

# **Advancing Learning Programming: Using Web-Based Learning Integrated with Live Coding for Vocational High School Students**

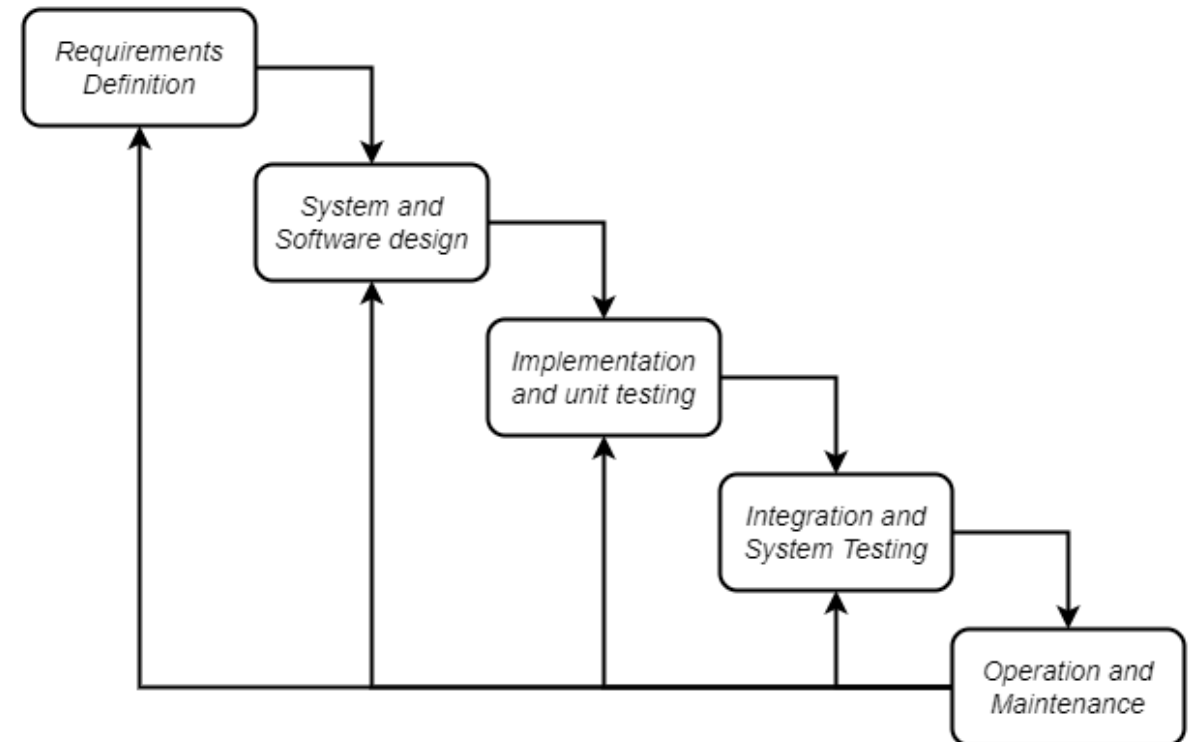
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# Introduction

- The potential of web-based learning as a solution for integrating information technology into education in the era of the Industrial Revolution 4.0.
- A case study at SMK Negeri 2 Bangkalan shows that students face difficulties in learning basic programming, primarily due to limited devices, learning time, and challenging materials.
- This research proposes a solution in the form of developing a web-based learning system with interactive features like live coding and gamification to help students better understand programming and algorithm concepts.

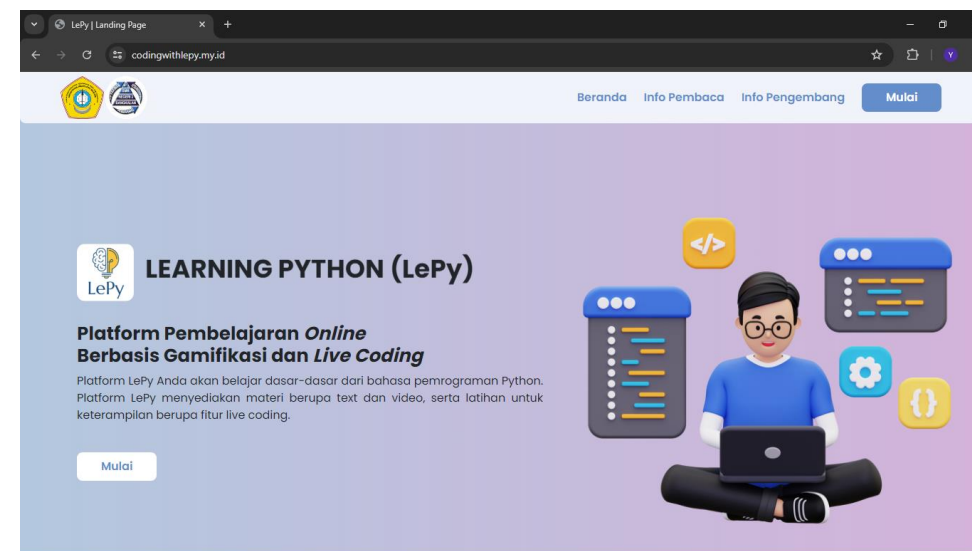
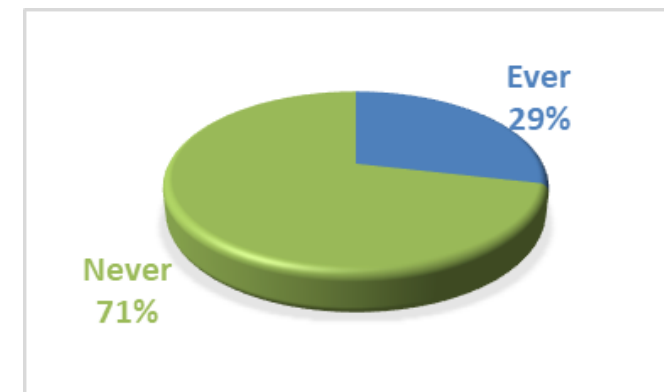
# Method

System Development Life Cycle is an method used to build software to ensure it functions as expected. One of the research models within System Development Life Cycle is the Waterfall model (Noviana, 2022).



## Findings and Discussion

- More than 50% of students have not used a web-based learning system for Basic Programming.
- Some research results, namely the database used in the system and website that can be accessed via a web browser.



## Findings and Discussion

- The developed web-based learning materials received a total score of 94 out of 100 points with a percentage score of 94% from content expert testing.
- The developed web-based learning platform received a total score of 167 out of 180 points, with a percentage score of 92.78% from media expert testing.
- Web-based learning system has good functionality from functional suitability testing.

## Findings and Discussion

- The GTMetrix results were as follows: GTMetrix Grade: C; Page Speed Score: 72%; YSlow Score: 82%; Load Time: 2.6 seconds. The website is considered to have good performance as the load time is well below the acceptable threshold of 10 seconds (Lamada et al., 2020).
- The reliability testing consisted of three tests: Click Test; Time Test; Ramp Test. The results were: Total Error Percentage per Test: 9.63% and Total Success Percentage per Test: 90.37%, this indicates that the developed system has high reliability (Lamada et al., 2020).

## Findings and Discussion

- This research produces different product developments from previous research.
- The difference with the research conducted by Arif & Rosyid, (2019) is a material into web-based learning.
- The difference with the research conducted by Gumilar et al. (2021) is that the testing carried out on the web-based learning system is more complex.

## Conclusion

- The web-based learning that has been developed can be used to support students in learning anywhere and anytime according to the results of tests conducted by material experts, media experts, and system testing using the ISO 25010 standard.
- Suggestions from researchers for the continued development is adding a multiple-choice practice feature that has a passing grade feature and adding a program code error alert feature in live coding by displaying a more specific error message.



## Reference

- Noviana, R. (2022). Pembuatan Aplikasi Penjualan Berbasis Web Monja Store Menggunakan PHP dan MySQL. *Jurnal Teknik dan Science (JTS)*, 1(2), 112–124. <https://doi.org/https://doi.org/10.56127/jts.v1i2.128>
- Lamada, M. S., Miru, A. S., & Amalia, R. (2020). Pengujian Aplikasi Sistem Monitoring Perkuliahan Menggunakan Standar ISO 25010. *Jurnal Media TIK: Jurnal Media Pendidikan Teknik Informatika dan Komputer*, 3(3). <https://doi.org/http://dx.doi.org/10.26858/jmtik.v3i3.15172>