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Needs Analysis of Sharf Learning for Interactive Digital Media in an Indonesian Islamic Boarding School

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Abstract

This study analyzes the learning conditions, existing media use, and interactive-media needs in Sharf (Arabic morphology) instruction at an Indonesian Islamic boarding school. An exploratory descriptive needs-analysis design combined a 15-item four-point Likert questionnaire completed by 17 students with guided interviews involving the Sharf teacher, vice principal for curriculum, and headmaster. Questionnaire scores were normalized into percentages and examined at item and dimension levels; the negatively worded difficulty item was reverse-scored only for the composite learning-condition index. The results show that the learning-condition dimension reached 77.65% (high), current media use 74.12% (high), and the need for interactive media 83.82% (very high). The strongest needs concerned attractive learning media (89.71%), more interactive learning (88.24%), and visual support through images or mind maps (85.29%). Interview data confirmed persistent difficulties with wazn changes, tashrif, weak verbs, and other abstract morphological processes. The Sharf teacher reported no prior use of PowerPoint or dedicated interactive Sharf media, while school leaders described technology use as supported but still uneven because devices are shared and teacher development time is limited. Across the interviews, desired features included stepwise visualization, easy navigation, interactive exercises, immediate feedback, audio, short explanatory video, and evaluation. The findings suggest that Sharf media should be designed around these pedagogical functions rather than treating a particular platform as the solution itself.

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1. Introduction

Sharf, the traditional Arabic discipline concerned with word formation and morphological change, is central to the learning of Arabic because it explains how roots, patterns, affixes, and inflectional markers interact to produce different forms and meanings. Arabic morphology is particularly rich: derivational and inflectional processes may alter the internal structure of a word rather than simply append transparent endings. Consequently, learning Sharf requires more than memorizing tables; learners must recognize recurrent form-meaning relations and apply them to unfamiliar words (Nujaima & Kurniawan, 2024; Omari & Najjar, 2024).

Recent research on Arabic morphological awareness reinforces this pedagogical importance. Morphological awareness develops across inflectional and derivational systems and is affected by the structural distance among Arabic varieties, while it also contributes to higher-level literacy processes such as reading comprehension (Shahbari-Kassem et al., 2025; Smail et al., 2025). For learners of Arabic as an additional language, these findings imply that morphology should be taught as an organized system of patterns and transformations, not merely as isolated paradigms. When students can notice what remains constant, what changes, and what each change contributes to meaning or grammatical function, Sharf can become a resource for vocabulary growth and grammatical control rather than a collection of forms to reproduce.

The difficulty is that Sharf is often experienced as cognitively demanding. Studies report problems in distinguishing morphological terms, following changes from one form to another, understanding the purpose of a transformation, and learning irregular or less transparent phenomena such as i'lal and ibdal (Md. Noor & Sahrir, 2019; Sulaikho et al., 2023). In pesantren and madrasah contexts, these linguistic demands can interact with instructional routines dominated by verbal explanation, recitation, and memorization. Active-learning studies in Arabic grammar therefore emphasize student participation, problem solving, collaborative work, and appropriate media as important complements to explanation and memorization (Hafidah et al., 2024). Similar classroom-oriented research also notes that difficulties in nahwu-sharf learning are shaped by materials, facilities, learner background, and limited media, not by a single learner factor (Yunisa, 2022).

Digital media offer several affordances that are relevant to the transformational nature of Sharf. Stepwise visual highlighting can make changes in roots and patterns perceptually salient; interactive exercises can require learners to identify, classify, or transform forms; and immediate feedback can turn errors into opportunities to inspect the specific pattern that has been misunderstood. In Arabic education, the use of technology and digital learning media has expanded markedly, including Android applications, interactive quizzes, computational morphology platforms, social media, and augmented-reality resources (Khoirunnisa & Ahsanuddin, 2024; Ridha et al., 2026).

A systematic review of Indonesian Arabic-learning-media studies similarly shows that development research and technology-based products have become a dominant strand of publication (Abdul Haris et al., 2024). Studies of digital media and instructional aids additionally report potential gains in understanding and motivation when resources are selected in accordance with learning needs (Abdullah et al., 2023; Hasanuddin, 2024). Sharf-specific development research also demonstrates the continuing search for models

that make morphological knowledge more accessible and applicable (Maswani et al., 2023).

However, the availability of technology does not itself establish what learners need. Multimedia can support learning when its verbal, visual, and interactive elements are aligned with cognitive processing rather than added as decoration. The cognitive theory of multimedia learning and recent process-oriented research on digital tools stress signaling, coherence, manageable processing demands, purposeful activity, and feedback (Mayer, 2024; Reinhold et al., 2024). Likewise, evidence from digital game-based language learning indicates that interactive and game-like formats can support engagement and language outcomes, but effects depend on instructional design, learning goals, duration, and the type of game or task (Dixon et al., 2022; Zahra et al., 2026).

For this reason, needs analysis should precede the selection of a platform. Arabic-language studies have used questionnaires, interviews, and classroom observation to identify gaps between available materials and learners' actual needs before developing digital products (Al Husna et al., 2025; Salma et al., 2024). Their common implication is that a useful product specification should be derived from the learning problem: the content that causes difficulty, the classroom practices already in use, learner preferences, and the instructional functions that technology needs to provide. This sequence reduces the risk of solution-driven research in which a technology is selected first and a questionnaire is then used merely to justify it.

The present study addresses that gap in a pesantren Sharf context. Rather than asking whether students simply want PowerPoint or another predetermined application, it maps three layers of evidence: the perceived condition of Sharf learning, the extent and perceived value of existing learning media, and the specific level of demand for more attractive, visual, and interactive support. These quantitative data are interpreted alongside role-specific interviews with the Sharf teacher, vice principal for curriculum, and headmaster concerning morphological difficulties, reported teaching practice, institutional constraints, and desired media features. The novelty lies in translating a small-scale, context-specific needs profile into pedagogically defined design requirements for interactive Sharf media.

Accordingly, this study asks three questions: (1) what is the current profile of students' Sharf learning conditions; (2) how do students perceive the current use of learning media and the need for more interactive support; and (3) what design requirements for interactive digital media can be inferred from the combined quantitative and qualitative evidence? The answers are intended to guide subsequent product development while keeping the pedagogical problem, rather than the software platform, at the center of design decisions.

2. Method

This study used an exploratory descriptive needs-analysis design with a quantitative core supported by qualitative interview evidence. The quantitative component was intended to map students' perceptions at the item and dimension levels, while guided interviews with three key informants-the Sharf teacher, vice principal for curriculum, and headmaster-were used to explain pedagogical difficulties, existing media practices, institutional constraints, and desired media features. The study was conducted at Pondok Pesantren Darul Khair, Pekanbaru, Indonesia, and the questionnaire dataset contained 17

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complete student responses. Because the aim was diagnostic rather than inferential, the study did not test causal hypotheses or generalize beyond the local setting.

The questionnaire consisted of 15 statements rated on a four-point Likert scale. Items 1-5 represented learning conditions, items 6-10 represented current media use, and items 11-15 represented needs for interactive media. The instrument addressed students' interest in Sharf, perceived ease of understanding, difficulty with wazn changes, memorization of tashrif, clarity of teacher explanation, current use of media and PowerPoint, the usefulness and attractiveness of visual media, and preferences for more attractive, visual, and interactive learning. Item 3 was negatively worded ('I often have difficulty understanding changes in wazn'); therefore, it was reverse-scored only when computing the composite learning-condition index. At the item level, the original direction was retained so that the percentage directly represents agreement with the stated difficulty.

For each item, the observed score was divided by the maximum possible score (17 respondents x 4 points) and multiplied by 100. Dimension scores were calculated from the combined items after reverse-scoring Item 3 for the learning-condition dimension. For the composite interpretation used in this study, 81-100% was classified as very high, 61-80% as high, 41-60% as moderate, 21-40% as low, and 0-20% as very low. Item percentages were reported as continuous values and ranked rather than forced into categories, because the purpose was to retain diagnostic detail at the boundary values.

The qualitative component used role-specific interview guides rather than classroom observation. The Sharf teacher interview covered instructional routines, difficult morphological content, existing media, barriers to media use, student responses, and desired media features. The vice principal for curriculum interview examined the curricular position of Sharf, facilities, technology policy, implementation barriers, and institutional support for innovation. The headmaster interview addressed school-level technology use, infrastructure, innovation support, perceived Sharf difficulties, and expectations for the proposed media.

Interview responses were organized into four analytical themes: teaching practice and morphological difficulty, current media and implementation constraints, institutional feasibility, and design requirements. These themes were compared with questionnaire patterns as source triangulation. No classroom-observation data were analyzed in this article; consequently, statements about classroom practice are presented as interview-based reports rather than direct behavioral observations. Given the small single-site sample and the exploratory nature of the questionnaire, results are interpreted as a local needs profile rather than a psychometric model of a stable latent construct.

3. Result

The questionnaire results reveal a generally positive learning context alongside a clear demand for stronger interactive support. Table 1 summarizes the three composite dimensions. The learning-condition index reached 77.65%, indicating a high overall condition after reverse-scoring the difficulty item. Current media use reached 74.12%, also high. The strongest composite, however, was the need for interactive media at 83.82%, which falls in the very-high range. The difference between current media use and interactive-media need suggests that media are already present in instruction, but students expect richer functions than the current practice consistently provides.

Table 1. Composite Needs-Analysis Profile

Dimension	Items	Percentage	Interpretation
Learning conditions	1-5	77.65%	High
Current media use	6-10	74.12%	High
Need for interactive media	11-15	83.82%	Very high

Item-level results in Table 2 show why the composite picture requires a more nuanced interpretation. Students expressed strong interest in Sharf (85.29%) and rated teacher explanation very positively (89.71%). At the same time, agreement with the statement that they often had difficulty understanding changes in wazn remained 60.29%. This coexistence is important: it indicates that perceived difficulty is not simply the result of low interest or unclear teacher explanation. Rather, at least part of the problem appears to lie in the representational and procedural demands of the morphological content itself.

Table 2. Item-Level Questionnaire Results (n = 17)

No.	Questionnaire statement	Percentage
1	I like learning Sharf.	85.29%
2	Sharf material is easy to understand.	72.06%
3	I often have difficulty understanding changes in wazn.	60.29%
4	I can memorize tashrif easily.	76.47%
5	The teacher explains the material clearly.	89.71%
6	The teacher uses learning media in Sharf lessons.	82.35%
7	The teacher uses PowerPoint in Sharf lessons.	64.71%
8	The teacher uses pictures or mind maps.	64.71%
9	The learning media used are attractive.	77.94%
10	The media help me understand the material.	80.88%
11	I need more attractive Sharf learning media.	89.71%
12	I understand Sharf more easily with pictures or mind maps.	85.29%
13	I want Sharf learning to be more interactive.	88.24%
14	Interactive PowerPoint would help me understand Sharf.	76.47%
15	I hope the teacher uses interactive media in every Sharf lesson.	79.41%

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The media-use items show a second gap. Students reported that teachers already used learning media (82.35%) and that these media helped understanding (80.88%). Yet the specific use of PowerPoint and of pictures or mind maps was only 64.71% for each item. Thus, students did not describe a media-free classroom; instead, their responses indicate uneven exposure to specific visual and presentation formats. The needs items then rose above these current-use indicators: 89.71% agreed that they needed more attractive media, 88.24% wanted more interactive learning, and 85.29% reported that pictures or mind maps made Sharf easier to understand.

Interview evidence provides a more specific explanation of the questionnaire profile. The Sharf teacher described lessons as dominated by lecture, question-and-answer, examples, textbook and whiteboard explanation, and exercises in transforming word forms (tashrif). The teacher identified difficult content including changes in fi'il wazn, tashrif lughawi and tashrif istilahi in weak verbs, changes involving weak letters, classification of fi'il mu'tal, identification of the bab of fi'il tsulatsi mujarrad, and determination of word form (shighah). The teacher also reported that PowerPoint had never been used in Sharf lessons and that no dedicated interactive Sharf media had been used; when digital display was needed, MS Word files were projected. The vice principal for curriculum and the headmaster independently characterized technology use as developing but not yet optimal or evenly distributed. Both reported that projectors, laptops, speakers, and internet access were available but shared or limited, and both expressed institutional support for validated digital learning innovation.

3.1 Interview Findings: Pedagogical and Institutional Needs

The three interviews converged on four points: Sharf is considered a core subject for understanding word transformation and reading Arabic texts; the most difficult content is concentrated in abstract and pattern-sensitive morphology; interactive media use is still limited despite available basic technology; and the school supports the development of a practical, curriculum-aligned medium. The teacher's feature requests were especially specific, including an easy menu, hyperlink navigation, stepwise wazn animation, Arabic-pronunciation audio, short explanatory videos, interactive exercises, quizzes with immediate feedback, attractive images, and built-in evaluation.

Table 3. Interview-Based Needs Profile

Theme	Interview evidence	Need implication
Reported teaching practice	Teacher: lecture, Q&A, examples, textbook/board work, and tashrif exercises; no PowerPoint or dedicated interactive Sharf media. School leaders: technology use is developing but uneven.	Interactive media should complement explanation and practice without requiring complex applications.
Morphological difficulty	Teacher: wazn changes, tashrif lughawi/istilahi in fi'il mu'tal, weak-letter changes, fi'il mu'tal types, bab tsulatsi mujarrad, and shighah. Headmaster also emphasized abstract word	Use stepwise visual transformation, comparison, and repeated guided practice.

	transformation and repeated practice.	
Resources and constraints	Shared projectors/laptops/speakers and limited internet coverage; limited teacher time and uneven skill in creating interactive media; no Sharf-specific interactive resource.	Design for existing shared hardware, simple operation, and low implementation complexity.
Institutional support	Curriculum leadership and headmaster support digital innovation, teacher development, and use of validated media aligned with the curriculum and pesantren values.	Implementation is feasible if the product is valid, practical, easy to use, and curriculum-aligned.
Desired features	Easy menu and hyperlink navigation, wazn animation, Arabic audio, short video, interactive exercises, immediate-feedback quizzes, attractive images, and evaluation.	Translate needs into purposeful interactivity, explanatory feedback, multimodal signaling, and built-in assessment.

A notable source discrepancy concerns PowerPoint. In the questionnaire, 64.71% of students agreed with the statement that the teacher used PowerPoint, whereas the Sharf teacher explicitly reported that PowerPoint had never been used and that projected MS Word files were the digital material used in class. The vice principal for curriculum likewise described interactive PowerPoint use as very limited. Item 7 is therefore retained as a measure of student perception rather than treated as verified evidence of actual PowerPoint use. The discrepancy may indicate that some students interpreted projected digital content broadly as PowerPoint, and it should be considered when reading the current-media-use index.

4. Discussion

4.1 A Representational and Procedural Difficulty, Not Merely a Motivation Problem

A notable result is the simultaneous presence of strong interest in Sharf (85.29%), very positive perceptions of teacher clarity (89.71%), and persistent difficulty with wazn changes (60.29%). This pattern cautions against interpreting morphology difficulty as a simple motivational deficit. Arabic morphology encodes information through root-and-pattern relations and through derivational and inflectional procedures that may involve internal changes to the word (Luthfan & Hadi, 2019; Shahbari-Kassem et al., 2025). Learners therefore have to coordinate multiple pieces of information: the root, the template, the location of additional letters, phonological changes, grammatical function, and meaning. Morphological awareness research confirms that these processes develop in differentiated ways and matter for broader Arabic literacy (Shahbari-Kassem et al., 2025; Smail et al., 2025).

The qualitative indication that students struggle with tashrif and weak-verb changes fits previous Sharf research. Noor and Sahrir (2019) specifically discuss learning problems in i'lal and ibdal, while Sulaikho et al. (2023) report confusion when one Arabic

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word changes into many forms and when learners do not grasp the purpose of the change. Faedurrohman et al. (Faedurrohman et al., 2023) similarly frame beginner Sharf difficulties as both linguistic and pedagogical. These findings support a design response that makes the transformation process visible and practiceable rather than simply increasing the amount of explanation.

4.2 Existing Media Are Useful, but Their Functions Are Not Yet Sufficient

Students' ratings of current media use are broadly positive: 82.35% agreed that media were used and 80.88% reported that media helped them understand the lesson. Nevertheless, PowerPoint use and the use of pictures or mind maps each stood at 64.71%, while the interactive-media needs dimension reached 83.82%. The most defensible interpretation is therefore not that the pesantren lacks media, but that the current media ecology does not yet consistently provide the functions students want. This distinction matters because research on Arabic digital learning has documented many platforms and formats, from Android applications and Quizizz to augmented reality, social media, and computational morphology tools (Muhlis et al., 2024; Muthongah et al., 2024).

The interview evidence requires a cautious reading of the PowerPoint item. Although 64.71% of students perceived PowerPoint use, the Sharf teacher stated that PowerPoint had never been used and that only MS Word files had been projected. This mismatch is analytically useful rather than merely problematic: it distinguishes perceived media exposure from verified classroom practice and suggests that the questionnaire wording may have elicited a broad interpretation of projected digital content. Accordingly, the present study does not claim that PowerPoint was routinely used; instead, it treats the result as evidence that students had some experience with projected digital materials while dedicated interactive Sharf media remained absent.

The broader evidence also suggests that technology should be evaluated through its learning mechanisms. Mayer (2024) argues that multimedia learning depends on how words and visuals are selected, organized, and integrated, while Reinhold et al. (2024) propose a cognitive-process framework for explaining how digital tools contribute to learning. AlShaikh et al. (2024) show how multimedia-learning principles can inform the design of AI-supported educational tools, and Désiron et al. (2025) caution that teachers' creation of multimedia materials is not automatically aligned with established multimedia principles. In the present context, adding more colors, animations, or screens would therefore be insufficient unless these elements direct attention to the morphological relation being learned.

4.3 Translating the Needs Profile into Design Requirements

The strongest need indicators - attractive media (89.71%), more interactive learning (88.24%), and visual support (85.29%) - can be translated into four design requirements. First, the media should be representational: changes in roots, patterns, prefixes, suffixes, or internal vowels should be visually signaled so that students can see exactly what changes and what remains stable. Second, the media should be procedural: students should perform guided identification, classification, and word-transformation tasks rather than only watch explanations. Third, the media should provide explanatory feedback that identifies the type of error and prompts learners to re-examine the relevant

pattern. Fourth, interactivity should support repeated, low-stakes retrieval and practice, with game-like elements used only where they reinforce a clear Sharf objective.

Table 4. From Empirical Need to Interactive Sharf Design Requirement

Empirical evidence	Design requirement	Illustrative feature
60.29% report difficulty with wazn changes; teacher reports pattern-related difficulties	Make transformations perceptually explicit	Color/signaling of root and pattern; step-by-step before-after transformation
85.29% find pictures/mind maps helpful	Use visual organization to reduce structural ambiguity	Pattern maps, comparison grids, flow diagrams
88.24% want more interactive learning	Require active morphological decisions	Identify, classify, drag/order, transform, and apply forms
89.71% need more attractive media	Support engagement without irrelevant decoration	Clean interface, meaningful visual cues, short activity cycles
Qualitative demand for practice and feedback	Turn errors into diagnostic information	Immediate explanatory feedback and targeted retry

The interviews refine these design requirements beyond the questionnaire percentages. The teacher requested simple menu structure and hyperlink navigation, gradual animation of wazn changes, Arabic-pronunciation audio, short explanatory video, interactive exercises, quizzes with immediate feedback, attractive images, and built-in evaluation. The curriculum vice principal emphasized that the medium should work with the school's existing projector, laptop, speaker, and limited internet environment, while the headmaster stressed ease of use, curricular accuracy, and expert validation. These requirements favor a lightweight and teacher-operable design whose interactivity is directly tied to morphological learning tasks.

This translation is consistent with Arabic needs-analysis studies that derive multimedia specifications from observed problems rather than from a predetermined platform. Aulia (2023), Salma et al. (2024), Hidayah et al. (2025), and Al Husna et al. (2025) demonstrate the value of combining learner responses with contextual evidence before product development. The very-high need score in the present study therefore justifies the development of richer interactive support, but it does not by itself prove that one application is superior. PowerPoint, Android, a web application, or another platform could be appropriate if it can implement the required pedagogical functions reliably within the pesantren's technical context.

The preference for more interactive and attractive learning also needs to be interpreted carefully. Meta-analytic evidence indicates that digital game-based language learning can produce positive outcomes, but effects vary by target skill, design, and implementation conditions (Liu et al., 2025; Nitisakunwut & Hwang, 2023). Arabic-language reviews and design studies likewise suggest that games and interactive multimedia can raise engagement when aligned with learning objectives (Syarifah, 2024; Zahra et al., 2026). For Sharf, a useful game element would therefore be one that rehearses pattern recognition, transformation, or error correction, not competition added for its own sake.

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Finally, the results should be read within the limits of the study. The sample consists of only 17 complete respondents from one pesantren, the questionnaire is an exploratory needs instrument rather than a fully validated psychometric scale, and most difficulty evidence is perceptual rather than performance based. Moreover, only one questionnaire item directly asks about wazn difficulty, while more detailed difficulties come from the three guided interviews. Future research should combine a refined multi-item diagnostic scale with objective Sharf tasks, include several institutions, and examine whether the resulting design requirements actually improve students' ability to analyze and transform Arabic word forms.

5. Conclusion

The study identifies a meaningful mismatch between a generally positive Sharf learning environment and students' demand for stronger interactive support. Learning conditions were high (77.65%) and current media use was also high (74.12%), yet the need for interactive media was very high (83.82%). Students valued teacher explanation and existing media, but difficulty with wazn changes remained visible and the highest preferences concerned attractive media, interactivity, and visual support. The interviews sharpen this interpretation: the Sharf teacher reported no previous use of PowerPoint or dedicated interactive media in Sharf lessons, while the vice principal for curriculum and headmaster described technology use as institutionally supported but still uneven because devices are shared, teachers have limited development time, and Sharf-specific interactive resources are not yet available. The central design problem is therefore not the absence of teaching or institutional support, but the need to represent morphological transformations more explicitly and to give students more opportunities to manipulate patterns and receive immediate feedback.

Accordingly, subsequent Sharf media development should begin from four functions: visual signaling of word transformation, guided pattern-based practice, explanatory feedback with opportunities to retry, and purposeful interactivity that sustains engagement. The study does not conclude that students inherently need a particular software platform. Instead, it provides a local empirical specification of what the technology should enable. This distinction keeps future development needs-driven and pedagogically accountable.

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