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Game-Based Learning in Arabic Reading Instruction: The Effect of Smart Wheel Media on Students' Achievement

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Abstract

This study aims to investigate the effectiveness of Smart Wheel game-based instructional media in enhancing students' Arabic reading skills at the secondary school level. The research employed a pre-experimental design using a one-group pre-test and post-test approach. The participants consisted of 29 students who were given a pre-test before the implementation of the Smart Wheel media and a post-test after the instructional treatment. In addition, a questionnaire was administered to examine students' perceptions of the media. The quantitative data were analyzed using descriptive and inferential statistics, including mean score calculation, N-Gain analysis, normality testing using the Shapiro–Wilk test, and a paired-samples t-test. The results revealed a significant improvement in students' reading achievement, with the mean score increasing from 54.65 in the pre-test to 75 in the post-test, indicating a gain of 20.35 points. The N-Gain score of 65.72% was categorized as moderately effective. The paired-samples t-test showed a significance value of $p < 0.05$, confirming that the improvement was statistically significant. Furthermore, questionnaire results indicated very positive student responses, with an overall percentage of 87.24%, reflecting high levels of motivation, engagement, and perceived usefulness of the media. These findings suggest that the Smart Wheel media is an effective and engaging instructional tool for improving students' Arabic reading skills.

How to cite :
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Introduction

Arabic is a language that originated and developed in the Arab countries of the Middle East and serves as the language of the Islamic holy book, the Qur'an. In the context of accelerating globalization, Arabic has increasingly assumed the status of an international language (Harisca, 2019), comparable to English, Mandarin, and other widely used world languages. Its function, therefore, is no longer confined to religious purposes; rather, it also operates as a medium of cross-cultural and international communication. As a result, Arabic is studied in various countries around the world (Bouchentouf, 2009), including Indonesia.

Despite its growing global significance, learning Arabic remains a considerable challenge for Indonesian learners (Munip, 2020). Arabic is not used as a mother tongue in daily communication in Indonesia, which consequently requires students to invest relatively more time and effort to achieve proficiency (Fikri, 2020). Arabic is often perceived as a less engaging subject, partly due to the limited use of attractive and innovative instructional media in the learning process. This perception highlights the

urgent need for pedagogical strategies that enhance students' motivation and interest, particularly through the integration of appropriate learning media.

Among the four fundamental language skills reading constitutes a core competence that must be mastered by students in foreign language learning. Reading skills play a crucial role in expanding learners' intellectual horizons, enabling access to vast bodies of knowledge, and facilitating engagement with written cultural and religious heritage, including classical texts (Yunis & Dajani, 2022). In the contemporary era, marked by rapid developments in education, science, technology, and Islamic studies, the importance of reading proficiency has become even more pronounced (Haug, 2021). Mastery of reading allows learners to navigate and critically engage with the continuous expansion of knowledge across various domains of human life.

The teaching of reading skills, therefore, requires effective and innovative instructional media to support students' comprehension and engagement. Educational media in Arabic language instruction function as supportive tools that foster an enjoyable learning atmosphere and positively influence students' mastery of language skills. In foreign language classrooms, a stimulating and interactive environment is essential for facilitating meaningful learning experiences. Learning media not only assist in delivering instructional content but also support assessment processes and enhance students' active participation (Adelhardt, 2022).

One innovative medium that can be applied in Arabic language instruction, particularly in the development of reading skills, is the Smart Wheel media. This instructional model utilizes a rotating wheel as a learning tool, encouraging students to think, speak, listen, and collaborate actively. By integrating elements of interaction and engagement, the Smart Wheel promotes student-centered learning and creates a dynamic classroom atmosphere. In the present study, the Smart Wheel media is specifically employed to support the teaching of Arabic reading skills.

The research was conducted at MTsS Terpadu Langsa, where Arabic is included in the curriculum. Preliminary observations and interviews revealed that Arabic instruction predominantly relied on printed textbooks and conventional feedback methods. As a result, students appeared to experience boredom, particularly during reading activities. Furthermore, teachers rarely incorporated creative or interactive media into Arabic language teaching. This situation indicates the necessity of introducing alternative instructional strategies to enhance students' motivation and reading competence.

Based on these considerations, this study implements the Smart Wheel media as an alternative instructional tool in Arabic language learning for eighth-grade students at MTsS Terpadu Langsa. The use of engaging and interactive media is expected to increase students' enthusiasm and improve their reading proficiency. Accordingly, this research is entitled: "The Effectiveness of Smart Wheel Media in Enhancing Students' Arabic Reading Skills at MTsS Terpadu Langsa."

Literature Review

Definition of Smart Wheel Media

Smart Wheel media is an instructional tool designed to facilitate meaningful interaction between teachers and students in the teaching–learning process (Udin Arifin et al., 2021). The term "wheel" refers to a rotating object, while "words" denote linguistic elements produced in speech. In an educational context, Smart Wheel media integrates these two components into a rotating device that supports early reading instruction (Riyani et al., 2023). The wheel typically displays alphabet letters or selected vocabulary items, which are revealed through rotation. This interactive mechanism stimulates students' curiosity and encourages active thinking. By presenting learning material in a dynamic and visually engaging format, the Smart Wheel fosters students' enthusiasm and creates an enjoyable classroom atmosphere. Although conceptually inspired by the roulette wheel the Smart Wheel is adapted exclusively for constructive pedagogical purposes (Candra & Sismulyasih, 2024). Its use aims to promote positive changes in students' knowledge, skills, and critical thinking abilities, thereby supporting the achievement of instructional objectives, particularly in reading skill development.

The process of designing the Smart Wheel is relatively simple and utilizes affordable, easily accessible materials. The necessary materials include ice cream sticks, origami paper, cardboard, a glue gun, scissors, and writing tools such as pencils or markers. The construction begins by cutting cardboard into a circular shape, which serves as the base of the wheel. Origami paper is then cut according to the circle's size and attached securely to its surface. Letters, numbers, or vocabulary items are written on the wheel's surface. A triangular piece of cardboard is prepared as a pointer, and small holes are created to allow the wheel to rotate smoothly, resembling a windmill mechanism. The circular board is attached to a stick as its axis, and an additional circular base is added to ensure stability and smooth rotation. Once completed, the wheel can be operated manually by spinning it with a finger and responding to the item indicated when it stops.

The Smart Wheel in classroom implementation is applied through structured group activities that promote collaboration and healthy competition (Umaroh et al., 2024). Students are divided into groups of four to five members, and each group appoints a leader. The teacher determines the order of participation, and a representative from the selected group spins the wheel and reads the question obtained aloud. The group then discusses the question and selects the correct answer from response cards displayed on the board. If the group fails to answer correctly, the opportunity is given to another group. Points are awarded for correct answers, and the group with the highest score at the end of the session is declared the winner. This interactive procedure encourages students to read aloud, think critically, cooperate with peers, and actively engage in the learning process.

The Smart Wheel offers several pedagogical advantages. Its tangible and colorful design makes learning materials more concrete and visually appealing, thereby

enhancing students' comprehension and attention. The integration of game elements reduces boredom and increases motivation, creating a more enjoyable learning experience. Furthermore, the medium is inexpensive, easy to construct, and reflects creativity and innovation in instructional practice. However, certain limitations should be acknowledged. The wheel operates manually, which may limit efficiency, and the implementation of the activity may require additional classroom time. Despite these drawbacks, the Smart Wheel remains a practical and innovative instructional medium that effectively supports the development of reading skills in foreign language learning contexts.

Reading instruction

Reading instruction constitutes a fundamental component of language education, particularly in the context of Arabic as a foreign language. Etymologically, the Arabic term *qirā'ah* (reading) derives from the root qara'a, which conveys meanings such as reading, studying, transmitting, collecting, and reciting (Thu'aimah, 1989). In classical scholarship, reading has also been associated with the science of Qur'anic recitation, which examines the correct articulation of the Qur'an, including aspects agreed upon and disputed among recitation scholars, such as pronunciation of letters, vowelization, assimilation, substitution, and other phonetic features acquired through auditory transmission (Al-Khuli, 2000). From a broader linguistic perspective, however, reading extends beyond recitation and encompasses the ability to interpret written symbols and derive meaning from them.

Reading skill refers to the ability to recognize written symbols and comprehend their meaning, either through oral recitation or silent cognitive processing. Mastery of reading involves two interrelated dimensions. The first concerns the transformation of written symbols into sounds, while the second involves grasping the overall meaning conveyed by those symbols within a particular context (Tahir & Wang, 2022). The essence of reading proficiency lies primarily in the second dimension although accurate decoding of symbols forms its essential foundation. Reading is therefore understood as a complex cognitive activity that entails interpreting visual symbols, connecting them with prior knowledge, drawing inferences, evaluating ideas, appreciating meaning, and solving problems (Yunis & Dajani, 2022). In educational settings, teaching reading represents a process of reconstructing learners' experiences through which they acquire knowledge, skills, attitudes, and values.

The objectives of teaching reading in Arabic, particularly for non-native speakers, reflect its dual role as both a linguistic skill and a central goal of language learning. Students are expected to associate written symbols with their corresponding sounds accurately and to read texts aloud with correct pronunciation (Faruq et al., 2023). They should be able to derive general meaning directly from printed texts, recognize how structural changes affect meaning, and infer vocabulary meaning from contextual clues (Hendriks, 2014). Comprehension at the sentence and paragraph levels is emphasized, including understanding relationships among ideas and identifying main and supporting

details. Learners are also expected to read fluently without excessive reliance on dictionaries, to grasp partial ideas and finer details, and to engage in extensive reading across genres such as newspapers, literature, history, science, and contemporary issues. Ultimately, reading instruction aims to connect learners with broader Arab-Islamic culture while cultivating analytical and critical thinking skills (Faiz, 2016). At the secondary school level, reading instruction aims to develop students' fluency in accordance with Arabic grammatical rules, enable them to understand textual meaning accurately, and foster the ability to pronounce and comprehend texts effectively (Medjedoub, 2022). Students are expected not only to read correctly but also to internalize and interpret the content of texts in a meaningful way.

Reading In terms of performance can be broadly categorized into two principal types, silent reading and oral reading. Silent reading involves receiving printed symbols, assigning them integrated meaning within the framework of the reader's prior experiences, and constructing new understanding without using speech organs (ʼulyan, 1992). Oral reading requires recognizing printed symbols visually, processing them cognitively, and articulating them aloud using correct pronunciation and intonation (Fazrina & Muradi, 2020). While oral reading provides opportunities to practice accuracy, pronunciation, and expressive delivery, it incorporates all the cognitive processes of silent reading and adds the dimension of verbal expression. For this reason, oral reading is often considered more demanding than silent reading. Pedagogically, reading instruction has been approached through various methods, most notably the synthetic (bottom-up) approach and the analytic (top-down) approach (Kim, 2010).

The teaching of reading generally progresses through four developmental stages. The first stage focuses on recognition and pronunciation, corresponding to the development of oral reading skills. At this stage, learners must clearly understand the relationship between Arabic sounds and their written symbols, avoiding confusion in sound–symbol correspondence. The second stage emphasizes reading for comprehension, during which learners engage with texts more deeply under teacher guidance and expand their vocabulary base. Success at this stage largely depends on careful material planning and systematic progression. The third stage involves intensive reading aimed at improving fluency, speed, and accuracy of comprehension, while consolidating the essential skills required for higher-level analytical reading. The fourth and final stage centers on extensive, reflective reading across intellectual and cultural domains, including literature, politics, religion, economics, philosophy, and science. At this advanced stage, learners are expected to read confidently, critically, and independently, demonstrating full integration of reading as both a linguistic skill and a tool for intellectual development.

Method

This study employed an experimental research method to examine the effect of the Smart Wheel media on students' reading skills. Specifically, a pre-experimental design with a One-Group Pretest–Posttest format was used. In this design, a single group

of students was given a pretest to measure their initial reading ability before the treatment. The Smart Wheel media was then implemented in the reading instruction process, followed by a posttest to determine whether there was a significant improvement after the treatment. This design does not involve a control group or random sampling; therefore, external variables may influence the results. However, it is considered appropriate for identifying the initial effectiveness of an instructional intervention in a real classroom setting.

The population of this study consisted of eighth-grade students at MTsS Terpadu Langsa, totaling 160 students. The sample was selected using purposive sampling. Class VIII-2, consisting of 29 students, was chosen based on preliminary observations indicating limited use of instructional media in reading lessons and relatively low reading performance. The selection of 29 students was considered adequate to represent the target population while remaining manageable in terms of time and research resources.

Data were collected through tests and questionnaires. The tests included a pretest and a posttest to measure students' reading ability before and after the implementation of the Smart Wheel media. The test scores were classified into five categories: Excellent (91–100), Very Good (81–90), Good (72–80), Fair (56–71), and Poor (40–55). In addition to the tests, a questionnaire was administered to gather students' responses toward the use and effectiveness of the Smart Wheel media. The questionnaire was designed using a five-point Likert scale ranging from "Strongly Agree" (5) to "Strongly Disagree" (1), enabling quantitative measurement of students' attitudes and perceptions.

Data were analyzed using descriptive statistics and an independent samples t-test with the assistance of SPSS Statistics 17. The t-test was conducted to determine whether there was a statistically significant difference between pretest and posttest scores. Questionnaire data were analyzed using percentage calculations to evaluate the overall effectiveness and students' responses to the instructional media. The research procedure consisted of three main stages: preliminary observation, administration of the pretest, implementation of the Smart Wheel media in reading instruction, administration of the posttest, and finally, statistical analysis of the collected data to draw conclusions regarding the effectiveness of the intervention.

Result and Discussion

Questionnaire Contents

After the post-test was administered in the final session, the researcher distributed a questionnaire to evaluate students' responses to the implementation of reading instruction using the Smart Wheel media. The questionnaire consisted of ten statements measured on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). It was designed to explore students' perceptions regarding the effectiveness, attractiveness, relevance, and motivational impact of the Smart Wheel in learning reading skills.

The results indicate that the majority of students gave positive responses to almost all items. Most students agreed or strongly agreed that the Smart Wheel media helped improve their reading skills and made it easier to identify the meanings of words in texts. A large number of respondents also reported that the media increased their interest and motivation in learning, primarily due to its attractive design and interactive format. In addition, students perceived that the materials presented through the Smart Wheel were well-structured, aligned with learning objectives, and related to everyday life contexts. These findings suggest that the media not only supported cognitive aspects of reading comprehension but also enhanced students' affective engagement during the learning process.

The questionnaire results reinforce the findings of the test data. While the pre-test and post-test scores demonstrated quantitative improvement in reading achievement, the questionnaire findings provide qualitative support by showing that students responded positively to the instructional strategy. This positive perception implies that the Smart Wheel media created a more enjoyable and meaningful learning environment, which likely contributed to the observed improvement in students' reading performance.

Students' reading achievement

The data on students' reading achievement were obtained through a pre-test administered before the implementation of the Smart Wheel media and a post-test conducted after the instructional treatment. The pre-test results showed that the total score achieved by the 29 students was 1,585, with a mean score of 54.65. Based on the predetermined assessment criteria, this average falls within the "low" or "acceptable" category and indicates that most students did not reach the minimum passing score of 71. In fact, nearly all students were classified as failing in the pre-test. These findings suggest that, prior to the intervention, students experienced considerable difficulties in reading comprehension, including limited vocabulary mastery, weak understanding of textual meaning, and insufficient fluency in reading Arabic texts.

After the implementation of the Smart Wheel media in reading instruction, a post-test was administered to measure students' progress. The results revealed a substantial improvement, with a total score of 2,175 and a mean score of 75. This average exceeds the minimum passing standard and falls within the "good" category. The majority of students achieved passing scores, and many reached the "very good" and "excellent" levels. The increase from a mean score of 54.65 in the pre-test to 75 in the post-test indicates a significant gain of 20.35 points.

This improvement demonstrates that the use of the Smart Wheel media had a positive impact on students' reading skills. The interactive and engaging nature of the medium appears to have enhanced students' motivation, participation, and comprehension during the learning process. The findings suggest that incorporating game-based and student-centered instructional media can effectively improve reading performance, particularly in contexts where students initially show low achievement and

limited engagement. Overall, the results support the conclusion that the Smart Wheel media is an effective tool for enhancing students' Arabic reading skills at the secondary school level.

Data Analysis and Interpretation

The questionnaire data were analyzed using Microsoft Excel to calculate the total score and percentage value of students' responses. The overall score obtained was 1,265 out of a maximum possible score of 1,450. The final result was 87.24%. This percentage falls within the "very good" category, indicating that students responded very positively to the implementation of the Smart Wheel media in reading instruction. The findings suggest that the media was perceived as attractive, easy to use, relevant to learning objectives, and helpful in improving reading comprehension. The high average score reflects strong student agreement that the Smart Wheel enhanced their motivation, engagement, and understanding of reading materials. In interpretative terms, these results demonstrate that the Smart Wheel media was not only pedagogically acceptable but also highly appreciated by students as an effective and enjoyable instructional tool.

The effectiveness of the Smart Wheel media was further examined through pre-test and post-test comparisons. The mean pre-test score was 54.65, while the mean post-test score increased to 75, showing a substantial improvement of 20.35 points. This difference indicates that students' reading performance improved significantly after the implementation of the Smart Wheel media. To ensure the appropriateness of parametric testing, a normality test was conducted using the Shapiro–Wilk test in SPSS version 17. The results confirmed that the data met the assumptions for further statistical analysis.

An N-Gain analysis was then performed to measure the level of improvement. The mean N-Gain percentage was 65.72%, which falls within the "moderately effective" category (56–75%). This result indicates that the Smart Wheel media contributed to a meaningful and measurable improvement in students' reading skills, although there remains room for further optimization. A paired-samples t-test was conducted to determine whether the difference between pre-test and post-test scores was statistically significant. The results showed a significance value (p) of 0.000, which is lower than 0.05 ($p < 0.05$). This confirms that there was a statistically significant difference between students' reading performance before and after the intervention. Therefore, the null hypothesis (H_o) was rejected, and the alternative hypothesis (H_1) was accepted.

Both descriptive and inferential statistical analyses consistently indicate that the Smart Wheel media had a significant and positive effect on improving students' Arabic reading skills. The combination of improved test scores and highly positive student responses suggests that this innovative instructional medium effectively supports reading comprehension while creating a more engaging and motivating learning environment.

Discussion

The findings of this study provide compelling evidence that the implementation of the Smart Wheel media significantly improved students' Arabic reading skills. The

improvement in the mean score from 54.65 in the pre-test to 75 in the post-test demonstrates a substantial academic gain of 20.35 points. This increase not only exceeds the minimum passing standard but also indicates a meaningful shift from a predominantly "low" achievement category to a "good" level of performance. The statistical confirmation through the paired-samples t-test ($p < 0.05$) further strengthens the claim that the observed improvement was not coincidental, but rather the result of the instructional intervention.

From a pedagogical perspective, the effectiveness of the Smart Wheel media can be interpreted through the lens of active and student-centered learning theory. The interactive and game-based format appears to have transformed reading instruction from a traditionally passive activity into an engaging learning experience (Tahir & Wang, 2022). Prior to the intervention, students demonstrated limited vocabulary mastery, weak comprehension of textual meaning, and low fluency in reading Arabic texts. The Smart Wheel by integrating elements of challenge, participation, and immediate feedback, likely facilitated deeper cognitive processing. When students actively engage with textual content in a dynamic format, they are more likely to construct meaning, retain vocabulary, and develop interpretative skills.

The N-Gain result of 65.72%, categorized as "moderately effective," suggests that while the intervention produced substantial improvement, there remains room for further instructional refinement. This moderate effectiveness may be influenced by several factors, including students' initial proficiency levels, limited exposure duration to the media, or variations in individual learning styles. Nonetheless, achieving a moderate-to-high gain within a relatively short instructional period indicates that the Smart Wheel has strong potential as a complementary instructional strategy in Arabic reading classes.

The questionnaire findings provide important affective insights that complement the quantitative data. With an overall percentage of 87.24% in the "very good" category, students overwhelmingly perceived the Smart Wheel as attractive, motivating, and relevant. This positive perception is pedagogically significant because affective factors play a crucial role in language acquisition. When learners perceive instructional media as enjoyable and meaningful, their anxiety decreases and their willingness to participate increases. The students' responses indicating that the materials were aligned with learning objectives and connected to everyday life contexts also suggest that the media successfully bridged abstract textual content with practical relevance, thereby enhancing comprehension.

The findings highlight the importance of instructional design in language learning. The structured presentation of materials, the contextualized problems, and the visual attractiveness of the Smart Wheel likely contributed to dual-channel processing which supports better retention and understanding. In contexts where Arabic is taught as a foreign language and students often struggle with vocabulary and syntactic structures, such multimodal approaches can significantly reduce cognitive overload and improve accessibility to complex texts.

Another important implication of this study lies in its contribution to the integration of game-based learning in formal education. The results demonstrate that educational games, when systematically designed and aligned with curricular objectives, can function not merely as supplementary activities but as effective core instructional tools. However, several considerations should be acknowledged. The study was conducted with a relatively limited sample size and within a specific educational context, which may affect the generalizability of the findings. Additionally, the duration of the intervention may not fully capture long-term retention effects. Future research could involve a larger and more diverse sample, implement a longer treatment period, or compare the Smart Wheel with other interactive media to examine relative effectiveness. Longitudinal studies would also be valuable to determine whether the improvement in reading skills is sustained over time.

The discussion of findings indicates that the Smart Wheel media significantly enhanced students' Arabic reading skills by improving both cognitive achievement and affective engagement. The statistically significant test results, moderate-to-high N-Gain score, and overwhelmingly positive student perceptions collectively confirm that the intervention was effective. The integration of interactive, visually engaging, and contextually relevant media in reading instruction not only addresses academic challenges but also fosters a more motivating and meaningful learning environment. These findings underscore the critical role of innovative instructional strategies in advancing language education at the secondary school level.

Conclusion

The findings of this study demonstrate that the implementation of the Smart Wheel media significantly improved students' Arabic reading skills, as evidenced by the substantial increase in post-test scores, the moderate N-Gain result, and the statistically significant t-test outcome. In addition to enhancing students' cognitive achievement, the media also positively influenced their motivation, interest, and engagement in learning. The strong positive responses reflected in the questionnaire further confirm that the Smart Wheel created an enjoyable and meaningful learning environment. Therefore, it can be concluded that the Smart Wheel media is an effective and pedagogically valuable instructional tool for improving Arabic reading skills at the secondary school level.

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