including FOR, WHILE, and REPEAT loops). A notable achievement was their successful implementation of a star-pattern simulation using the gotoxy command. Meanwhile, in web development, 90% of students completed static web projects employing HTML and CSS, exemplified by their creation of responsive class organizational structure webpages. The program's positive outcomes include measurable improvement in computational logic, collaborative problem-solving, and readiness for advanced programming studies. These results underscore the efficacy of integrating structured programming and web development into secondary education curricula as a means of cultivating digital literacy and preparing learners for future technological challenges.

Keywords: Extracurricular, HTML, Pascal, Programming

INTRODUCTION

The rapid development of information and communication technology (ICT) in today's digital era has brought significant changes to various aspects of life, including the field of education (Fricticarani et al., 2023). ICT proficiency, particularly in programming skills, has become essential to prepare younger generations for the challenges of the 21st century. Digital literacy is not merely limited to using technological devices but also includes the ability for logical, systematic, and creative thinking to solve problems through technology-based approaches (Sugiarto & Farid, 2023). Therefore, it is crucial for educational institutions to introduce programming skills early on to students as part of efforts to improve the quality of adaptive and innovative human resources.

In the context of secondary education, programming learning can be integrated not only through formal subjects but also through extracurricular activities that are more flexible, interactive, and student-centered. Extracurricular activities allow students to explore their interests and talents more deeply without the rigid pressures of academic demands (H. N. Saputra et al., 2024; Gulo et al., 2024). SMA Budi Mulia, as a visionary educational institution committed to developing students' potential, has taken the initiative to organize extracurricular programming activities focused on two basic programming languages: Pascal and HTML.

The choice of Pascal as one of the core subjects is based on its structured nature and ease of understanding for beginners, making it suitable for introducing basic algorithm and programming logic concepts. Meanwhile, HTML was chosen for its relevance to today's digital world, particularly for developing static web pages that give students a concrete understanding of how programming can produce real and functional digital products (A. A. Saputra et al., 2023; Zulfiani Rohmah et al., 2024). Through the combination of these two languages, students gain a comprehensive understanding of both programming logic and digital visualization.

Beyond developing hard skills, this extracurricular activity also serves to nurture students' soft skills (Noviana et al., 2025), such as communication, teamwork, time management, and independent problem-solving. These values align with the objectives of shaping the Pancasila Student Profile as outlined in the Merdeka Curriculum (Zalukhu et al., 2023), which emphasizes character building and critical thinking skills. Thus, the programming extracurricular program at SMA Budi Mulia is not only aimed at enhancing students' technical abilities but also at shaping independent, responsible individuals who are ready to face future challenges (Haris et al., 2024).

Problems and Solutions

In the implementation of Pascal and HTML programming extracurricular activities at SMA Budi Mulia, several challenges have emerged, both technical and non-technical. One of the main issues is the varying levels of understanding among students. Participants come from diverse backgrounds some have prior experience in programming, while many are complete beginners. As a result, some students are able to grasp the material quickly, whereas others require more intensive guidance. To address this, the mentors applied a grouping strategy based on students' comprehension levels and implemented a differentiated learning approach. In addition, supplementary learning materials such as modules were provided to encourage independent study outside of extracurricular sessions.

Another challenge is the limited time available for extracurricular sessions. With meetings held only once or twice a week, effectively delivering material without compromising understanding became a key concern. To overcome this, the university students adopted a blended learning model, combining face-to-face instruction with online assignments. The material was also structured into short, progressive modules to ensure it was easy to follow and aligned with the available time allocation.



Figure 1. Extracurricular Activity at SMA Budi Mulia
Source: Personal Gallery

METHOD

The Pascal and HTML programming extracurricular activities at SMA Budi Mulia are conducted in the form of structured mentoring that combines fundamental theory and hands-on practice. The activities are held regularly every week and are divided into two main sessions: a basic learning session and a project-based practice session. Each session was designed to ensure that students understood the concepts and could apply them in real-world contexts, such as creating simple programs (Pascal) and web pages (HTML). The extracurricular sessions were conducted offline every Tuesday and Friday from 3:00 to 4:30 PM, taking place from January to February 2025.



Figure 2. Academic Calendar of Budi Mulia High School
Source: Budi Mulia High School

The activity took place in the SMA Budi Mulia Computer Laboratory, which has been equipped with adequate computer devices and internet access. To support flexibility and additional access, some materials are also provided through an online learning platform that students can access independently.



Figure 3. SMA Budi Mulia Computer Lab and Floor Plan
Source: Personal Gallery

After knowing what SMA Budi Mulia needs, the next step is to create materials for each meeting. The following is a material plan for each meeting with a total of 12 (twelve) meetings. The meetings will be divided into 2, namely 6 days for class 10 which are held on Tuesdays at 15.00-16.30 and 6 meetings for class 11 every Friday at 15.00-16.30 and will start on January 14, 2025. The following is a design of extracurricular learning materials for class X and class XI in the following table.

Table 1. Design of Extracurricular Learning Materials for Class X

No	Date	Material	Main Material	Method
1	January 14th, 2025	Pascal	Using gotoxy in for loop.	Practice
2	Januari 21th, 2025		Use of gotoxy level 2 in for loop.	Practice
3	February 4th, 2025		Use of while and repeat and combination of using while and repeat.	Practice
4	February 11th, 2025		Use of while and repeat and combinations using while and repeat level 2.	Practice
5	February 18th,2025		Using copy with string data type.	Practice
6	February 25th, 2025		Using copy with level 2 string data type.	Practice

Table 2. Design of Extracurricular Learning Materials for Grade XI

No	Date	Material	Main Material	Method
1	January 17th, 2025	HTML & CSS	Re-introducing the basics of HTML and HTML structure.	Theory & Practice
2	January 24th, 2025		Re-introducing CSS basics and CSS structure.	Theory & Practice
3	February 7th, 2025		Using color, font and text families in HTML & CSS.	Theory & Practice

4	February 14th, 2025	Project	Creating a class administrator structure using HTML & CSS.	Practice
5	February 21th, 2025		Continuing to create the class administrator structure using HTML & CSS.	Practice
6	Februari 28th, 2025		Completed the creation of a class management structure project using HTML & CSS.	Practice

This extracurricular program will cover two main topics: the fundamentals of programming using the Pascal language and the basics of building simple websites using HTML and CSS. The material is delivered offline in the computer laboratory of SMA Budi Mulia for 1 hour and 30 minutes per session. Therefore, to keep the learning process engaging, the content must be presented interactively with the aid of software tools.

In this activity, the primary program used for learning Pascal programming is Turbo Pascal (with DOSBox). Turbo Pascal is an integrated development environment (IDE) that comes with a compiler for the Pascal programming language (Diksa, 2012). This program has been widely recognized as an effective learning tool, particularly for teaching fundamental concepts of programming logic and algorithms. Although Turbo Pascal is an older program originally developed for DOS operating systems, its simple and structured syntax continues to make it relevant in educational settings.

DOSBox is a DOS emulator that allows DOS-based applications to run smoothly on modern devices using the latest Windows operating systems. It enables Turbo Pascal to function properly on these modern systems. With the combination of Turbo Pascal and DOSBox, students can learn to write code, compile programs, and perform debugging in a simple yet effective environment. It is expected that using this program will help students gradually understand fundamental programming concepts before moving on to more advanced programming languages.



Figure 4. Pascal Gotoxy While Display
Source: Personal Gallery

Students use Visual Studio Code (VS Code) for learning HTML and CSS. This program teaches them how to create the structure of a web page using HTML and design its appearance using CSS. VS Code is also highly flexible, lightweight, and supports many extensions relevant to web development. The project-based learning method helps students not only understand the theory of HTML and CSS but also apply it by building simple websites that can be published. It is expected that this will increase students' interest in web development and help strengthen their digital literacy skills. Below is the result of a project created by Grade XI students.



Figure 5. Class Organizational Structure Website Display (HTML)
Source: Personal Gallery

RESULT AND DISCUSSION

The Pascal and HTML programming extracurricular program at SMA Budi Mulia Jakarta has successfully achieved its target. During the implementation period from January to February 2025, students showed significant progress in mastering the material. For Pascal programming, 85% of participants have been able to understand basic syntax, branching structures such as IF-ELSE and CASE, and various forms of looping including FOR, WHILE, and REPEAT.



Figure 6. Atmosphere of SMA Budi Mulia Extracurricular Meeting
Source: Personal Gallery

In addition to improving hard skills, the program also succeeded in developing participants' soft skills. Through various group assignments and project presentations, students showed progress in teamwork, creativity, and problem-solving skills.



Figure 7. Assignment Result Presentation
Source: Personal Gallery

The high level of participation was reflected in the consistent attendance of over 90% during the 12 meetings, as well as the enthusiasm seen in the interactive discussions and timely completion of assignments. Documentation of activities in the form of photos of learning sessions, participants' coding results, and HTML/CSS projects have been collected as real evidence of the program's implementation.

CONCLUSION

The Pascal and HTML programming extracurricular program at SMA Budi Mulia Jakarta has succeeded in achieving its main goal of improving students' technological literacy. Through an interactive project-based learning approach, participants showed significant improvements in their mastery of basic programming concepts, with 85% of participants able to create simple Pascal programs and 90% successfully developing static web pages using HTML and CSS. This program not only develops hard skills in technology, but also successfully trains soft skills such as teamwork, creativity, and problem-solving skills. The high level of participation (attendance> 90%) and the enthusiasm of participants during 12 meetings prove that this practical learning model is effective for high school students. There are several things that can be evaluated related to the activities, some participants experienced obstacles during the learning process, but overall this extracurricular activity went well. This activity can also be a liaison for MBKM Kampus Mengajar.

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