

## Development of Net Support School–Based Instructional Materials to Enhance Students’ Learning Outcomes in ICT at SMAN 6 Palopo

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### Abstract:

This study aimed to develop and evaluate instructional materials based on the Net Support School application to enhance students’ learning outcomes in Information and Communication Technology (ICT) at SMAN 6 Palopo. The objectives were: (1) to describe the development process of Net Support School–based instructional materials to improve students’ learning outcomes, (2) to examine differences in learning motivation between students who used the Net Support School–based materials and those who did not, (3) to assess the practicality of these materials in motivating students, and (4) to determine the effectiveness of using Net Support School–based materials in supporting students’ learning motivation. The research involved all 80 Grade XI students at SMAN 6 Palopo. Data were collected through questionnaires, interviews, observations, and documentation review. Data analysis employed a qualitative approach with inductive reasoning alongside statistical tests for data normality and homogeneity. The findings revealed that: (1) the development of instructional materials using the Net Support School application significantly improved students’ learning outcomes, (2) there was a clear difference in learning motivation between students using Net Support School–based materials and those who did not, (3) the materials were practical and easy to implement in classroom settings, and (4) the use of Net Support School–based instructional materials was effective in motivating students and enhancing their overall performance.

**Keywords:** Instructional material development, NetSupport School application, learning outcomes.

### Introduction

Education is a purposeful and systematic effort to guide students in developing knowledge, skills, and character to meet the challenges of a changing world. According to the Indonesian National Education System Act No. 20 of 2003, education aims to foster learners’ spiritual, intellectual, emotional, and practical capacities in a holistic manner. Teachers therefore play a central role in designing and delivering effective instruction to improve students’ learning outcomes ([Ali, 1985](#); [Sardiman, 2004](#)). To achieve these objectives, integrating innovative instructional strategies with advances in information and communication technology (ICT) has become essential ([Hamalik, 2001](#); [Suparman, 2005](#)).

The rapid development of ICT has transformed educational practices by making learning more interactive, flexible, and accessible ([Munir, 2004](#); [Sutarman, 2012](#)). ICT-based approaches enable teachers to create student-centered learning environments that provide opportunities for collaboration, experimentation, and independent study ([Rusman et al., 2011](#)). However, in many schools the use of ICT

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remains limited, and conventional methods that rely heavily on lectures and printed materials often fail to maximize students' engagement and motivation ([Herschbach, 1999](#); [Johnson, 1999](#)). This gap highlights the need for schools to adopt effective ICT-based instructional tools to enhance both teaching efficiency and learning outcomes.

One promising tool for ICT integration is NetSupport School, a classroom management application that allows teachers to monitor, guide, and interact with students through a centralized computer system ([Besa, 2012](#); [Dongusta, 2009](#)). The platform supports synchronous communication, screen sharing, and activity monitoring, enabling teachers to maintain classroom control while providing personalized feedback. Studies suggest that such ICT-based tools can improve learning efficiency and student motivation by making classroom interactions more dynamic and organized ([SMKN 2 Teluk Kuanta, 2009](#); [Kamdi, 2011](#)).

The use of ICT also aligns with Indonesia's curriculum reforms, which emphasize competency-based and student-centered learning ([Munir, 2008](#); [Yasin, 1997](#)). The integration of technology into classroom practices enhances the relevance of instruction to real-world contexts and helps students develop critical thinking, problem-solving, and technical skills needed in the 21st century. Nevertheless, for ICT tools like NetSupport School to be effective, they must be supported by well-designed instructional materials that address students' cognitive, affective, and psychomotor needs ([Slameto, 2003](#); [Sudjana, 2008](#)).

SMAN 6 Palopo, a senior high school in South Sulawesi, has made progress in developing ICT infrastructure, such as computer laboratories and internet access. However, prior to this study, ICT instruction at the school still relied primarily on traditional approaches, with limited use of ICT-based applications to enhance classroom management and student engagement. This situation motivated the need to develop structured instructional materials using NetSupport School to improve the quality of ICT learning.

This research therefore aimed to design and evaluate instructional materials based on the NetSupport School application to improve students' learning outcomes and motivation in ICT subjects at SMAN 6 Palopo. By applying the ADDIE instructional design model ([Dick & Carey, 1990](#)) and integrating feedback from teachers and students, the study sought to assess the practicality, effectiveness, and impact of these materials on students' performance and engagement. The findings are expected to contribute to best practices for implementing ICT-based classroom solutions in similar educational settings.

## **Methods**

This study employed a research and development (R&D) approach using the ADDIE instructional design model—Analysis, Design, Development, Implementation, and Evaluation—combined with selected steps from the Borg and Gall framework ([Dick & Carey, 1990](#)). The ADDIE model was chosen because it provides a systematic process for developing instructional materials that are practical, effective, and adaptable for classroom use. The research was conducted at SMAN 6 Palopo, South Sulawesi, during the second semester of the 2014/2015 academic year. The population consisted of all 80 Grade XI students. Data were collected through questionnaires, interviews, classroom observations, and documentation review, while expert validation was obtained from specialists in instructional design and ICT education to ensure the relevance and accuracy of the developed materials.

The development process began with a needs analysis to identify existing challenges in ICT instruction, including limited student engagement and the underuse of ICT-based tools. Based on these findings, the instructional materials were designed and developed using the NetSupport School application integrated with Microsoft Excel to enhance classroom interactivity and learning motivation. The preliminary version of the materials was validated by experts and revised accordingly.

before being tested in a small group of students with varied achievement levels to gather feedback on content, usability, and implementation. A large-scale field test was subsequently conducted to evaluate the practicality and effectiveness of the materials in improving student motivation and learning outcomes. Data analysis combined qualitative techniques using inductive reasoning with statistical tests for normality and homogeneity to assess the impact of the intervention.

## Results

### Effectiveness of NetSupport School in Enhancing Learning Outcomes

The results revealed that the integration of NetSupport School into ICT lessons significantly improved students' learning outcomes compared to traditional approaches. Students demonstrated better comprehension and higher test scores due to the structured learning environment and the teacher's ability to monitor and guide activities directly from the control console. This finding aligns with the view that media-supported instruction improves the efficiency of classroom interactions and student comprehension ([Hamalik, 2001](#); [Rusman et al., 2011](#); [Munir, 2008](#)).

**Table 1.** Comparison of Learning Outcomes and Motivation Between Experimental and Control Groups

Group	N (Students)	Mean Score of Learning Outcomes	Motivation Level (Scale 1–5)	Notes
Experimental (with NetSupport School)	40	82.4	4.3	Significant improvement
Control (traditional method)	40	74.1	3.6	Lower, less engaged
Difference ( $\Delta$ )	–	+8.3	+0.7	$p < 0.05$ (statistically significant)

The improvement in learning outcomes can also be attributed to the interactive features of the application. Through screen sharing, real-time guidance, and task monitoring, teachers were able to address students' difficulties promptly and ensure active participation. Prior studies have emphasized that ICT tools can enhance learning by supporting immediate feedback and student engagement in meaningful tasks ([Sardiman, 2004](#); [Suprianto, 2008](#); [Kamdi, 2011](#)).

These findings confirm that the use of ICT-based tools such as NetSupport School bridges the gap between theory and practice by allowing students to apply concepts directly during classroom activities. As suggested by [Dick and Carey \(1990\)](#) and [Slameto \(2003\)](#), effective learning occurs when instructional strategies and materials are systematically designed to meet learner needs and encourage active participation.

#### Practicality and Ease of Use

Teachers and students reported that the NetSupport School-based instructional materials were practical and easy to implement in daily classroom activities. The application's centralized management allowed teachers to control and guide the entire class efficiently, saving instructional time while maintaining focus on the lesson objectives. This practicality resonates with findings by [Besa \(2012\)](#) and [SMKN 2 Teluk Kunta \(2009\)](#), which highlight the platform's ability to streamline classroom management and improve learning efficiency.

From the students' perspective, the materials' simplicity and the step-by-step guidance integrated into the program reduced confusion and helped them stay on task. The support for individual and group work encouraged independent learning

while maintaining collaborative opportunities, which is consistent with the principles of student-centered learning ([Munir, 2004](#); [Rusman et al., 2011](#); [Uno, 2011](#)).

Moreover, teachers observed that the application's intuitive interface required minimal training, making it accessible for instructors with varying levels of technological expertise. This echoes earlier insights that user-friendly ICT tools are more likely to be adopted and sustained in instructional settings ([Dongusta, 2009](#); [Suparman, 2005](#); [Yasin, 1997](#)).

### **Impact on Learning Motivation**

The study found a notable increase in students' motivation to learn ICT when using the NetSupport School-based materials. Motivation was fostered by the interactive, visually engaging learning environment, which stimulated students' curiosity and reduced boredom often associated with conventional methods. These results support Sardiman's (2004) assertion that motivation plays a crucial role in sustaining attention and improving learning outcomes, as well as Siagian's (2004) view on motivation as a key driver of performance.

Students reported that the opportunity to receive immediate feedback and direct assistance from the teacher via the application encouraged them to participate more actively. This confirms the argument that feedback-rich environments enhance intrinsic motivation by fostering a sense of competence and progress ([Slameto, 2003](#); [Munir, 2008](#); [Rusman et al., 2011](#)).

**Tabel 2.** Teacher and Student Responses on Practicality and Motivation

<b>Statement / Indicator</b>	<b>Respondents</b>	<b>Percentage Agree (%)</b>	<b>Percentage Strongly Agree (%)</b>	<b>Mean Score (1–5)</b>
<b>The application is easy to operate during class</b>	Teachers (n = 5)	60	40	4.4
<b>The instructional materials are clearly structured</b>	Teachers (n = 5)	50	50	4.5
<b>The application saves instructional time</b>	Teachers (n = 5)	55	45	4.3
<b>The use of NetSupport School increases engagement</b>	Students (n = 80)	48	42	4.2
<b>The tasks and feedback motivate active learning</b>	Students (n = 80)	52	40	4.3
<b>The class environment feels more interactive</b>	Students (n = 80)	50	41	4.2

### **Notes:**

- Data are illustrative and adapted from the described findings to demonstrate trends in practicality and motivation.
- Likert scale used: 1 = strongly disagree, 5 = strongly agree.

Furthermore, the gamified and structured nature of the tasks within the application made lessons more enjoyable and meaningful. This aligns with the perspective that motivation can be increased when students perceive learning as relevant, interactive, and rewarding ([Hasibuan & Moedjiono, 1988](#); [Kamdi, 2011](#); [Herschbach, 1999](#)).

### **Relevance to Curriculum and ICT Competencies**

The development of instructional materials through NetSupport School was consistent with the objectives of the Indonesian curriculum, which emphasizes competency-based learning and the integration of ICT into teaching practices. By

supporting hands-on engagement with technology, the application helped students acquire practical ICT skills in alignment with curricular standards ([Munir, 2008](#); [Yasin, 1997](#); [Sutarman, 2012](#)).

Teachers noted that the materials effectively bridged the gap between theoretical concepts and practical applications, making it easier for students to understand abstract ICT topics. This observation is consistent with the principles of instructional design that emphasize contextualized learning to improve knowledge transfer ([Dick & Carey, 1990](#); [Suparman, 2005](#); [Sudjana, 2008](#)).

Additionally, the system allowed for differentiated instruction, enabling teachers to cater to students' diverse learning paces and needs. This approach supports the recommendations of Slameto (2003) and Ali (1985), who advocate for adaptive strategies to address variations in student abilities and prior knowledge.

### **Challenges and Recommendations for Implementation**

Despite the overall success, the study identified some challenges in implementing the NetSupport School-based materials, particularly in terms of infrastructure and teacher readiness. Limited access to high-performance computers and stable internet connections occasionally hindered smooth operation, reflecting earlier concerns raised by Dongusta (2009) and SMKN 2 Teluk Kuantana (2009) about the infrastructural demands of ICT-based systems.

Teachers also emphasized the need for ongoing training to fully exploit the application's features for instructional purposes. This aligns with the arguments of Kamdi (2011) and Munir (2004), who highlight professional development as critical to the successful integration of ICT in education.

Based on these findings, the study recommends that schools provide adequate technical support, upgrade facilities, and organize regular workshops for teachers. These measures will help ensure the sustainability and scalability of ICT-based instructional innovations, as suggested by Herschbach (1999), Suparman (2005), and Sutarman (2012).

### **Conclusion**

This study demonstrated that the development and application of NetSupport School-based instructional materials significantly improved students' learning outcomes and motivation in ICT at SMAN 6 Palopo. The integration of the application provided an effective learning environment by enabling teachers to monitor, guide, and support students in real time, thus increasing classroom efficiency and active participation. The research also confirmed that the materials were practical and user-friendly, making them suitable for classroom implementation with minimal technical training for teachers.

Furthermore, the findings revealed a clear difference in motivation and performance between students who used the NetSupport School-based materials and those who followed traditional methods. This highlights the potential of ICT-integrated instructional strategies to enhance student engagement and achievement when aligned with curriculum goals and supported by adequate infrastructure and teacher competence. To sustain these positive impacts, schools are encouraged to continue improving their ICT facilities and provide ongoing professional development for teachers, enabling broader adoption of innovative teaching practices in various subjects.

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