

ABSTRAK

Perkembangan teknologi informasi dan komunikasi (TIK) mendorong transformasi dalam dunia pendidikan, termasuk di jenjang Sekolah Menengah Atas (SMA). Infrastruktur jaringan komputer menjadi kunci utama dalam mendukung pembelajaran digital. Namun, banyak sekolah masih mengalami kendala seperti keterbatasan infrastruktur, kurangnya keamanan jaringan, serta pemanfaatan sumber daya yang belum optimal.

Penelitian ini menganalisis dan mengoptimalkan infrastruktur jaringan komputer di SMA Negeri 7 Tasikmalaya menggunakan pendekatan *Network Development Life Cycle* (NDLC) yang terdiri dari enam tahap: analisis kebutuhan, desain, simulasi, implementasi, pemantauan, dan pemeliharaan. Metode yang digunakan bersifat *kualitatif-deskriptif* melalui observasi, wawancara, dan studi literatur.

Hasil menunjukkan bahwa penerapan NDLC meningkatkan stabilitas, keamanan, dan efisiensi jaringan. Tantangan utama yang ditemukan meliputi keterbatasan *bandwidth*, minimnya tenaga teknis, dan manajemen infrastruktur yang belum maksimal. Maka dari itu, direkomendasikan peningkatan kapasitas jaringan, pelatihan teknis bagi staf, serta penerapan *firewall* dan sistem manajemen *bandwidth* yang efektif sebagai solusi strategis yang dapat diadaptasi oleh sekolah lain.

Kata Kunci: Jaringan Komputer, *NDLC*, Infrastruktur Sekolah, Manajemen Jaringan, Teknologi Pendidikan.

ABSTRACT

The development of information and communication technology (ICT) continues to drive transformation within the education sector, including at the senior high school (SMA) level. Computer network infrastructure plays a central role in supporting digital learning. However, many schools still face challenges such as limited infrastructure, insufficient network security, and suboptimal use of available resources.

This study analyzes and optimizes the computer network infrastructure at SMA Negeri 7 Tasikmalaya using the Network Development Life Cycle (NDLC) approach, which consists of six stages: needs analysis, design, simulation, implementation, monitoring, and maintenance. The research method applied is qualitative-descriptive, involving observation, interviews, and literature studies.

Results show that the implementation of NDLC improves the stability, security, and efficiency of the network. The main challenges identified include limited bandwidth, lack of technical personnel, and inadequate infrastructure management. Therefore, increasing network capacity, providing technical training for staff, and implementing effective firewall and bandwidth management systems are recommended as strategic solutions that can be adopted by other schools.

Keywords: *Computer Network, NDLC, School Infrastructure, Network Management, Educational Technology*