

OPTIMALISASI PERSEBARAN SINYAL WIFI DI SMA NEGERI 2 GIANYAR MENGGUNAKAN APLIKASI *NETSPOT*

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ABSTRAK

Perkembangan Teknologi Informasi dan Komunikasi (TIK) menuntut tersedianya infrastruktur jaringan yang andal, khususnya di bidang pendidikan yang semakin bergantung pada konektivitas digital untuk mendukung proses pembelajaran, administrasi, dan pengembangan inovasi berbasis teknologi. SMA Negeri 2 Gianyar sebagai sekolah yang relatif baru masih menghadapi permasalahan pemerataan akses internet akibat distribusi sinyal Wi-Fi yang belum optimal di beberapa area strategis, sehingga berdampak pada efektivitas kegiatan akademik dan operasional sekolah. Penelitian ini bertujuan untuk mengevaluasi serta meningkatkan jangkauan dan kualitas sinyal Wi-Fi melalui pendekatan simulasi heatmap dan analisis Received Signal Strength Indicator (RSSI) berbasis data lapangan. Metode penelitian yang digunakan adalah action research yang meliputi lima tahapan, yaitu diagnosing, action planning, action taking, evaluating, dan learning. Pengumpulan data dilakukan dengan memanfaatkan aplikasi NetSpot melalui metode active site survey dan passive site survey untuk memperoleh pemetaan kekuatan sinyal secara menyeluruh. Hasil penelitian menunjukkan adanya beberapa area dengan kualitas sinyal rendah, ditandai oleh nilai RSSI di bawah -80 dBm, terutama pada lantai satu gedung kelas dan ruang administrasi. Setelah dilakukan optimasi melalui penataan ulang dan penambahan access point, jangkauan dan kualitas sinyal meningkat secara signifikan. Coverage area ratio mencapai 98%, dengan nilai RSSI yang merata di atas -65 dBm di seluruh area sekolah. Simulasi ketiga menjadi skenario paling optimal dengan penambahan lima unit access point dan estimasi biaya sebesar Rp4.977.689. Temuan ini menunjukkan bahwa simulasi jaringan berbasis data lapangan efektif sebagai dasar optimasi infrastruktur Wi-Fi di lingkungan pendidikan.

Kata Kunci: *Wi-Fi, Persebaran Sinyal Wi-Fi, RSSI, Heatmap, Action Research.*

OPTIMIZATION OF WIFI SIGNAL DISTRIBUTION AT SMA NEGERI 2 GIANYAR USING THE NETSPOT APPLICATION

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ABSTRACT

The development of Information and Communication Technology (ICT) requires the availability of reliable network infrastructure, particularly in the education sector, which increasingly depends on digital connectivity to support learning activities, administrative processes, and the development of technology-based innovations. SMA Negeri 2 Gianyar, as a relatively new educational institution, still faces challenges in achieving equitable internet access due to suboptimal Wi-Fi signal distribution in several strategic areas. This condition has affected the effectiveness of academic and operational activities within the school. This study aims to evaluate and improve the coverage and quality of Wi-Fi signals through a heatmap simulation approach and an analysis of the Received Signal Strength Indicator (RSSI) based on field data. The research method employed is action research, which consists of five stages: diagnosing, action planning, action taking, evaluating, and learning. Data were collected using the NetSpot application through active site survey and passive site survey methods to obtain a comprehensive mapping of signal strength. The results indicate the presence of several areas with poor signal quality, characterized by RSSI values below -80 dBm, particularly on the first floor of the classroom building and in administrative offices. After optimization through repositioning and the addition of access points, both signal coverage and quality improved significantly. The coverage area ratio reached 98%, with RSSI values evenly distributed above -65 dBm throughout the school area. The third simulation scenario proved to be the most optimal, involving the addition of five access points with an estimated cost of IDR 4,977,689. These findings demonstrate that field data-based network simulation is an effective approach for optimizing Wi-Fi infrastructure in educational environments.

Kata Kunci: *Wi-Fi, Signal Distribution, Wi-Fi, RSSI, Heatmap, Action Research.*