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Development and preliminary evaluation of ESSENTIAL: A multimedia English listening module for physical education students

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ABSTRACT

Physical education students must understand spoken English in coaching, training, and match contexts, yet listening materials tailored to these settings remain limited. This study developed and conducted a preliminary evaluation of ESSENTIAL, a five-unit multimedia module, using the ADDIE framework. Forty students completed six learning sessions over approximately six weeks and took listening tests before and after implementation. Three specialists appraised the module, and a separate three-reviewer panel assessed the content relevance of 30 test items. The module received ratings of 83.16% for sports content, 83.33% for media, and 98.75% for language. Mean listening scores increased from 70.23 to 75.60; the within-group change was statistically significant (Wilcoxon signed-rank test, $p < .001$), while the normalized gain calculated from the group means was modest (0.181). These findings indicate that ESSENTIAL is a context-specific resource with preliminary evidence of improved scores during implementation. However, the single-group design and absence of a comparison group preclude a causal conclusion.

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Introduction

Understanding English in physical education involves more than recognizing individual words. Future teachers and sports practitioners may need to follow a coach's tactical explanation, interpret instructions during strength training, or respond to a match official's briefing. These are time-sensitive situations in which listeners must identify the main message while processing unfamiliar terminology and spoken details. General English materials do not always provide sufficient practice with these particular demands. Studies of sports coaching show that tactical talk, feedback, and on-field instructions rely on specialized language that can be challenging for non-native English speakers (Ettl Rodríguez & Kandel-Cisco, 2021; Nishijo, 2022).

Recent needs analyses provide a clear rationale for developing discipline-specific materials. Sari et al. (2025), working with sports students in West Sumatra, identified a demand for practical English content connected with students' disciplinary activities. Putra et al. (2025) likewise reported that physical education students valued English for professional communication but experienced difficulties with listening. Comparable needs have been documented among sports students in Serbia, Croatia, and Indonesia, where learners and teachers called for materials grounded in sports practice (Burhan et al., 2025; Đorić, 2020; Penjak, 2024). These findings support an English for Specific Purposes (ESP) approach (Hyland, 2022), in which target communication tasks-not the textbook's general topic sequence-guide material selection. Needs analyses in other professional fields similarly

show that general courses rarely match workplace communication demands (Nateghian, 2024). The ESSENTIAL project was developed in this context at Universitas Negeri Padang.

A relevant topic alone does not make a listening task effective. Wallace (2022) showed that listening comprehension draws on linguistic knowledge, attention, memory, and metacognitive awareness. Vafaee and Suzuki (2020) and Du and Man (2022) identified vocabulary knowledge, syntactic knowledge, and metacognitive knowledge as relevant to listening performance, while Fung and Macaro (2021) examined how linguistic knowledge relates to strategy use. A meta-analysis by In'nami et al. (2023) also found a relationship between metacognitive awareness and second-language listening, although its magnitude varied across studies. Su (2025) further linked metacognitive awareness and listening anxiety to EFL listening comprehension. Listening activities therefore need to guide students through predicting content, noticing information during playback, and checking their interpretations afterward. Intervention studies based on metacognitive instruction-including listening homework, online practice, and use of learners' first language-have reported improvements in listening comprehension (Bozorgian et al., 2022a, 2022b; Goh & Vandergrift, 2021; Pei et al., 2023; Robillos, 2023). The ESSENTIAL module uses pre-listening, while-listening, and post-listening activities to make these processes more explicit.

Multimedia offers useful ways to deliver listening practice, but it does not guarantee learning gains. Mayer (2020) and Mayer and Fiorella (2021) argue that words, sound, and images should be coordinated to support learners' processing of essential information rather than compete for attention. An overview of meta-analyses likewise found that multimedia design principles can benefit learning, although the size of the benefit depends on how materials are designed (Mayer, 2024; Noetel et al., 2022). In their systematic review, Zhang et al. (2023) found that technology-supported L2 listening research encompasses a range of tools and instructional arrangements; the learning task and the way technology is used remain important. Reviews of technology-enhanced language learning reach a similar conclusion (Shadiev & Yang, 2020), while studies of captioned video and mobile listening apps show that the mode of presentation can influence comprehension (Hafour, 2025; Hsieh, 2020; Montero Perez, 2022). In ESSENTIAL, an interactive flipbook provides access to audio and video, while short exercises and quizzes are designed to help students revisit and apply language encountered in sports scenarios. Comparable flipbook-based and digital modules developed with the ADDIE model have been rated as valid and practical in Indonesian English courses (Daud et al., 2022; Yosintha et al., 2023). Game-based quizzes have also been associated with higher engagement and vocabulary learning (Panmei & Waluyo, 2023; Sailer & Homner, 2020; Zainuddin et al., 2020).

The contribution of this study is twofold: it documents the development and expert appraisal of a sports-oriented listening module, and it reports score changes observed in a field trial using paired student data. Specifically, the study examines the module's content and design, the results of expert review and preliminary student feedback, and changes in listening performance from pre-test to post-test. Because the field trial included no comparison group, score changes are treated as preliminary evidence observed during implementation, not as proof that the module caused those changes.

Method

Design and setting

The project adopted research and development procedures organized around the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) framework (Spatioti et al., 2022). A one-group pre-test–post-test assessment was embedded in the implementation stage. The research took place in the Physical Education, Health and Recreation (PJKR) programme at the Faculty of Sports Science, Universitas Negeri Padang, Indonesia. The partner department issued a cooperation letter dated 24 February 2025 (No. 0242/UN35.3.4/TU/2025). The letter documented institutional cooperation and was not an ethics committee approval.

Participants and sampling

The sampling records list 250 students across eight parallel classes. The study documentation describes a multistage cluster-sampling procedure in which classes B and H were selected. The main trial included 30 students from class B and 10 from class H (N = 40). Another nine students from class C participated in a separate small-group development tryout and were not included in the paired outcome analysis. The available records differ on whether the main-trial participants were in their second or fifth semester. Semester level is therefore not reported as an eligibility criterion pending verification against the enrolment records.

Development of the ESSENTIAL module

During the Analysis stage, the researchers reviewed course requirements and students' reported difficulties with spoken English. The Design stage established the learning objectives, a five-unit sequence, listening scripts,

activities, and an interactive storyboard. Development involved producing the digital module in Canva Pro and Heyzine Pro, with audio or video links and exercises delivered through Wordwall and Quizizz/Wayground. The module included sports vocabulary, coach–athlete communication, instructional language, and activities for listening before, during, and after playback. Expert feedback informed revisions to instructions, transitions between units, feedback provision, and media controls. During Implementation, students used the module in six meetings over approximately six weeks. Evaluation drew on expert reviews, project-reported student feedback, and the 40 paired listening scores.



Figure 1. ADDIE stages used to develop and evaluate the ESSENTIAL module.

Listening assessment and content review

The documented final listening instrument contains five sports-related audio contexts: a football halftime briefing, a post-match athlete interview, a strength-and-conditioning briefing, a sports nutrition and hydration segment, and a referee pre-match briefing. Each segment was accompanied by six four-option multiple-choice questions, giving 30 items in total. The test instructions permitted each recording to be played no more than twice. The final document provides answer keys and revised wording for five items; however, the source recordings and the original administration log were not available for comparison with the completed test.

A separate panel of three reviewers assessed the relevance of the initial 30 items using a four-point scale. Aiken's V was used to quantify item-level content validity (Merino-Soto, 2023). The mean item-level Aiken's V across the initial 30 items was 0.863. According to the decision rules recorded in the validation workbook, 25 items met the retention threshold ($V \geq .78$), three were marked for minor revision (items 4, 17, and 27), and two were marked for replacement (items 11 and 24). The revised final instrument reflects these changes, although the revised items were not assessed in a second expert review. Because item-level student responses were unavailable, internal-consistency reliability could not be estimated. The item-review decisions are summarized in Table 1.

Table 1. Item-content review results for the initial listening test.

Initial item decision	Number of items	Relevant item numbers
Retain ($V \geq .78$)	25	Remaining items
Minor revision ($V = .667$)	3	4, 17, 27
Replacement ($V = .444$)	2	11, 24
Mean Aiken's V	0.863	Original 30-item set

Expert review of the learning module

Three specialists independently evaluated the module: one reviewer for sports content, one for media, and one for English language. The sports-content and media reviewers used five-point response scales, whereas the English-language reviewer used a four-point scale. Scores were expressed as percentages of the maximum possible score for each instrument; raw totals across the different scales were not combined. The signed review forms documented recommendations for minor revisions, particularly to unit continuity, exercise feedback, audio controls, and the clarity of learner-facing explanations.

Data analysis

Student scores were paired using anonymous study identifiers. Descriptive statistics summarized pre-test scores, post-test scores, and within-student differences. The distribution of the difference scores was checked using the Shapiro–Wilk test. Because the differences were not normally distributed, the Wilcoxon signed-rank test was selected as the primary analysis; zero differences were omitted from the signed ranks. A paired-samples t-test and a sign test were conducted as supplementary within-group analyses, and a 95% confidence interval was calculated for the mean difference. Normalized gain was calculated from the group means as the mean change divided by the difference between 100 and the pre-test mean (Coletta & Steinert, 2020). These analyses describe within-group change and cannot isolate a treatment effect from other classroom influences.

Research ethics

No formal research ethics committee approval was obtained for this study. The departmental cooperation letter established institutional collaboration but did not constitute ethics approval or exemption. Analyses used de-identified student scores.

Results and Discussions

Module features and specialist appraisal

The completed prototype brought together five learning units, sports-specific listening situations, short explanations, multimedia links, and interactive tasks. The specialist review forms indicated favorable evaluations while also identifying aspects requiring attention. The sports-content review yielded 158 of 190 points (83.16%), the media review yielded 75 of 90 points (83.33%), and the English-language review yielded 39.5 of 40 points (98.75%). Because the reviewers used different rating scales, normalized percentages are more informative than unadjusted point totals. These figures represent expert judgments of module quality; they are not validity coefficients for the students' listening-test scores (Table 2).

Table 2. Expert appraisal ratings for the ESSENTIAL module.

Area of review	Score / maximum	Normalized rating	Review recommendation
Sports content	158 / 190	83.16%	Minor revision
Media	75 / 90	83.33%	Minor revision
English language	39.5 / 40	98.75%	Clarify selected instructions

The comments primarily concerned usability and instructional clarity rather than the overall approach. The sports-content reviewer identified continuity between units and answer feedback as areas for improvement. The media reviewer highlighted playback controls, while the language reviewer requested clearer task instructions and examples. These issues matter in listening instruction: students should be able to locate the audio, understand what to listen for, and use feedback without unnecessary effort navigating the materials. This interpretation is consistent with multimedia learning principles discussed by Mayer (2020). Moura et al. (2021) and Bores-García et al. (2020) similarly emphasize that assessment and feedback in physical education should inform subsequent learning rather than merely record performance, a view supported by meta-analytic evidence on educational feedback (Wisniewski et al., 2020).

Student feedback

The final project report summarized five indicators of module quality using a five-point scale. Mean ratings ranged from 4.0 for ease of access to 4.5 for media attractiveness; sports relevance received a mean rating of 4.3. Because individual questionnaire responses were unavailable, these values are reported descriptively. The percentages in Table 3 are arithmetic equivalents of the mean ratings (mean/5 × 100), not independently estimated proportions of students selecting a particular response.

Table 3. Student ratings of ESSENTIAL module features.

Module quality indicator	Mean / 5	Report percentage
Clarity of content	4.2	84%
Ease of access	4.0	80%
Media attractiveness	4.5	90%
Sports relevance	4.3	86%
Clarity of listening instructions	4.1	82%

Listening performance before and after implementation

All 40 students had paired scores. The mean pre-test score was 70.23 (SD = 13.37), and the mean post-test score was 75.60 (SD = 11.32). The mean within-student increase was 5.38 points (95% confidence interval [3.63, 7.12]). Thirty-two students improved, five had unchanged scores, and three scored lower. The Shapiro–Wilk test indicated that the distribution of difference scores departed from normality ($W = 0.916$, $p = .006$). The Wilcoxon signed-rank test indicated a positive within-group change ($W = 19.0$, $p < .001$). As supplementary analyses, the paired-samples t-test yielded $t(39) = 6.219$, $p < .001$, and the sign test supported the predominance of positive changes among non-tied cases ($p < .001$). Descriptive results are presented in Table 4 and Figures 2–3.

Table 4. Pre-test and post-test listening scores and paired changes.

Indicator	Pre-test	Post-test	Paired change
Number of students	40	40	40
Mean score	70.225	75.600	5.375
Standard deviation	13.368	11.325	5.466
Median	67.5	74.5	4.0
Observed range	46–92	50–94	−2 to 20

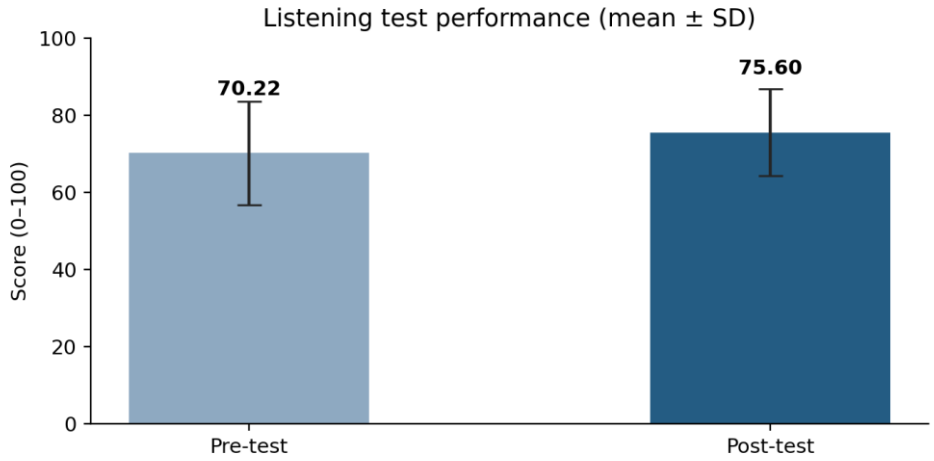

Figure 2. Pre-test and post-test mean listening scores (error bars show standard deviations).
Note. The figure was prepared with AI-assisted visualization support; all numerical values were checked against the paired-score dataset.

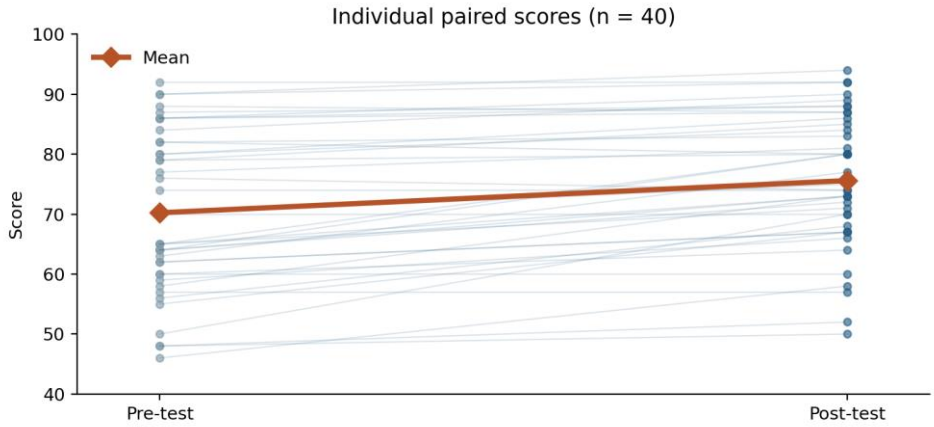

Figure 3. Individual student score trajectories from pre-test to post-test (n = 40).
Note. The visualization was prepared with AI-assisted plotting support using the recorded student scores.

Although the statistical tests indicated a positive change, the magnitude of improvement should not be overstated. The mean increase of 5.38 points is modest on a 100-point scale, and the normalized gain calculated from the group means was 0.181. The within-group standardized mean change (d_z = 0.983) reflects the variability of students' score differences; it should not be interpreted as a between-group intervention effect. The available data describe progress during the module's implementation rather than a direct estimate of the module's independent contribution.

The results suggest that sports-oriented audio content can be incorporated into an accessible listening sequence and used in regular teaching. This interpretation is compatible with the needs reported by Sari et al. (2025) and Putra et al. (2025), which emphasized communication tasks drawn from sports settings. It also accords with research showing that listening depends on vocabulary knowledge and attentional processes (Wallace, 2022) and may benefit from strategic monitoring (In'nami et al., 2023). Nonetheless, the present study did not measure these processes separately, so the observed score increase cannot be attributed to any single feature of the module.

Limitations and further research

The field trial included 40 students and had no comparison group. Students may have benefited from their regular coursework, familiarity with the test format, or additional practice across the six meetings, irrespective of the module itself. The findings therefore describe improvement during implementation, not the size of an intervention effect. Furthermore, the module was evaluated at one institution; research across a broader range of classes and teaching contexts is needed before its usefulness can be generalized.

Because individual questionnaire responses were unavailable, response distributions and the reliability of the feedback scale could not be examined. The records were also inconsistent about participants' semester level. A

subsequent study should verify enrolment details, retain the source recordings and final test versions, examine item performance and test reliability, and include follow-up beyond the immediate post-test. A comparison-group design would allow a more defensible assessment of whether ESSENTIAL adds value beyond ordinary instruction.

Conclusions

ESSENTIAL was developed as a five-unit multimedia listening module for physical education students and was reviewed by specialists in sports content, media, and English language. The expert ratings support its suitability for further classroom use, subject to minor revisions. Across six learning sessions, mean listening scores increased from 70.23 to 75.60 among 40 students, and the within-group change was statistically significant. The modest normalized gain and the absence of a comparison group call for restraint in interpreting this result. ESSENTIAL provides a practical starting point for sports-specific English listening instruction; its effectiveness should be examined in a controlled study using a fully documented assessment with established reliability.

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