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Development of NAPZA E-LKPD based on Problem to Improve Collaboration and Problem Solving Abilities of High School Students

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Abstract

In learning material about NAPZA, learning media that involve collaborative process among students to solve issues related to drug misuse is essential during high school education. The existing NAPZA abuse learning media at SMA N 1 Slawi have been found to be limited in terms of contextual relevance and student engagement in collaborative problem-solving activities. Thus, there is a need to develop problem-based learning media for NAPZA material. This study aims to analyze the validity of the content and media of the E-LKPD product, as well as assess the improvement in collaboration and problem-solving abilities of high school students using the NAPZA E-LKPD based on problem. This research was conducted at Senior High School 1 Slawi even semester. The research adopts a research and development method, following the ADDIE model (analyze, design, development, implementation, and evaluation). NAPZA E-LKPD based on problem was declared highly valid with an assessment of 98.64% by media experts and 97.58% by material experts. Based on the result of this research, NAPZA E-LKPD based on problem proves to enhance students' collaboration abillity. Additionally, the E-LKPD NAPZA based on problem significantly improves high school students' problem-solving ability.

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INTRODUCTION

Learning activities in schools are inseparable from the teacher's role in managing student learning activities, starting from preparing learning designs to conducting evaluations to support learning objectives (Pamela et al., 2019). Teachers are expected to be able to innovate and improvise in utilizing various developing technologies as one of the efforts to enhance the quality of teaching. In the 2013 curriculum, teachers are required to consider several aspects, including adapting learning media to technological advancements and students' learning needs, designing up-to-date learning strategies, and integrating 21st-century skills into learning activities (Widodo, 2018).

One of the subjects studied by high school students in Grade XI is Narcotics, Psychotropics, and Addictive Substances (NAPZA). This material discusses the dangers, impacts, and efforts to overcome drug abuse of NAPZA. To study this subject effectively, contextual learning is necessary, involving active student participation. NAPZA learning that engages students actively, such as discussions, questions and answers, can encourage students to make the appropriate attitude decisions when facing problems (Asrina *et al.*, 2020).

The NAPZA material is one of the most essential subjects for students to learn and understand because the adolescent age is highly vulnerable to being ensnared and tempted by drug abuse (Rahayu, 2020). The rate of illegal drug abuse among Indonesian students is high and poses a serious threat that needs to be addressed. Thus, students need to fully understand the NAPZA material to prevent them from falling into the dangers of drug abuse (Wahyu, 2022). In this case, students should be faced with real problems to raise awareness of the dangers of drug abuse and find appropriate solutions to solve these problems.

Based on interviews with the Biology teacher at SMA N 1 Slawi, there are challenges faced in NAPZA teaching, including limited learning resources. The learning resources used for NAPZA materials have been limited to textbooks and internet sources that only cover summaries of the material without addressing the related issues of NAPZA abuse. The available learning resources often emphasize the dangers of illegal drugs but overlook the danger of addictive substances found in cigarettes. However, smoking habits can be a starting point for someone to try other types of NAPZA. Fathonah & Ratnasari (2020) stated that the lack of learning resources resulted in students struggling to understand the various types of drugs and their dangers. Another challenge encountered in learning is that the delivery of material is still predominantly through teacher-centered-learning. Complex issues related to NAPZA abuse cannot be effectively taught to students using teacher-centered learning methods, so a more contextual and student-centered learning approach is needed.

Based on these challenges, the development of learning media that incorporate real problems and actively involve students is necessary. This can be achieved through Students Electronic Worksheets (E-LKPD) based on problem. E-LKPD based on problem can one of the alternative learning media that directs students to understand the dangers of various types of NAPZA so the students are more literate about the importance of campaigning against drug abuse. E-LKPD can be developed through the liveworksheets platform, an interactive learning platform containing online worksheets with various features (Yuniastuti *et al.*, 2021). The benefits of E-LKPD include efficiency in saving space and time, cost-effectiveness, and can be modified easily. E-LKPD on the liveworksheet paltform can integrate Microsoft PowerPoint (PPT), video, audio, and questions (Firtsanianta & Khofifah, 2022).

Implementation of problem-based learning with the help of E-LKPD can be one of the ways to improve students' problem-solving and collaboration abilities. Both of these abilities are crucial for 21st-century learners to face future challenges. According to Ansori (2021), collaborative problem-solving-based learning can improve students' ability to solve problems together as a unified group. In the effort of problem-solving, students require cooperation with their peers because each student possesses different ways of thinking to solve the problems. Thus, they can assist one another in obtaining the best solutions or answers through collaborative efforts (Hannania et al., 2022) .

Problem-solving ability refer to one's ability to effectively and accurately find solutions to a problem by analyzing and evaluating the situation (Istiyono *et al.*, 2019). Rahmawati et al (2019) stated that learning activities presenting problems related to the learning material can encourage students to formulate the most appropriate problem-solving alternatives and decide on the best efforts until the problem is resolved. Learning media that contain contextual problems able to train students to correlate their knowledge with real-life-cases (Herianto & Sifak, 2020). In study by Arestu et al. (2019), the use of problem-based E-LKPD in learning encourage an improvement in problem-solving skills, as students were introduced to problems that involved their knowledge, and they were required to formulate ideas using their problem-solving thinking patterns.

Problem-solving activities can be supported by collaboration skills. Collaboration skills are one of the essential 21st-century skills that students need to possess. Dewi et al. (2020) define collaboration skills

as the ability to manage groups, solve common problems, and deal with differences that exist within groups. Student collaboration skills include students' ability to contribute actively, work productively, show flexibility, responsibility, and respect (Greenstein, 2012). E-LKPD-assisted learning can also develop students' collaboration skills, as the E-LKPD contains guidelines for students to carry out problem-solving activities in groups (Fitriyani et al., 2019).

In NAPZA learning at high school, it is essential to have learning media that involve collaborative problem-solving processes related to NAPZA abuse in real-life situations to enhance students' collaboration and problem-solving abilities. Thus, the development of NAPZA E-LKPD based on problem is necessary to improve the collaborative and problem solving abilities of high school students.

RESEARCH METHOD

This research was conducted at Senior High School 1 Slawi during even semester of April-May in the 2022/2023 school year. This research is a development research that refers to the ADDIE model, which consists of five stages, namely analysis, design, development, implementation, and evaluation. The analysis stage is carried out to identify the learning problem through interviews with biology teacher and observations, aimed at determining the appropriate solution. During the design stage, NAPZA E-LKPD based on problem began to be designed using Microsoft Word and Canva. At the development stage, the designed E-LKPD was realized into a product which can be accessed through th liveworksheet platform. The developed product also validated by media and material experts. The feedback provided by the experts based on the validity results was used to improve the learning media. The implementation stages consist of small-scale and large-scale trials. The small-scale trials involved 30 students from class XII MIPA 1 and one biology teacher. The large-scale trials were conducted with 29 students of class XI MIPA 1 and 22 students of class XI MIPA 3. The data collected included the validation results from material and media experts, the results of media legibility by teachers and students during small-scale trials, the results of peer assessment and observation of collaboration abilities, and pretest-postes score to determine students' problem solving ability before and after learning use the developed media.

RESULTS AND DISCUSSION

1. Validation of NAPZA E-LKPD based on Problem by Media and Material Experts

The validation of NAPZA E-LKPD based on problem was conducted by two experts, namely media and material expert. The purpose of the validation was to determine the product validity score and to correct any deficiencies in the E-LKPD product development. The E-LKPD is s considered valid if it obtains a score that exceeds the minimum limit, aligning with the provisions of the National Education Standards Agency (BSNP).

The media expert validation was carried out by Biology Lecturer at Semarang State University, namely Dr. Sigit Saptono, M.Pd. The assessment by the media expert aimed to ascertain the percentage of eligibility of the E-LKPD media based on graphic and language aspects.

Table 1. The Result of Validation by Media Expert

No.	Assesment Aspect	Score	Maximum Score	Percentage (%)	Criteria
1.	Grafic	110	112	98,21	Very valid
2.	Language	36	36	100	Very valid
			Total (%)	**98,64**	**Very valid**

Based on the data in Table 1, the developed E-LKPD media obtained highly appropriate criteria in both graphic and language aspects. This media can be considered highly valid for use as a learning medium because it possesses complete, proportional, clear, and engaging graphic elements, as well as concise, communicative, and age-appropriate language elements that align with the intellectual development of high school students.

Material expert validation was also carried out by Dr. Sigit Saptono, M.Pd. Material experts provide an assessment of the material presented in the E-LKPD in terms of the feasibility of content, presentation, language, and contextual assessment. The recapitulation of the material expert validity results can be seen in Table 2.

Table 2. The Result of Validation by Material Expert

No.	Assesment Aspect	Score	Maximum Score	Percentage (%)	Criteria
1.	Content	48	48	100	Very valid
2.	Presentation	23	24	95,83	Very valid
3.	Language	32	32	100	Very valid
4.	Contextual Assesment	18	20	95	Very valid
			Total (%)	**97.58**	**Very valid**

Based on the validation results by the material expert, the content presented in the Problem-Based NAPZA E-LKPD showed highly appropriate criteria with a percentage of 97.58%. The content and learning activities contained in the NAPZA E-LKPD based on problem are presented comprehensively, starting from the material introduction, case examples, discussion activities, and student analysis. The learning activities are designed to support the achievement of the learning objectives in accordance with the competency standards (KD). Thus, it can be concluded that the content found in the NAPZA E-LKPD bases on problem is suitable for use in learning.

2. Results of NAPZA E-LKPD based on Problem Readability by Teacher and Students

The E-LKPD product that has been validated and revised is then used in the implementation phase of a small-scale trial to measure the practicality, convenience, and helpfulness of the developed E-LKPD media. This questionnaire is filled out by teachers and students.

The E-LKPD readability questionnaire data was obtained from a biology teacher at SMA N 1 Slawi, namely Mr. Sapto Raharjo, S.Pd. The results of the media readability questionnaire analysis can be seen in Table 3.

Table 3. The Result of of NAPZA E-LKPD based on Problem Readability by Teacher

No.	Aspect	Score	Maximum Score	Percentage (%)	Criteria
1.	Learning	12	16	75	Good
2.	Language	9	12	75	Good
3.	Technical	11	12	91,67	Very Good
	Total (%)			**80**	**Good**

The result of E-LKPD readability assessed by the teacher shows good criteria with a percentage of 80% so the NAPZA E-LKPD based on problem can be used as a learning media.

The E-LKPD readability questionnaire was also distributed to class XII MIPA 1 students with a total of 31 students. The results of the media readability questionnaire analysis by students can be seen in Table 4.

Table 4. The Result of of NAPZA E-LKPD based on Problem Readability by Students

No.	Aspect	Score	Maximum Score	Percentage (%)	Criteria
1.	Learning	12	16	75	Good
2.	Language	9	12	75	Good
3.	Technical	11	12	91,67	Very Good
	Total (%)			**80**	**Good**

The readability results of the E-LKPD show very good criteria so that it can be said to be very suitable for use as a learning medium that helps improve students' collaboration and problem solving abilities.

In general, the developed E-LKPD shows practicality, convenience, and good assistance in learning. From the results of the legibility of the E-LKPD by teachers and students, the learning aspects in the media are good. This shows that the developed media already has E-LKPD assistance in encouraging students to solve problems, improve collaboration skills, understand learning material, and increase student activity in learning.

3. Students Collaboration Ability

In this study, the learning process was conducted over the course of four meetings. During the initial meeting, only the pretest and an introduction to the NAPZA E-LKPD based on problem were administered. No collaborative activities were conducted among students during this session, thus an assessment of student collaboration abilities had not been carried out. The evaluation of students' collaboration skills commenced from the second to the fourth session, during which students were guided to collaborate in resolving challenges presented in the developed E-LKPD.

Data on collaboration abilities were gathered from peer assessment forms and observation sheets carried out during 3 learning meetings. Data was collected over the course of three instructional meetings to ascertain the score improvements at each session. The results of the analysis of students' collaboration abilities are presented in Table 5.

Table 5. Student Collaboration Ability Data

Meetings	Peer Assesment Score	Observation score	Average score	Criteria
1st meeting		Data collection is not carried out		
2nd meeting	91.41	77.94	**84.67**	Very good
3rd meeting	96.47	89.84	**93.15**	Very good
4th meeting	99.15	95.78	**97.47**	Very good

Students' collaboration abilities at the first, second, and third meeting showed very good criteria with different average scores. At the second meeting, students commenced group work on the E-LKPD NAPZA based on problem. Generally, the students' collaborative capabilities met the criteria of being very good at this meeting. Nonetheless, practical observations revealed a subset of students who remained passive and hesitated to contribute fully to the group effort. Consequently, certain students were still in the process of adapting and comprehending their roles and responsibilities as group members. According to Utami (2017), the diverse habits of individual students necessitate a period of adjustment within group dynamics.

The students' collaboration abilities at the next meeting has increased compared to when students first worked on the E-LKPD in groups. The developed E-LKPD is structured to facilitate student collaboration. The difference in the average score at each meeting is influenced by variations in the students' learning experiences and their adaptability to the instructional media and group dynamics. The increase in students' collaboration abilities across each meeting was attributed to their enhanced comprehension and familiarity with their individual roles and responsibilities within their respective groups. The group members have grown accustomed to harmonious cooperation while addressing the predicaments posed by the NAPZA E-LKPD based on problem. This improvement can be seen from the group's performance which is getting better. Tasks were then equitably allocated among group members, ensuring systematic and timely problem-solving. During the discussion process at the third and fourth meetings, an atmosphere characterized by mutual respect and comfort was cultivated, thereby optimizing collaborative dynamics among the students.

Students' collaboration abilities were analyzed based on five indicators based on : contributing actively, work productively, showing flexibility, responsibility, and attitude of appreciation. The results of the analysis of students' collaboration abilities per indicator are presented in the Table 6.

Table 6. Student Collaboration Ability Data based on Indicators

	Indicators	Score at the 2nd meeting	Score at the 3rd meeting	Score at the 4th meeting	Average score
1.	Contributing actively	79.04	87.50	94.24	86.93
2.	Work productively	81.61	94.47	98.16	91.41
3.	Showing flexibility	86.27	94.95	98.23	93.15
4.	Showing responsibility	85.62	92.32	98.79	92.24
5.	Showing an attitude of appreciation	90.77	94.48	98.93	94.69

The ability to contributing actively obtained the lowest score compared to other indicators. This is due to the presence of students who have not fully participated in the discussion activities, especially during the second learning meeting. Several factors might contribute to this, including students' inadequate preparation for group discussions, fear of expressing opinions, difficulty in adapting to group members, and lack of concentration during the learning processs (Firman et al., 2023; Risanatul & Junaidi, 2022). Additionally, the limited time allocated for discussions during the learning process constrained student engagement (Shafira & Suratsih, 2023).

The indicator of work productively encompasses students' ability to utilize time efficiently, yielding desired outcomes effectively and punctually (Rahmawati et al., 2019). In this study, students demonstrated commendable proficiency in working productively, which further improved over the course of the learning process. By the fourth session, all group members exhibited dedication in working on the E-LKPD and successfully collated the discussion outcomes within the stipulated timeframe.

Collaboration ability also encompasses the capability of students to showing flexibility. This involves students' willingness to accept opinions, decisions, and suggestions from other group members to attain shared objectives. This indicator was nurtured through problem-solving activities within the E-LKPD. Collaborative problem-solving activities in groups involve grappling with various differences that students need to comprehend and address.

In this research, the indicator of a showing responsibility received commendable scores and showcased improvement in each instructional session. This can be attributed to students being facilitated with the E-LKPD, which encourages collaborative problem-solving. During discussions, students divided the presented issues within the E-LKPD among all group members. Task allocation within the group trains students to complete their responsibilities and contribute towards achieving shared objectives. Fostering a sense of responsibility in collaboration requires gradual character cultivation within the learning process (Firman et al., 2023).

Another collaboration skill is showing an attitude of appreciation. This mutual respect among group members is crucial during collaborative problem-solving activities. In this research, students displayed favorable and polite attitudes, respected their peers' opinions, and actively engaged in discussions to achieve collective goals.

The results showed that the criteria were very good for students' collaboration abilities after carrying out problem-based E-LKPD NAPZA-assisted learning. This proves that the use of problem-based NAPZA E-LKPD is effective in increasing students' collaboration skills.

6. Students Problem Solving Ability

Data on students' problem solving abilities were obtained from students' pretest and posttest scores. The pretest and posttest questions used were in the form of 20 multiple choice questions and 4 essay questions which were arranged based on four problem solving indicators. The results of student scores were analyzed using the N-gain method to determine the increase in students' problem-solving abilities after learning about NAPZA using E-LKPD based on problem. Data on improving students' problem-solving skills were analyzed on each indicator of problem-solving ability. The problem solving indicators include understanding the problem, devise a plan, carry out the plan, and looking back. N-gain data of problem solving ability for each indicator is presented in Table 7.

Table 7. N-Gain Data Problem-Solving Ability Indicator.

Indicator	Pretest Score	Posttest Score	Maximum Score	N-gain	Criteria
Understanding the problem	45.10	84.90	100	0.72	High
Devise a plan	54.12	82.55	100	0.62	High
Carry out the plan	60.21	89.41	100	0.74	High
Looking back	62.74	90	100	0.76	High
			Average N-Gain	**0.71**	**Tinggi**

Table 7 shows that there was an increase in students' problem-solving skills after carrying out drug learning with the help of NAPZA E-LKPD based on problem. Improved problem-solving ability is also seen in each indicator.

The first indicator is understanding the problem, encompassing students' ability to identify what is known and being asked in the presented issue. In NAPZA E-LKPD based on problem, there are learning activities guiding students to understand the core problem based on the presented phenomenon or case, thereby training students to formulate and identify issues involving their logical and systematic thinking abilities. This indicator attained a high score due to students being trained and stimulated by actual problems within the E-LKPD, enabling them to analyze and articulate related issues (Elvianasti et al., 2022). The issues presented in the E-LKPD are drawn from real-life cases, facilitating understanding for students.

The second indicator is devise a plan. The developed E-LKPD facilitates students in cultivating their ability to formulate problem-solving plans. For instance, in Activity 3 of the NAPZA E-LKPD based on problem, students are prompted to outline measures to prevent the escalation of drug abuse cases. Through this activity, students are trained to create plans for solving issues, aiming to familiarize them with making appropriate decisions when confronting problems. Regarding the indicator of devise a plan, the N-gain scores depicted in this research are categorized as moderate and represent the lowest scores among other indicators. In the process of crafting plans, students must possess prior knowledge of the problem to effectively link their understanding with relevant plans (Suhadianto et al., 2021). The deficiency in students' ability to devise plans could stem from limited knowledge or initial concepts about the issue. The indicator of creating plans is also intertwined with an individual's capacity to make the best decisions or

solutions, necessitating a high degree of critical thinking (Bahri et al., 2018). Furthermore, the competence to create plans needs gradual and continuous training to familiarize students with making appropriate decisions in the planning process. In conventional learning, students are accustomed to executing tasks based on plans or information provided by teachers, making them unaccustomed to devising their own problem-solving approaches.

The third indicator pertains to carry out the plan. In this indicator, students are directed towards the ability to implement the plans that have been formulated to address a problem. To enhance this competence, there is an activity within the E-LKPD that requires students to create an anti-drug campaign poster as one of their efforts to tackle NAPZA abuse issues within the school environment. This poster encompasses the preventive measures against drug abuse that they previously formulated in Activity 3 of the E-LKPD. The ability to carry out the plan exhibits higher scores compared to the ability to devise a plan. This can be attributed to the intricate and more complex nature of the planning process, which involves the need for accurate and relevant ideas to tackle problems, the capacity to consider various interconnected factors, and the assessment of multiple possible solution options. In carry out the plan, the focus is on applying well-structured plans, rather than formulating extensive strategies and decisions.

Problem-solving ability incorporates the fourth indicator, namely looking back. This indicator encompasses students' capacity to assess a problem-solving approach that has been undertaken. Learning activities within the E-LKPD train students in evaluation; for instance, in Activity 2, students are asked to evaluate whether electronic cigarettes are a suitable solution to reduce addiction to addictive substances in cigarettes. Students who have been trained to analyze real-life issues find it easier to evaluate problem-solving activities because they can comprehend the problem situation well. This is further supported by the knowledge and concepts possessed by students. Those who have the ability to comprehend problems also possess analytical and critical skills to evaluate suitable solutions in problem-solving.

Students' problem-solving ability experiences improvement across all related indicators. This is attributed to students engaging in problem-based NAPZA E-LKPD-assisted learning, which effectively facilitates their problem-solving skills development. The developed E-LKPD includes factual cases related to the learning material, supplemented with content, images, and videos to enhance student comprehension. It also features learning activities that train students to enhance their problem-solving skills. The questions within the E-LKPD stimulate students' problem-solving abilities, spanning from understanding the problem, creating plans, executing plans, to evaluating outcomes.

CONCLUSION

Based on the results of this research, it can be concluded that the NAPZA E-LKPD based on problem is deemed highly suitable, as affirmed by the validation from content and media experts, thus qualifying it as a viable instructional medium for high schools. The NAPZA E-LKPD based on problem contributes to the improvement of students' collaborative skills, evident through progressively improved scores across each learning meeting. Furthermore, the problem-based NAPZA E-LKPD effectively fosters the improvement of problem-solving abilities among high school students, as indicated by the high-category N-gain scores attained in problem-solving proficiency.

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