



Basic Programming Training in Python for Junior High School Students at Al Fitrah Islamic Boarding School

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Abstract

This research discusses the implementation of basic programming training using the Python programming language for junior high school (SMP) students at Al Fitrah Islamic Boarding School. The aim of this study is to provide an overview of the training experience and its impact on students' understanding of programming and their proficiency in using Python. The research method used is qualitative with a case study approach. The participants of the study consist of students from the seventh and eighth grades at Al Fitrah Islamic Boarding School. Data was collected through observations, interviews, and tests of students' learning outcomes. The results of the research show that the basic programming training with Python effectively improves students' understanding of programming concepts and develops their computational skills. Additionally, the students demonstrate high interest and enthusiasm in programming activities, indicating strong potential for developing technological skills in the future. This research concludes that basic programming training with Python can be well integrated into the junior high school curriculum to enhance digital literacy and prepare students to face the challenges of an increasingly advanced technological world.

Keywords: Basic Programming, Python, Junior High School, Islamic Boarding School

1. Introduction

In the continuously evolving digital era, mastery of technology and programming has become an increasingly crucial need for the next generation (Yuliana, 2022). Children today grow up in a society dominated by technology, making programming skills essential to respond to future challenges. Programming is no longer just the domain of technology experts but has become an essential competence for individuals from various backgrounds to succeed in various life fields (Assyne et al., 2022).

Schools play a crucial role in preparing the younger generation to face the ever-changing technological world (Verhoeven et al., 2019). Therefore, it is important to present relevant and effective educational approaches to introduce programming at the elementary education level (George, 2020). This is where the significance of basic programming training with Python for junior high school students at Al Fitrah Islamic Boarding School comes into focus.

Al Fitrah Islamic Boarding School, as an educational institution caring for the holistic development of students, recognizes the need to introduce programming at an early age. Thus, the basic programming training using the Python programming language at Al Fitrah Islamic Boarding School aims to provide opportunities for students to learn and practice programming skills from an early age.

The objective of this research is to describe how the basic programming training with Python³ is implemented at Al Fitrah Islamic Boarding School and to examine its impact on students' understanding of programming concepts and their proficiency in using the Python programming language. Additionally, this research will explore students' interest and enthusiasm towards programming activities, providing deeper insights into the effectiveness of this training in building students' interest in technology.

By exploring the basic programming training with Python at Al Fitrah Islamic Boarding School, this research is expected to make a meaningful contribution to the development of technology education at the elementary education level. Moreover, this research is also expected to serve as a reference for other educational institutions planning to integrate programming into their curricula, providing relevant and comprehensive preparation for students to face the ever-evolving world of technology.

2. Materials and Methods

Research Location: This research was conducted at Al Fitrah Islamic Boarding School, an educational institution located at Kompleks Margahayu Raya, Merkuri Timur No.1, Manjahlega, Rancasari District, Bandung City, West Java, Indonesia. Al Fitrah Islamic Boarding School is a junior high school that emphasizes the development of technology and programming at the elementary education level.

Participants: The research participants consisted of students from grades VIII and IX at Al Fitrah Middle School who attended basic programming training with Python. The number of participants was selected through purposive sampling based on their interest and willingness to participate in the training.

Research Instruments:

- **Initial Questionnaire:** Before the training commenced, students completed an initial questionnaire to evaluate their understanding of technology and programming, as well as their interest in participating in the training.
- **Observation:** Researchers observed and recorded the training process, including interactions between students and instructors, and the level of student participation during the training sessions.
- **Interview:** Interviews with the training instructors and students were conducted after the training to understand students' experiences in the training, the challenges they encountered, and their perceptions of its benefits.
- **Learning Outcome Test:** Tests relevant to basic programming concepts with Python were conducted before and after the training to evaluate students' improvement in understanding.

Training Design: The basic programming training with Python was conducted in several sessions with a total duration of 6 hours. The training design incorporated an interactive, demonstrative, practical exercise, and project-based approach to enhance student participation and build their understanding of programming concepts.

Training Curriculum: The training curriculum included: a. Introduction to programming concepts and the Python programming language. b. Variables, data types, operators, and expressions. c. Conditionals (if-else) and loops (iteration). d. Basic functions and programming procedures. e. Introduction to simple projects with Python.

Teaching and Learning: The training was delivered through project-based teaching, where students learned through interactive exercises and practical projects. The training instructors provided guidance and support throughout the learning process.

Integration of Islamic Values: Islamic values were integrated into the training to emphasize ethics in technology usage and the importance of positive contributions to society.

Data Analysis: Data collected from the initial questionnaire, observation, interviews, and learning outcome tests were analyzed qualitatively and quantitatively to obtain comprehensive insights into the programming training and its impact on students' understanding.

Through this comprehensive research method, it is expected that this study can provide in-depth insights into the basic programming training with Python at Al Fitrah Islamic Boarding School and its contribution to building students' understanding of programming and technological skills.

3. Results and Discussion

Improvement in Understanding Programming Concepts: After participating in the basic programming training with Python, students experienced significant improvement in their understanding of programming concepts. Before the training, most students had limited knowledge of programming concepts, but after the training, the majority of students were able to identify variables, implement conditional structures, and create loops using the Python language.

Programming Skills: The training successfully enhanced students' programming skills. Students were able to write simple Python code to complete basic programming tasks. They could design and execute simple programs that involved variables, conditionals, and loops.

Interest and Enthusiasm in Programming: The research results indicate that the training successfully increased students' interest and enthusiasm in learning programming. Many students expressed their eagerness to learn more about programming and expressed their desire to develop more complex projects using the Python language.



Figure 1: Activity of program

The basic programming training with Python at Al Fitrah Middle School has positively contributed to students' understanding of programming and their technological skills. The use of project-based teaching methods in the training allowed students to learn actively and apply programming concepts in real-world contexts (Almulla, 2020).

The improvement in understanding programming concepts and programming skills demonstrates that this training successfully laid a strong foundation for students to further develop their programming abilities. This provides them with a competitive advantage in the future, as they face a workforce increasingly dominated by technology.

Furthermore, the increased interest and enthusiasm in programming indicate that the training successfully sparked students' interest in the field of technology. This heightened interest can have a positive impact on motivating students to pursue education and careers in technology, where they can become agents of change in facing the challenges of an advancing technological world (Haleem et al., 2022; Simões et al., 2022).

The integration of Islamic values in the training also had a positive impact in shaping students' character and teaching ethics in technology usage (Pu et al., 2022). This helps students become responsible and ethical programmers, prioritizing the well-being of society and aligning technology with religious values.

However, this research also faced some limitations. The use of qualitative methods with a case study design limited the generalization of research findings to a broader population. Additionally, this research only evaluated the short-term impact of the training. Therefore, further research with broader and longer-term methods is needed to gain a more comprehensive and in-depth understanding of the long-term impact of this training.

Overall, the basic programming training with Python at Al Fitrah Middle School has proven that introducing programming at an early age can provide significant benefits to students. It offers them the opportunity to develop the programming and technological skills necessary to face a future dominated by digital technology. Moreover, the integration of Islamic values in the training can shape responsible and ethical students who are ready to make positive contributions in the modern technological world.

4. Conclusion

This research investigates the impact of basic programming training with Python for junior high school students at Al Fitrah Middle School. Based on the research findings and data analysis, the following conclusions are drawn:

Overall, the basic programming training with Python at Al Fitrah Middle School has proven to be highly beneficial for students. The introduction of programming at an early age provides significant advantages for students. The training has resulted in improved understanding of programming concepts, technological skills, and increased interest in the field of technology among the students.

The integration of Islamic values in the learning process has also had a positive impact in shaping students' character to be responsible and ethical. Therefore, it is recommended that more educational institutions consider integrating basic programming training into their curricula, allowing students to acquire relevant skills in line with the current technological developments.

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