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Development and Feasibility of Sundanese Script Matching Cards for Fifth Grade Students

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Abstract

Background – Fifth-grade learners at SDN Bangka 3 reported difficulties recalling Sundanese script forms and applying rarangkén, alongside limited concrete instructional media.

Purpose – This study developed Sundanese script matching cards and described expert appraisals and user responses.

Method/Approach – An adapted 4-D model guided development, appraisal, revision, and local handover. One media expert and one content expert assessed the initial prototype. Testing comprised a five-student pilot and a 30-student Class VA trial; one classroom teacher supplied a response. Pilot/trial overlap was unspecified. Analysis was descriptive.

Findings – Equal-weight means of displayed dimension percentages were 92.19% for media appraisal, 95.83% for content appraisal, 81.77% for student responses, and 83.44% for the teacher response. Raw-score denominators were unavailable for independent verification. A corrected "ja" card was checked by the competition coach but was not formally revalidated. Separate pilot results were not reported.

Conclusion – The prototype received favourable expert and user appraisals. These findings concern preliminary feasibility and perceived acceptability, not learning effectiveness. Limited instrument documentation and a single-school sample constrain interpretation.

Novelty/Originality/Value – The prototype integrates physical character matching, rarangkén composition, and board-based writing with teacher feedback. Its contribution is a documented local product adaptation rather than demonstrated superiority over existing media.

Keywords: matching cards; instructional media; Sundanese script; feasibility; user responses

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INTRODUCTION

Sundanese script is included in the fifth-grade Sundanese language textbook used as the curricular reference for this product (Tim Motekar, 2025). Relevant studies identify specific instructional difficulties rather than establishing a population-wide loss of script knowledge. Pebriyani et al. (2023) examined flashcards for improving elementary students' Sundanese script writing, while Rahmawati et al. (2026) documented limited media and difficulty distinguishing character forms in one elementary school. Research on posters in Grade VII and flashcards in senior high school also addresses Sundanese script writing, but those settings differ from the fifth-grade classroom considered here (Megawati & Ropiah, 2026; Somantri & Ropiah, 2025). The present problem concerns recognizing characters and applying rarangkén, the diacritic markers that modify their pronunciation, in a specific elementary classroom.

A preliminary observation took place during a Class VA Sundanese language lesson at SDN Bangka 3, Bogor, on 7 March 2026. Informal interviews involved the Class VA teacher and a second-grade teacher who also coaches the school's Sundanese script competition participants. They described reliance on textbooks and blackboard examples, limited concrete instructional media, and errors in remembering and writing characters. Student accounts distinguished difficulty recalling basic forms from difficulty applying rarangkén. These accounts describe perceived needs; the study did not quantify boredom, motivation, or the prevalence of errors. A physical card-and-board medium was therefore designed to make character combinations visible and manipulable and to provide opportunities for teacher feedback. This design rationale follows the identified task demands rather than assuming that every child belongs to a fixed developmental stage.

Prior work provides relevant but distinct comparisons. Salsabila and Saputra (2021) discussed Sundanese script flashcards through a literature review, whereas Pebriyani et al. (2023) investigated their classroom use in writing instruction. Mutammimah et al. (2024) developed KAGANGA, an Android application containing Sundanese script material and quizzes. Card-matching activities have also been studied in science and English vocabulary contexts, which do not establish benefits for Sundanese script learning (Amir et al., 2021; Situmeang et al., 2026). The present prototype combines 7.5 × 9 cm character cards, a 60 × 60 cm board, game instructions, a rarangkén guide, and an answer key. Its distinguishing feature is the combination of character matching, assembling characters with diacritics, and writing the resulting forms on the board. This is a product-design contribution; superiority over flashcards or digital media was not tested.

This study aimed to develop Sundanese script matching cards for fifth-grade students at SDN Bangka 3 and to describe expert feasibility appraisals and teacher/student responses. It addressed three questions: (1) What product and process outputs were documented in the adapted 4-D stages? (2) How did one media expert and one content expert appraise the prototype? (3) How did the Class VA teacher and students rate their experience of the medium?

The contribution is a locally developed prototype and a bounded account of its design, revision, and appraisal. The product covers aksara ngalagena (consonant characters), aksara swara (vowel characters), and rarangkén. It adapts existing card-based practice to character composition and board-based writing. The results concern preliminary product feasibility and perceived acceptability at one school; they do not measure learning gains or establish a new learning theory.

METHODS

The study used a research and development design adapted from the 4-D model of Thiagarajan et al. (1974): Define, Design, Develop, and Disseminate. This sequence fits the tasks of identifying a classroom need, specifying a physical medium, obtaining expert/user feedback, and transferring the product to the school. The adaptation limited evaluation to expert appraisal and user responses and limited dissemination to a local handover; it did not include a summative effectiveness evaluation or

wider adoption study. The school and Class VA were purposively selected in relation to the reported Sundanese script learning need. The documented needs-assessment date was 7 March 2026. The subsequent development and trial dates were not documented, preventing specification of the complete data-collection period. Product appraisal involved one media expert and one content expert; user testing comprised a five-student pilot and a 30-student Class VA trial, with one Class VA teacher providing a questionnaire response. It was not documented whether the five pilot students were included among the 30 trial participants; therefore, these figures cannot be added to claim 35 distinct students.

The adapted development procedure comprised the following stages.

Define. The preliminary lesson observation and informal interviews explored current instructional resources, difficulties recognizing and writing characters, and difficulties applying rarangkén. Two teachers contributed accounts, together with fifth-grade students, including students preparing for the Festival Tunas Bahasa Ibu (FTBI) competition. The number of student interviewees is not recorded separately. The interviews were conversational rather than based on a structured guide; no interview transcript coding scheme or counts of recurring responses are reported. The reported accounts were summarized by difficulty and existing resource. These accounts informed three design priorities: visible character forms, a guide to diacritic placement, and progressively more demanding character-composition tasks.

Design. The prototype was specified as a physical set covering seven swara characters, 25 ngalagena characters, and 13 rarangkén types. Cards measured 7.5 × 9 cm and were designed in Canva with contrasting backgrounds. A 60 × 60 cm board supported card matching and writing. The set also included game instructions, a rarangkén-writing guide, and an answer key relating Sundanese forms to Latin representations. Activities progressed from two-syllable forms without rarangkén to forms using diacritics and then two- to three-word sequences. At least two players were envisaged, with teacher feedback during matching and writing. Card stock, lamination, print size, exact pair counts, lesson duration, final group sizes, and competition/completion rules are not documented in sufficient detail for exact replication.

Develop. The initial prototype underwent separate media and content appraisal, followed by revision and developmental testing. Developmental testing included a five-student pilot before the 30-student Class VA trial. It also documents a correction to the "ja" character after initial expert appraisal: the competition coach identified a nonstandard form, and the card was replaced with the revised form shown in Figure 1. The coach checked the replacement, but the revised card did not undergo a second formal validation. The reported expert percentages therefore apply to the pre-revision prototype. No separate quantitative pilot results or systematic before/after usability log are reported. The latest version remains a revised prototype whose final content requires independent revalidation.

Disseminate. Dissemination was restricted to handing the matching-card set and usage instructions to a fifth-grade teacher at the research school. This action represents local transfer of a prototype rather than evidence of institutional adoption, sustained classroom use, or use beyond the school.

Data sources comprised preliminary observation, informal interviews, two expert appraisal forms, and teacher/student response questionnaires. Expert appraisal concerned the prototype's perceived suitability, presentation, and content. User questionnaires concerned perceived appeal, usefulness, and usability. These constructs are distinct from objectively observed engagement, motivation, comprehension, and learning outcomes, none of which was directly measured.

The media appraisal instrument drew on presentation and learner-suitability considerations in Hapsari and Zulherman (2021), whose product was a Canva animation. For the present physical medium, relevant considerations concerned printed character visibility, card/board presentation, and handling rather than animation or audio. Junita and Yuliani (2022), who studied an electronic biology worksheet, informed the general consideration of users' responses, rather than providing validation of the matching-card questionnaire. The reported item wording was adapted to the card activity and reviewed for content and age appropriateness. However, the full item wording, item counts, reviewers

of the adapted instruments, and psychometric results are not reported. Consequently, validity established for the earlier products cannot be assumed for these instruments. Table 1 summarizes only the instrument characteristics documented in the present report.

Table 1. Instrument characteristics documented in the report

Instrument	Reported dimensions	Respondents and scale	Reporting limitation
Media appraisal	Developmental suitability; accessibility/ease; visual design; interactivity	One media expert; four-point quality scale	Item counts and raw/maximum totals not reported
Content appraisal	Depth/accuracy; accuracy/clarity; developmental alignment	One content expert; four-point quality scale	Overlapping dimensions; no item blueprint or raw totals
Student responses	Interest/usefulness; ease; presentation; perceived engagement	30-student trial; four-point agreement scale	Valid form count and item denominators not reported
Teacher response	Same four reported response dimensions	One Class VA teacher; four-point agreement scale	Item wording/counts and raw totals not reported

The expert forms are described as using four ratings: very good (4), good (3), poor (2), and very poor (1). The teacher/student questionnaires are described as using strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Completed forms and item-level raw totals are not included with the summaries, so the actual anchors and denominators cannot be independently checked. The following equation states how a four-point item-based percentage would be calculated; it does not reconstruct unavailable raw scores.

$$P = [S / (4 \times k \times n)] \times 100\%$$

Here, P is an item-based percentage, S is the sum of item scores, k is the number of items, and n is the number of respondents. When dimensions contain different numbers of items, an overall percentage computed from raw totals differs from an unweighted average of dimension percentages. Because item counts and raw/maximum totals are not reported, the analysis reports an explicitly equal-weight dimension summary, $M = (P_1 + P_2 + \ldots + P_D) / d$, where d is the number of dimensions. These descriptive summaries are calculated from the displayed dimension values and rounded to two decimal places using conventional half-up rounding.

An equal-weight summary is a transparent secondary calculation from the reported dimension percentages, not a verified reanalysis of the original questionnaire records. No inferential tests or reliability coefficients are estimated. The numerical ratings are reported without categorical thresholds because the provenance and application of the original expert and user-response cut-offs cannot be established from the available scoring records.

Qualitative interpretation is restricted to the reported needs accounts, expert suggestions, the documented "ja" correction, and the informal student reflection. No frequencies, inter-rater agreement, theme-saturation claims, or pilot outcomes are inferred from narrative statements. Individual children are not identified in the results, and identifiable implementation photographs are omitted.

RESULTS AND DISCUSSION

Definition Phase (Define)

Needs assessment at SDN Bangka 3 involved the Class VA teacher (Teacher A), the school's Sundanese script competition coach (Teacher B), and student accounts. Teacher B was a second-grade teacher with responsibility for preparing FTBI competition participants. The two teachers were distinct informants; only Teacher A is identified as the teacher questionnaire respondent. Student accounts concerned both ordinary classroom learning and competition preparation, but the number of interviewees and the size of the competition subgroup were not specified.

Teacher A described textbook-based instruction and difficulty among some students in recalling and writing characters. Teacher B described the use of guidebooks, blackboard demonstrations, and Sundanese texts without a concrete matching medium. Fifth-grade students described reliance on guidebooks and difficulty memorizing characters and using rarangkén. Competition participants reportedly recognized basic forms but still made occasional diacritic errors. These accounts identified rarangkén as a shared task difficulty, with different levels of prior familiarity.

Teacher A also described a preference for game-based activities. An informal verbal reflection after use recorded expressions of enjoyment, but it did not use a structured interest or motivation measure. These statements informed the design but cannot establish a change in interest. The broader literature discusses the importance of matching media to instructional purposes and learner characteristics, without validating the present product's outcomes (Astuti et al., 2024; Mardatillah et al., 2023).

Students preparing for the competition belonged to the same classroom, and activities were not scheduled separately for that subgroup. The reported instructional progression began with two-syllable forms without rarangkén, moved to diacritic use, and ended with two- to three-word sequences. This progression provided a task-based rationale for scaffolding. The needs evidence remains an initial, single-school account based partly on teacher perceptions and informal student reports.

Design Phase (Design)

The prototype comprises seven swara character cards, 25 ngalagena character cards, and 13 rarangkén types, with supporting game, guide, and answer-key cards. Character cards measure 7.5 × 9 cm, and the board measures 60 × 60 cm. The researchers drew the script forms using graphic elements in Canva rather than using a script font. The design used contrasting backgrounds and linked the script forms to Latin representations and diacritic guidance. Firdaus et al. (2021) provide a relevant comparison concerning the design of Sundanese character forms and instructional media. Their work does not establish that the forms drawn for this prototype are accurate; that issue required content checking within the present development process.

During use, students combine ngalagena characters with rarangkén or swara characters and write the resulting forms on the board. Teacher feedback addresses character choice and diacritic placement. The reported "Marta" example illustrates the task: "ma" with panglayar represents the syllable-final /r/, followed by "ta." A longer construction using a separate "ra" marked with pamaéh was discussed as less economical. This example illustrates the intended feedback mechanism, not a quantified misconception rate or demonstrated improvement in writing.

Compared with the flashcard approaches discussed by Salsabila and Saputra (2021) and Pebriyani et al. (2023), the prototype emphasizes combining characters and writing the assembled form on a shared board. Compared with KAGANGA (Mutammimah et al., 2024), it provides a physical activity without requiring an Android device. These are differences in format and task organization, not evidence that one product is more effective. The designs of e-flashcards and board games in other learning contexts offer additional alternatives but do not establish benefits for this classroom (Desfrida et al., 2023; Mulyati & Suryani, 2023).

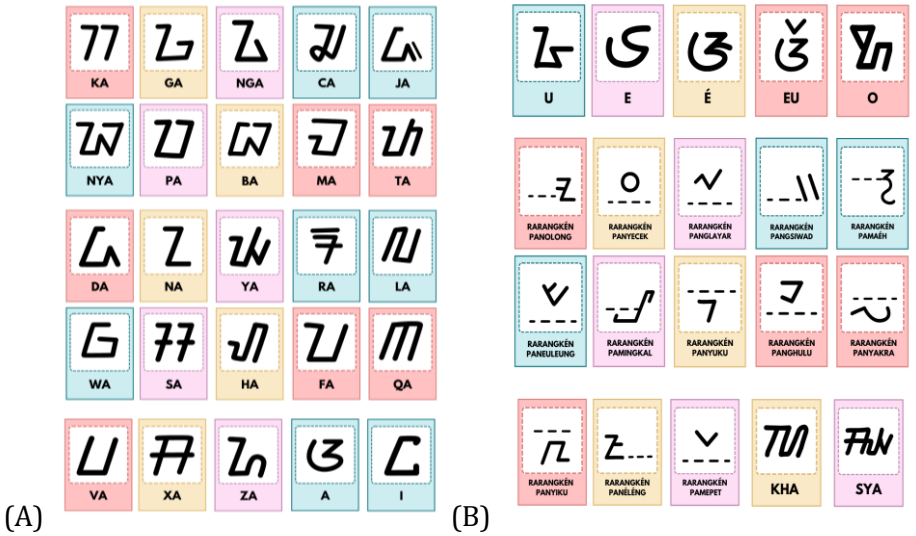


Figure 1. Sundanese script matching-card prototype. Panels A and B display the card set across two sheets, including ngalagena, swara, and rarangkén cards. The illustrated "ja" card is the revised version. The displayed layouts are product illustrations, not student outcome data.

Expert appraisal concerned the initial version. Afterward, the competition coach identified an incorrect "ja" form, and the researchers replaced that card. The revised form was checked by the coach but did not receive a second formal expert score. This distinction prevents the original validation percentages from being attributed to an independently revalidated revision. The researchers used Canva as the design platform and the coach's script guide as the local reference for character forms; a complete bibliographic description of that guide is not provided.

Development Phase

Development findings comprise two individual expert appraisals, the documented character-form revision, and user-response summaries. Expert feedback supports preliminary refinement of the prototype; it does not demonstrate learning effectiveness.

Validation Test

One media expert and one content expert appraised the initial prototype independently and supplied written comments. The media appraiser was described as a university professor in linguistics; the content appraiser was an experienced teacher responsible for the school's Sundanese script competition preparation. Each domain therefore rests on one judgment rather than a panel consensus. Study records do not provide a separate account of the appraisers' qualifications in media assessment or the dates of appraisal.

Table 2. Media expert appraisal of the initial prototype

Reported dimension	Dimension rating (%)
Appropriateness of Development Level	87.50%
Accessibility & Ease of Use	100.00%
Visual presentation design	93.75%
Interactivity	87.50%
Equal-weight dimension mean	92.19%

Note. The mean gives each displayed dimension equal weight. It is not a verified total-item score.

The four displayed media-appraisal percentages yield an equal-weight mean of 92.1875%, rounded to 92.19% (Table 2). The rating indicates a favourable individual appraisal of the pre-revision prototype. Written suggestions concerned word choice and spelling, but the report supplies no exact before/after wording examples. The separately documented "ja" correction concerns character form. Without raw totals and item counts, agreement with the reported aggregate does not independently verify the original scoring.

Table 3. Content expert appraisal of the initial prototype

Reported dimension	Dimension rating (%)
Depth & Accuracy of Content	93.75%
Accuracy and Clarity of Content	93.75%
Alignment of Content with Students' Developmental Level	100.00%
Equal-weight dimension mean	95.83%

Note. The mean gives each displayed dimension equal weight. It is not a verified total-item score.

The three displayed content-appraisal percentages yield an equal-weight mean of 95.8333%, rounded to 95.83% (Table 3). This is the content expert's appraisal of alignment, accuracy, and perceived suitability. It does not demonstrate student comprehension. The partially overlapping labels concerning depth, accuracy, and clarity are retained as reported dimensions; they cannot be treated as independent validated constructs without the item blueprint. The later "ja" revision also limits interpretation of the initial accuracy appraisal.

Student trial and pilot reporting

The development account describes a five-student pilot followed by a trial involving 30 Class VA students. The pilot was intended to identify usability and comprehension difficulties, but separate scores, an error log, and pilot-specific revisions are not reported. The "ja" correction cannot be attributed specifically to the pilot because it was identified by the competition coach. Accordingly, the pilot is not presented as evidence of effectiveness. Table 4 contains the dimension percentages attributed to the 30-student trial; the number of valid returned forms, timing of administration, lesson duration, group sizes, and facilitation details are not reported separately. The four displayed percentages average 81.765%, which rounds to 81.77%. The original 81.76% cannot be confirmed or replaced as a raw-score aggregate without the original item totals; 81.77% is used only as the labelled equal-weight summary.

Table 4. Student response dimensions from the 30-student trial

Reported dimension	Dimension rating (%)
Interest & Usefulness	84.16%
Ease of Use	79.16%
Media Presentation	82.91%
Perceived student engagement	80.83%
Equal-weight dimension mean	81.77%

Note. The mean gives each displayed dimension equal weight. It is not a verified total-item score.

Teacher response

Table 5. Response dimensions from the Class VA teacher

Reported dimension	Dimension rating (%)
Interest & Usefulness	90.00%
Ease of Use	81.25%
Media Presentation	87.50%
Perceived student engagement	75.00%
Equal-weight dimension mean	83.44%

Note. The mean gives each displayed dimension equal weight. It is not a verified total-item score.

One Class VA teacher was identified as the questionnaire respondent. The four teacher dimension percentages average 83.4375%, rounded to 83.44% (Table 5). This is an equal-weight summary of displayed ratings, not a response rate. The lowest teacher rating was 75.00% for the dimension labelled student engagement. That label represents the teacher's perception rather than directly observed behavioural engagement. It identifies an area for further investigation, such as clarity of turns, participation opportunities, and support for less confident students; these are proposed refinements, not completed revisions or measured explanations.

Interpretation of user responses

The student summary of 81.77% and the teacher summary of 83.44% indicate favourable reported perceptions under the stated dimension-average calculation. They are not percentages of students who improved or proportions of teachers who responded. Arifani et al. (2020) studied a different game-and-flashcard product for early-childhood letter recognition. That comparison supports considering play-based media as a design option; it does not establish that the present product improves fifth-grade Sundanese script learning.

Scoring and instrument limitations

The equal-weight summaries for the media and content appraisals reproduce the originally stated 92.19% and 95.83% after rounding. For student and teacher responses, the displayed dimension values yield 81.77% and 83.44%, rather than the original 81.76% and 83.43%. These differences may reflect truncation, underlying unrounded values, or weighting. Their cause cannot be established without the completed forms and item counts. The revised summaries therefore remain descriptive and do not certify the original raw-score calculation. Separate thresholds are not applied because their source and use were inconsistent.

Implications for product refinement

A card-and-board format makes character composition and corrective feedback visible, but content accuracy remains essential. The need to correct the "ja" card after initial appraisal shows why independent rechecking of every printed character is warranted. The teacher's comparatively lower perception rating for student engagement also argues for observing participation directly during a later trial. Neither the favourable appraisal nor the activity format substitutes for a learning-outcome test.

Study limitations

The study used one school, one expert per appraisal domain, and one teacher response. The five-student pilot is insufficiently documented, and its overlap with the 30-student trial is unknown. Item counts, completed forms, and trial administration details are not supplied. Informal reflection and

favourable questionnaires may be affected by social desirability and researcher/teacher involvement. The lack of a comparison condition and direct learning measures prevents causal conclusions. Local handover does not demonstrate sustained adoption.

Dissemination Phase

Local dissemination comprised handing over the revised matching-card set and usage instructions to a fifth-grade teacher at SDN Bangka 3. Study records do not establish the handover date, whether the receiving teacher belonged to Class VA or VB, whether training occurred, or whether later use was monitored. It is therefore interpreted as a limited product transfer. Wider adoption, continued use, and benefits for other classes remain untested.

CONCLUSION

The study developed a physical Sundanese script matching-card prototype for fifth-grade students through an adapted 4-D process. The documented product combines character cards, a board, usage guidance, and an answer key. One media expert and one content expert appraised the initial version favourably, with equal-weight dimension summaries of 92.19% and 95.83%. A subsequently corrected "ja" card was checked by the competition coach but was not formally revalidated. The displayed student and teacher response dimensions yield equal-weight summaries of 81.77% and 83.44%, respectively. These values describe reported user perceptions; item-level denominators remain unverified. The findings are limited by one appraiser per domain, one school, a small student group, uncertain pilot/trial overlap, incomplete instrument reporting, and possible response bias. No direct measure of engagement, motivation, comprehension, or learning outcomes supports an effectiveness claim.

The prototype warrants further refinement and testing rather than a claim of proven educational benefit. Subsequent work should verify the scoring against completed instruments, document pilot problems and revisions, obtain additional independent content/media appraisal, and evaluate script recognition and writing with an appropriate pretest–posttest or comparison-group design. Follow-up should also examine implementation beyond the initial school.

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