

ABSTRAK

Elsa Awalia Lesmana :Pembelajaran Berbasis Masalah (Pbl) Untuk Meningkatkan Pemahaman Konsep Dan Literasi Nutrisi Peserta didik Berbantuan *Internet of Things* (Iot) Sensor Suhu Pada Materi Termokimia

Penelitian ini bertujuan untuk mendeskripsikan desain dan keterlaksanaan pembelajaran berbasis masalah berbantuan *Internet of Things* (IoT), serta menganalisis peningkatan pemahaman konsep dan literasi nutrisi peserta didik pada materi termokimia. Penelitian ini menggunakan metode *Research and Development* (R&D) dengan model ADDIE yang terdiri atas tahap analisis, perancangan, pengembangan, implementasi, dan evaluasi. Produk yang dikembangkan meliputi modul ajar, LKPD berbasis masalah, dan perangkat IoT untuk mengukur perubahan suhu serta mengestimasi energi selama aktivitas fisik. Instrumen penelitian terdiri atas lembar validasi, lembar observasi keterlaksanaan pembelajaran, soal *two-tier test* untuk mengukur pemahaman konsep, serta instrumen literasi nutrisi yang mencakup *Functional Nutrition Literacy* (FNL), *Interactive Nutrition Literacy* (INL), dan *Critical Nutrition Literacy* (CNL). Produk dan instrumen penelitian divalidasi oleh ahli materi, ahli teknologi, dan praktisi pendidikan. Subjek pada penelitian ini adalah peserta didik kelas XI SMAS YKM Tanjungsari. Data keterlaksanaan pembelajaran dianalisis secara deskriptif, sedangkan peningkatan pemahaman konsep dan literasi nutrisi dianalisis menggunakan *N-Gain*. Hasil penelitian menunjukkan bahwa desain pembelajaran berbasis masalah berbantuan IoT dikembangkan melalui tahapan analisis kebutuhan, perancangan pembelajaran dan perangkat IoT, pengembangan serta validasi produk, implementasi, dan evaluasi. Keterlaksanaan pembelajaran mencapai 93% dengan kategori sangat baik. Peningkatan pemahaman konsep peserta didik memperoleh nilai *N-Gain* sebesar 0,57 dengan kategori sedang. Peningkatan literasi nutrisi berdasarkan tiga dimensinya menunjukkan nilai *N-Gain* FNL sebesar 0,87 dengan kategori tinggi, INL sebesar 0,74 dengan kategori sedang, dan CNL sebesar 0,48 dengan kategori sedang. Integrasi data hasil pengukuran berbantuan IoT dalam menyelesaikan masalah kontekstual membantu peserta didik dalam membangun keterkaitan antara konsep termokimia dan energi tubuh yang dilepaskan.

Kata Kunci: Pembelajaran berbasis masalah, *Internet of Things*, Pemahaman konsep, Literasi nutrisi, Termokimia

ABSTRACT

Elsa Awalia Lesmana : *Problem-Based Learning (PBL) to Improve Students' Understanding of Nutritional Concepts and Literacy with the Assistance of Internet of Things (IoT) Temperature Sensors in Thermochemistry Material*

This study aims to describe the design and implementation of problem-based learning assisted by the Internet of Things (IoT), as well as to analyze improvements in students' conceptual understanding and nutrition literacy regarding the topic of thermochemistry. The study employs the Research and Development (R&D) method using the ADDIE model, comprising the stages of analysis, design, development, implementation, and evaluation. The developed products include a teaching module, problem-based student worksheets (LKPD), and an IoT device designed to measure temperature changes and estimate energy expenditure during physical activity. Research instruments consist of validation sheets, learning implementation observation sheets, a two-tier test to measure conceptual understanding, and a nutrition literacy instrument covering Functional Nutrition Literacy (FNL), Interactive Nutrition Literacy (INL), and Critical Nutrition Literacy (CNL). The products and instruments were validated by subject matter experts, technology experts, and education practitioners. The subjects of this study were Grade XI students at SMAS YKM Tanjungsari. Data on learning implementation were analyzed descriptively, while improvements in conceptual understanding and nutrition literacy were analyzed using the N-Gain score. The results indicate that the IoT-assisted problem-based learning design was developed through stages involving needs analysis, the design of learning activities and IoT devices, product development and validation, implementation, and evaluation. Learning implementation achieved a score of 93%, falling into the "very good" category. The improvement in students' conceptual understanding yielded an N-Gain score of 0.57, categorized as "medium." Improvements in nutrition literacy across the three dimensions showed N-Gain scores of 0.87 for FNL ("high" category), 0.74 for INL ("medium" category), and 0.48 for CNL ("medium" category). Integrating IoT-assisted measurement data into the resolution of contextual problems helped students establish connections between thermochemistry concepts and the energy released by the body.

Keywords: Problem-based learning, Internet of Things, Concept understanding, Nutrition literacy, Thermochemistry