Research Article

LIVEWORKSHEETS-BASED DIGITAL STUDENT WORKSHEETS FOR EFL READING: VALIDITY AND PRACTICALITY

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Abstract

Indonesian senior high school students often show low interest in English reading, and many schools still rely on printed worksheets that offer little interaction or feedback. This study developed digital student worksheets for reading and examined their validity and practicality for Grade XI students at SMA Negeri 3 Takalar, South Sulawesi. Following the Planning, Design and Development phases of Alessi and Trollip's model, the worksheets were designed in Canva and made interactive on Liveworksheets. They contain two reading texts on environmental figures with word-level clickable audio, multiple-choice and fill-in-the-blank tasks, and a word puzzle with automatic scoring. Needs were analysed through a teacher interview and a questionnaire completed by 54 students in two classes. Two lecturers in English education, who also supervised the study, validated the material and the media. Practicality was judged by one English teacher and by 25 students in one class after a limited tryout. All instruments used a four-point scale. Both validators gave the same material ratings (M = 3.91, Aiken's V = .97), and their media ratings were 3.86 and 3.93 (V = .96). The teacher's rating was 3.64, and the students' mean was 3.61 (SD = 0.32). All of these fall in the highest category. The lowest-rated features were the clarity of instructions and the support for interactive concept discovery. The results provide preliminary evidence of validity and practicality in one class rather than readiness for wide use. Independent validators, more classes and a test of effects on reading comprehension are needed.

Keywords: *Digital student worksheets; EFL reading; Liveworksheets; Research and development; Validity and practicality*

Article History:
Submitted : 13 October 2026
Revised : 14 October 2026
Accepted : 14 October 2026
Published : 19 October 2026

How to cite this article:
Nurinzani, Nurpahmi, S., & Nur, N. A. (2026). Liveworksheets-based digital student worksheets for EFL reading: Validity and practicality. *ELSTIC-IJ: English Language, Linguistics, and Culture International Journal, 6*(02), https://doi.org/10.24252/elstic-ij.v6i02.73549

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INTRODUCTION

Reading is a central skill in English as a foreign language (EFL) learning because it gives students access to information, vocabulary and models of written language. Effective reading instruction involves more than decoding words: readers must integrate word

recognition, language comprehension and background knowledge with strategic processing to construct meaning from texts (Duke & Cartwright, 2021; Grabe, 2009). For Indonesian senior high school students, however, reading in English remains difficult. Limited vocabulary, the mismatch between English spelling and pronunciation, and low interest in reading English texts often lead students to approach reading passively, especially when classroom materials offer few opportunities for interaction or feedback.

Student worksheets (*lembar kerja peserta didik*, LKPD) are among the most common learning materials in Indonesian schools. They provide texts, tasks and instructions that guide students through learning activities. Most worksheets, however, are still printed, which limits the use of audio, immediate feedback and interactive tasks. Digital technology offers ways to overcome these limitations, and research on English education suggests that well-designed digital materials can make learning more engaging and flexible (Kanoksilapatham, 2022). At the same time, digital reading is not automatically better than reading on paper. Meta-analyses have found that comprehension can be lower on screens, particularly for informational texts and under time pressure (Clinton, 2019; Delgado et al., 2018), and multimedia elements support learning only when they are aligned with the learning goal rather than decorative (Mayer, 2024). Digital reading worksheets therefore need to be designed carefully and evaluated before they are used in classrooms.

Liveworksheets is a free online platform that converts static worksheets into interactive exercises with automatic scoring, drop-down and fill-in answer fields, and embedded audio. A growing number of Indonesian studies have used it for English reading. Aulia and Sibarani (2024) developed a descriptive-text worksheet that validators rated good to very good, and Simanjuntak and Purwanti (2025) developed exposition-text media that experts judged very valid. Larissa et al. (2026) and An Nisa et al. (2026) used the ADDIE model to develop Liveworksheets for descriptive and report texts in Grade X. In both studies, three experts rated the products very valid, but the implementation phase was omitted, and only An Nisa et al. collected open-ended feedback from students. Ginting and Suswati (2026), in a qualitative study, found that Liveworksheets worked well as a formative assessment tool when automatic scoring was combined with teacher feedback.

Taken together, these studies show that Liveworksheets products are usually judged by experts alone, with little systematic evidence from the teachers and students who are meant to use them. They also use audio, if at all, as whole-text or video input rather than as support for decoding individual words, even though the gap between English spelling and pronunciation is a recognised barrier for Indonesian readers. The present study differs from

earlier work in two ways. First, it builds word-level clickable audio into the reading texts, so that students can hear the pronunciation of any word they cannot decode. Second, it evaluates the product through rated practicality data from both a teacher and students after a classroom tryout, in addition to expert validation. The study used the multimedia development model of Alessi and Trollip (2001) to develop digital student worksheets for reading for Grade XI students at a public senior high school in Takalar, South Sulawesi. It was guided by one research question:

> RQ. How valid and practical are the digital student worksheets for reading developed for Grade XI senior high school students?

LITERATURE REVIEW

Digital Student Worksheets for Reading

A student worksheet is a structured learning resource containing materials, instructions and tasks that students complete to achieve learning objectives. Digital worksheets retain this structure but add features such as interactive answer fields, automatic feedback, embedded media and online access. For reading instruction, these features can support comprehension in several ways. Immediate feedback can show students which comprehension questions they misunderstood, online access allows them to reread and practise outside class, and teachers can collect and monitor students' work more easily than with paper worksheets. The value of these features, however, depends on whether they serve the reading objectives (Mayer, 2024) and whether students and teachers can use them without technical difficulty. Ginting and Suswati (2026) found, for example, that automatic scoring on Liveworksheets supported students' autonomy only when teachers added their own pedagogical feedback and gave technical instructions at the start of the lesson.

Audio Support for EFL Reading

The main design feature of the present worksheets is audio that students can play while reading. Research on reading-while-listening provides a rationale for this feature. When learners hear a text while reading it, the spoken form shows them how written words sound, divides the text into meaningful phrases and helps them keep up with a text that would otherwise be read slowly word by word. Brown et al. (2008) found that Japanese EFL learners acquired as many new words from reading-while-listening as from reading alone, and far more than from listening alone. Teng (2018) found that Chinese EFL learners who

read while listening learned more words incidentally than those who only read. In a study of beginner learners in Taiwan, Chang and Millett (2015) found that audio-assisted extensive reading improved reading rates and comprehension more than silent reading. Gobel and Kano (2014) also reported that a year-long reading-while-listening programme was feasible and well received by Japanese university students.

Most of this research concerns continuous narration of whole texts. The worksheets developed here use a different form of audio support: each word in the reading texts is linked to a sound file that students can play on demand. This design targets the specific difficulty reported by the teacher in this study, the gap between English spelling and pronunciation. When students meet a word they cannot decode, they can hear it immediately instead of skipping it or guessing its pronunciation. This may help them link written and spoken forms and recognise the word when they meet it again. Because students control when the audio is played, the feature avoids imposing a fixed listening pace on readers of different levels. Whether word-level audio produces the benefits found for continuous reading-while-listening is an empirical question that the present study does not test. The study examines only whether experts, a teacher and students judge the feature and the worksheets as a whole to be valid and practical.

Multimedia Development and Product Quality

Alessi and Trollip (2001) propose a model for developing multimedia learning materials that consists of three phases, Planning, Design and Development, with standards, ongoing evaluation and project management running throughout. Planning defines the scope, identifies learner characteristics and constraints, and collects resources; Design produces initial content ideas, a program description, prototypes, flowcharts and storyboards; and Development produces the materials and evaluates them through alpha testing by experts and beta testing with users. ADDIE and the 4D model are more common in Indonesian development research, but they are general instructional design models. Alessi and Trollip's model was chosen because it was written specifically for computer-based multimedia. Its Design phase requires flowcharts and storyboards, which suit an interactive product whose pages and audio links must be planned in advance. It also builds alpha and beta testing into development rather than leaving evaluation to a final stage. The model continues to be used in Indonesian English materials research, for example in the development of digital storytelling for online English learning (Yuliani & Hartanto, 2021).

The quality of educational products developed in design research is commonly judged by three criteria: validity, practicality and effectiveness (Nieveen, 1999). Validity concerns whether the content is accurate and up to date and whether the components are consistently linked; practicality concerns whether teachers and students consider the product usable in their setting; and effectiveness concerns whether it achieves the intended outcomes. Content validity based on expert ratings is often summarised with Aiken's (1985) V coefficient, which expresses the extent to which raters' scores approach the top of the scale. The present study addresses validity and practicality and leaves effectiveness for later classroom testing.

METHOD

Research Design

This study used a research and development (R&D) design following the Planning, Design and Development phases of Alessi and Trollip's (2001) model. Expert validation served as the model's alpha testing and the classroom tryout with the teacher and students as its beta testing. The research was conducted at a public senior high school, SMA Negeri 3 Takalar, in Takalar Regency, South Sulawesi, Indonesia, in the 2025/2026 academic year. The school implements the Merdeka Curriculum.

Participants

The participants were one Grade XI English teacher, who was interviewed in the needs analysis and later rated the product's practicality, and 54 Grade XI students from two classes who completed the needs analysis questionnaire: XI John Dalton (n = 23) and XI Alfred Nobel (n = 31). The tryout was conducted only in XI John Dalton, the class taught by the participating teacher confirm the reason for choosing this class. Twenty-five students of this class used the product and completed the student response questionnaire explain why 23 students of this class completed the needs analysis but 25 completed the response questionnaire, e.g., two students were absent on the day of the needs analysis. The students were about 16 years old.

The product was validated by two lecturers in English education at Universitas Islam Negeri Alauddin Makassar add each validator's academic rank and years of experience in ELT materials and educational media. Each validator rated both the material and the media. Both validators are co-authors of this article and supervised the first author's undergraduate

research. Their judgements are therefore not independent of the development process, and this is treated as a limitation in interpreting the validity results.

Development Procedure

Planning. The teacher was interviewed with a 16-item guide covering the curriculum (four items), learning difficulties (four items) and the use of worksheets (eight items), adapted from Al-Hayati (2019). Students completed a 21-item needs analysis questionnaire covering six aspects: initial understanding of reading materials, the need for digital worksheets, the need for reading materials, visual appearance, physical requirements for digital media, and expectations of reading media (adapted from Istiqomah, 2009). Every item is a statement of agreement on a four-point scale. For example, "I find it difficult to understand English texts due to vocabulary limitations" and "I need a learning medium that can help me understand reading texts more easily" belong to the first aspect. A high score therefore indicates strong agreement with a statement of difficulty or need, not a high level of understanding. The scope, learner characteristics and constraints (internet access and device availability) were then defined, and a style guide (Cambria font, a green–blue–white colour scheme and consistent page layout) was prepared.

Design. The content was developed around the Grade XI topic *Environmental Figures* in the textbook used at the school. Two reading texts were written by the first author about Indonesian environmental figures: the Pandawara Group, young river clean-up activists, and Hamish Daud, a marine conservation advocate. They were based on publicly available information about these. Six learning objectives were derived from the reading–viewing element of the Merdeka Curriculum learning outcomes for Phase F (Table 1). A flowchart of the student's path through the worksheets and a page-by-page storyboard were prepared, and a prototype was designed in Canva. The prototype contained a cover and identity page, author profile, user guide, learning objectives, two reading texts and three exercise types the flowchart and storyboard can be supplied as supplementary material.

Development. The Canva pages were uploaded to Liveworksheets, where interactive elements were added. Each word in the two reading texts was linked to an audio file that plays when it is clicked the audio was generated by text-to-speech, and how its pronunciation was checked. Ten multiple-choice comprehension items were added for the Pandawara text, ten fill-in-the-blank items (choosing one of two words) for the Hamish Daud text, and a ten-word puzzle using vocabulary from both texts. Answers are scored automatically when students press *Finish*. The product was shared with students through a

link and QR code. The photographs of the two environmental figures were initially taken from news websites.

Validation and tryout. The two validators rated the product using the material and media validation sheets and wrote comments, and the product was revised in response. The material validation sheet is dated 8 June 2026 and the teacher response sheet 29 May 2026. In the tryout, the students of XI John Dalton used the worksheets number of sessions and duration, e.g., one 2 × 45-minute meeting in the classroom on their own smartphones, with the researcher and the teacher present confirm; state whether all students completed all tasks and whether any technical problems occurred. The teacher and the students then completed the response questionnaires. The questionnaires were administered by the researcher and were not anonymous.

Table 1. Learning objectives, tasks and cognitive levels of the worksheets

Learning objective (students are able to…)	Task and items	Cognitive level
Identify the main topic and purpose of a text	Multiple choice 1, 2 and 9 (main idea, purpose, paragraph idea)	C2
Answer comprehension questions based on information in the text	Multiple choice 3 and 6 (general information, setting)	C2
Identify key components of the text, such as characters and their contributions	Multiple choice 4 and 5 (detailed information, character)	C1–C3
Interpret the meaning of a word or phrase from its context	Multiple choice 7; fill-in-the-blank 1–10; word puzzle	C1–C3
Complete sentences based on information in the text	Fill-in-the-blank 1–10 (choose one of two words)	C2
Draw conclusions about the important information in the text	Multiple choice 8 and 10 (inference, moral message)	C4

Note. The objectives were derived from the reading–viewing element of the Merdeka Curriculum learning outcomes for Phase F, which expects students to understand, interpret and evaluate a range of texts independently. C1–C4 = remember, understand, apply and analyse levels of the revised Bloom's taxonomy. Of the 10 multiple-choice items, one is at C1, five at C2, two at C3 and two at C4.

Instruments

Validity was assessed with two expert validation sheets. The material sheet covered content (six items), presentation (three items) and language (two items), adapted from BSNP (2010). The media sheet covered didactic (three items), construction (four items) and technical (seven items) aspects, adapted from Jayantri (2017). Practicality was assessed with a teacher response questionnaire and a student response questionnaire. The teacher questionnaire covered didactic (three items), construction (five items) and technical (six items) aspects, also adapted from Jayantri (2017). It shares these aspect labels with the media sheet,

but it was used to obtain the teacher's judgement as a practitioner. Several of its items concern use in the classroom, for example whether the steps of the activities are easy to follow, whether students can manage the worksheets themselves and whether the worksheets can be accessed on students' devices. The student questionnaire covered learning (four items), presentation (three items) and language (three items), adapted from Akbar (2016). All instruments used a four-point scale (1 = very poor to 4 = very good) and included space for comments. The instruments were adapted by translating and rewording items to refer to digital reading worksheets, the adapted instruments were reviewed by the supervisors or another expert before use.

Data Analysis

Interview data, open comments and validators' suggestions were analysed descriptively to identify needs and revisions. For each instrument, the overall mean was calculated as the total score divided by the number of items (an item-weighted mean), and aspect means were calculated in the same way. Because each validator and the teacher are single raters, their "means" are summaries of one person's item ratings; item-level ratings are therefore also reported. Agreement between the two validators was summarised with Aiken's (1985) V for each item, $V = \Sigma(r - 1) / [n(c - 1)]$, where r is a rating, n the number of raters and c the number of scale points. With only two raters, V can describe agreement but cannot be tested for significance. For the student questionnaire, the mean, standard deviation and range of students' mean ratings were calculated. Internal consistency was estimated with Cronbach's alpha across the three aspect scores, because only aspect totals per student were available. Mean scores were interpreted with the criteria in Table 2, adapted from Mardapi (2008), and are also expressed as percentages of the maximum score to allow comparison with studies using five-point scales.

Table 2. Criteria for interpreting mean scores

Mean score (X)	Validity	Practicality
$3.00 < X \leq 4.00$	Very valid	Very practical
$2.50 < X \leq 3.00$	Valid	Practical
$2.00 < X \leq 2.50$	Less valid	Less practical
$1.00 \leq X \leq 2.00$	Not valid	Not practical

Note. Adapted from Mardapi (2008). Because ratings of 3 (good) and 4 (very good) both lead to a mean above 3.00, these categories discriminate poorly at the top of the scale; item-level ratings, Aiken's V and percentages are therefore reported alongside them.

Ethical Considerations

Permission to conduct the study was obtained from the principal of SMA Negeri 3 Takalar. The teacher and students were informed about the purpose of the study, participation was voluntary and did not affect students' grades, and students' names were removed from the questionnaire data before analysis.

FINDINGS AND DISCUSSION

Findings

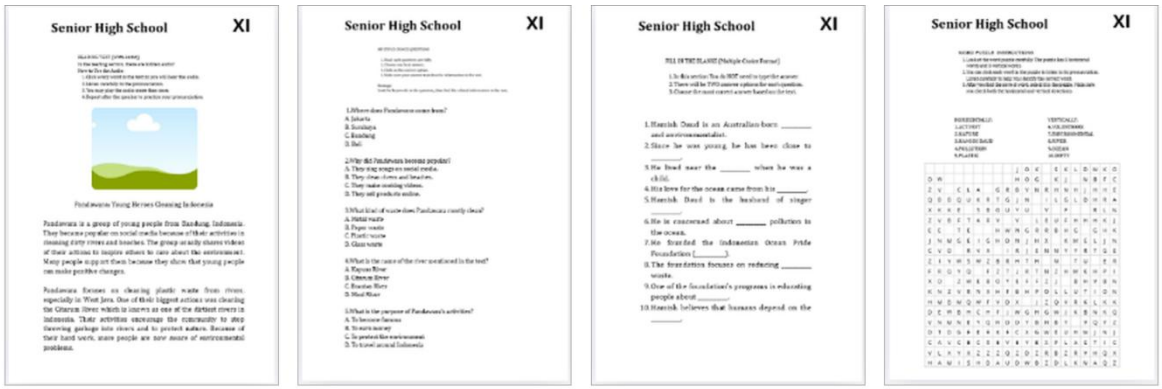
Needs analysis

The teacher reported that students found listening and reading the most difficult skills. She attributed this to limited vocabulary, the gap between English spelling and pronunciation, and low interest in reading English texts. All students had their own smartphones and could operate them independently. Smartphones were used occasionally, mainly when the teacher shared materials through class WhatsApp groups when printed resources were unavailable. The worksheets in use were printed, and the teacher had never seen or used digital worksheets but agreed that such worksheets were needed and welcomed their development.

The student questionnaire confirmed these needs. Because every item is a statement of agreement, the high scores for the first aspect (3.58 in XI John Dalton and 3.54 in XI Alfred Nobel) mean that students agreed that reading is important, that limited vocabulary makes English texts difficult and that they needed media to help them understand texts. They do not mean that students already understood reading materials well. All six aspects received mean scores between 3.42 and 3.76. The overall mean was 3.59 in XI John Dalton (SD = 0.15; range 3.19–3.81) and 3.59 in XI Alfred Nobel. The highest scores concerned physical requirements for digital media, such as interactive tasks, direct feedback and clear instructions (3.76 in XI John Dalton), and expectations of reading media (3.75 in both classes). The lowest concerned the need for digital worksheets (3.42 in both classes). These findings shaped three design decisions: smartphone-friendly access through Liveworksheets, word-level audio to address the spelling–pronunciation gap, and varied interactive exercises with automatic feedback.

The developed product

The final product consists of ten pages (Figure 1). These are a cover with an identity form, an author profile, a user guide and the learning objectives, followed by the first reading text (*Pandawara: Young Heroes Cleaning Indonesia*) and ten multiple-choice items. The second reading text (*Hamish Daud: A Love for the Ocean*) follows with ten fill-in-the-blank items, and the product ends with a word puzzle. Both texts have clickable word-level audio. As Table 1 shows, the multiple-choice items cover main ideas, purpose, detailed information, vocabulary in context, inference and moral message, ranging from C1 to C4. The fill-in-the-blank items ask students to choose one of two words to complete sentences about the second text. They therefore test vocabulary in context more than comprehension, and their two-option format gives a 50% chance of guessing correctly. The puzzle reviews ten words from both texts. Students access the worksheets through a link or QR code, fill in their names and classes, complete the tasks, and receive their scores immediately after pressing *Finish*; the teacher can view all submissions through the Liveworksheets account.



(a) Reading text (b) Multiple choice (c) Fill in the blanks (d) Word puzzle

Figure 1. Sample pages of the digital student worksheets

Validity

Table 3 presents the expert validation results by validator. The two validators gave identical ratings on the material sheet: ten of the eleven items received the maximum rating, and both rated one content item, "the instructions for the exercises are clear", as 3 (good). The item-weighted mean was therefore 3.91 (97.7% of the maximum) for each validator. On the media sheet, the first validator gave a mean of 3.86 and the second 3.93. Both rated the didactic item on whether the worksheets emphasise process skills in discovering concepts more interactively as 3, and the first validator also rated the use of colour as 3. All other media items received the maximum rating. The validators agreed exactly on all material items and on 13 of the 14 media items. Aiken's V was 1.00 for 10 of the 11 material items and 0.67

for the instructions item (mean V = .97). For the media items, V was 1.00 for 12 items, 0.83 for the colour item and 0.67 for the process-skills item (mean V = .96).

Table 3. Results of expert validation by validator

Instrument and aspect	Items	Validator 1	Validator 2	Aiken's V (mean)
Material				
Content	6	3.83	3.83	.94
Presentation	3	4.00	4.00	1.00
Language	2	4.00	4.00	1.00
Overall (item-weighted)	11	3.91 (43/44)	3.91 (43/44)	.97
Media				
Didactic	3	3.67	3.67	.89
Construction	4	4.00	4.00	1.00
Technical	7	3.86	4.00	.98
Overall (item-weighted)	14	3.86 (54/56)	3.93 (55/56)	.96

Note. Values are item-weighted means on a four-point scale; figures in parentheses are total scores and maximum scores. All values fall in the very valid category (Table 2).

The validators' written comments and the resulting revisions are summarised in Table 4. The second validator asked the developer to make sure that the exercises matched the material the teacher had actually taught. The first validator wrote no comments on the material or media sheets.

Table 4. Validators' suggestions and revisions

Validator	Suggestion	Revision
Validator 2 (material)	Make sure that the questions in the worksheets match the material that has been taught by the teacher.	items were checked against the teacher's teaching module for the Environmental Figures chapter and items X and Y were rewritten.
Validators 1 and 2 (both sheets)	Item rated 3: the instructions for the exercises are clear.	Instructions were shortened and an example answer was added.
Validators 1 and 2 (media)	Items rated 3: emphasis on process skills in discovering concepts; use of colour.	The the use of colour should be suitable with the material, and the process to discovering concept have been improved

Note. Suggestions in the first row are quoted from the validation sheet and translated from Indonesian. The other rows list the items rated below the maximum, for which the developer may have made revisions without a written comment.

Practicality

Table 5 presents the results of the response questionnaires. The English teacher's ratings gave an item-weighted mean of 3.64 (51 of 56; 91.1%). She gave the maximum rating to nine items and a rating of 3 to five items. These were the didactic item on discovering concepts, three construction items (clearly written instructions, easy-to-follow activity steps

and the display of scores) and the technical item on whether students can manage the worksheets themselves. She wrote no comments. The 25 students gave an overall mean of 3.61 (SD = 0.32; range 3.00–4.00; 90.3%). Every student's mean rating was 3.00 or higher, and five students gave the maximum rating to every item. Learning received the highest mean (3.66, SD = 0.36), followed by presentation (3.61, SD = 0.37) and language (3.55, SD = 0.40). Language was also the only aspect on which any student's mean fell below 3.00 (minimum 2.67). Cronbach's alpha across the three aspect scores was .82. No open-ended comments were written by the students.

Table 5. Results of the teacher and student response questionnaires

Respondent and aspect	Items	n	Mean (SD)	Category
Teacher				
Didactic	3	1	3.67	Very practical
Construction	5	1	3.40	Very practical
Technical	6	1	3.83	Very practical
Overall (item-weighted)	14	1	3.64	Very practical
Students				
Learning	4	25	3.66 (0.36)	Very practical
Presentation	3	25	3.61 (0.37)	Very practical
Language	3	25	3.55 (0.40)	Very practical
Overall (item-weighted)	10	25	3.61 (0.32)	Very practical

Note. Students' means and standard deviations were calculated from each student's mean rating on the aspect. The teacher's values are the mean of her item ratings.

Discussion

The research question asked how valid and practical the developed worksheets were. Both validators rated the worksheets in the highest category, with near-perfect agreement, and the teacher and students also rated them highly. Within the limits discussed below, the product therefore meets the first two quality criteria proposed by Nieveen (1999). The results are broadly consistent with earlier Indonesian studies of Liveworksheets reading materials. Expressed as a percentage of the maximum, the students' mean of 90.3% lies within the range reported by Aulia and Sibarani (2024), whose ratings of 4.1–4.7 on a five-point scale correspond to 82–94%. The validators' ratings of 97–98% are comparable to the very valid ratings reported by Simanjuntak and Purwanti (2025), Larissa et al. (2026) and An Nisa et al. (2026). An Nisa et al., for example, reported a mean of 3.52 for content, 4.00 for media and 4.00 for pedagogy on a four-point scale. The present study extends this work by adding rated

practicality data from both a teacher and students after a tryout, and by integrating word-level audio into the reading texts.

The item-level ratings say more than the aspect means. Across all four instruments, the items that received less than the maximum concerned how the tasks support learning rather than how the product looks or works. Both validators and the teacher gave a lower rating to the clarity of instructions or the ease of following the steps. Both validators and the teacher also rated the item on discovering concepts interactively as 3. The tasks themselves explain these ratings. As Table 1 shows, eight of the ten multiple-choice items are at the remember, understand or apply levels, and the fill-in-the-blank and puzzle tasks focus on vocabulary. Interactive features such as automatic scoring do not by themselves create interactive learning in Mayer's (2024) sense. The students' lowest-rated aspect, language, suggests in addition that some vocabulary or sentences in the texts were difficult for some students, which is consistent with the vocabulary difficulties reported in the needs analysis. These results point to two revisions: clearer instructions with worked examples, and more tasks that ask students to interpret, compare or evaluate information in the texts.

The practicality results reflect the students' digital readiness identified in the needs analysis. All students owned smartphones and were used to receiving materials online, so access through a link and QR code posed few problems. Students gave the highest rating to the learning aspect, suggesting that they valued the comprehension tasks and the immediate scores, which are consistent with multimedia principles that pair verbal and visual information and give learners feedback on their responses (Mayer, 2024). The reading-while-listening research reviewed above (Brown et al., 2008; Chang & Millett, 2015; Teng, 2018) suggests that the audio feature may also support vocabulary learning and reading fluency. The present data, however, show only that users rated the worksheets positively, not that the audio was used or that it helped.

Teachers who adopt Liveworksheets will also meet practical constraints of the platform. Free teacher accounts may limit the number of worksheets or features, depending on the platform's current terms. Advertisements may appear beside worksheets opened in a browser. Students' names and answers are stored on an external server, which raises questions of data privacy for minors, and the worksheets depend on a stable internet connection. An Nisa et al. (2026) found that about 30% of students reported slow or unstable internet when using Liveworksheets. Teachers should therefore check the platform's terms before relying on it, avoid collecting more personal data than necessary, and prepare an offline or printed alternative for students who cannot connect.

These findings should not be over-interpreted. The two validators were the supervisors of the study and co-authors of this article. Their near-perfect agreement and very high ratings may partly reflect their familiarity with the product's development rather than a fully independent judgement. Practicality was judged by one teacher and one class, and the questionnaires were administered by the developer and were not anonymous. These conditions, together with the novelty of a digital product, may have inflated the ratings. The decision rule also contributed to the uniformly high categories: any combination of ratings of 3 and 4 produces a mean above 3.00, so the very valid and very practical categories mainly show that no item was rated poor. Finally, the study did not test whether the worksheets improve reading comprehension. Research comparing screen and paper reading cautions that digital texts can lead to shallower processing (Clinton, 2019; Delgado et al., 2018), so the benefits of audio and interactivity need to be weighed against this risk in a controlled study.

Limitations

The study has several limitations. First, validity was judged by only two validators, who were also the supervisors of the study and co-authors of this article. Their agreement indices therefore describe consistency between two closely involved raters rather than independent expert consensus. Second, practicality was judged by one teacher and one class after a limited tryout, using questionnaires adapted from unpublished theses and local sources. Only aspect totals were available for the student questionnaire, so item-level reliability could not be estimated, and the teacher questionnaire shared its aspects with the media validation sheet. Third, the product covers one topic and one text type. Most of its tasks are literal or vocabulary-based, and the two-option fill-in-the-blank items allow a 50% chance of guessing correctly. Fourth, the study did not measure reading achievement or record how often students used the audio. Finally, the product depends on internet access, personal devices and a third-party platform.

CONCLUSION

This study developed digital student worksheets for reading for Grade XI students using the Planning, Design and Development phases of Alessi and Trollip's model. Canva was used for design and Liveworksheets for interactivity. The worksheets combine two reading texts on environmental figures with word-level clickable audio, comprehension and vocabulary tasks, and automatic scoring. Two validators rated them very valid with near-perfect agreement, and one teacher and 25 students rated them very practical. Because the

validators were involved in the study and the tryout was limited to one class, these results provide preliminary evidence of validity and practicality rather than evidence that the worksheets are ready for wide use.

For teachers who want to build similar worksheets, the study suggests two concrete steps. First, plan the tasks from the reading objectives before adding interactive features. In particular, include items that require inference and evaluation, and use multiple-choice or open answer fields instead of two-option gap-fills. Second, use the platform's audio feature for words that students are likely to find difficult to pronounce, and give clear instructions with a worked example before students begin. Future research should involve independent validators, revise the tasks in response to the item-level ratings, and try out the worksheets in more classes and schools with anonymous questionnaires. It should also test their effect on reading comprehension and vocabulary with a pre-test and post-test design, preferably with a comparison class.

AI USE AND DISCLOSURE

The authors used generative AI tools Grammarly to check grammar, claude to proofread the manuscript, review its clarity and consistency, and assist in searching for relevant references. All references suggested by the tools were checked against the original sources. The authors reviewed and edited all content and take full responsibility for the article.

ETHICAL STATEMENT AND INFORMED CONSENT

This study was approved by the principal of SMA Negeri 3 Takalar. The teacher and students were informed about the purpose of the study, participation was voluntary and did not affect students' grades, and students' names were removed from the data before analysis.

CRediT AUTHORSHIP CONTRIBUTION STATEMENT

- Nurinzani: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Visualization, Writing – original draft.
- Sitti Nurpahmi: Supervision, Methodology, Validation, Writing – review & editing.
- Nur Aliyah Nur: Supervision, Validation, Writing – review & editing.

CONFLICT OF INTEREST

The second and third authors supervised the first author's research and also served as the expert validators of the product. This dual role is reported in the Method and discussed as a limitation. The authors declare that they have no competing financial interests.

DATA AVAILABILITY

The anonymised needs analysis, validation and response questionnaire data are available from the corresponding author on reasonable request. The worksheets can be accessed at.https://www.liveworksheets.com/c?a=s&t=QtUaZsqCCX&sr=n&l=rr&i=oczznnz&r=yz&f=dzdxzfzx&ms=uz&cd=p-z-d-pt---lssjkggllgignngnmgegmxg&mw=hs

ACKNOWLEDGMENTS

The authors thank the principal, the English teacher and the Grade XI students of SMA Negeri 3 Takalar for their support and participation.

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