Empowering Asynchronous Arabic Language Learning Through PDF Hyperlink Media

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Abstract

The migration to online learning has brought about several new problems. Poor signal quality, large Internet quotas, and device compatibility with learning applications are the most common complaints among students. Additionally, students' poor self-directed learning skills, the excessive number of assignments given by teachers, and the use of monotonous teaching methods and media are also identified as issues. Therefore, the development of learning media that facilitate students' learning processes and support their active engagement becomes crucial. This research aimed to develop PDF hyperlink learning media for online Arabic language learning at Madrasah Aliyah Negeri 4 in Hulu Sungai Tengah District, South Kalimantan, Indonesia (MAN 4 HST). The research model used in this study is the 4D model, consisting of four stages: define, design, develop, and disseminate. In this research, layout and accessibility received good validation scores of 4.3, and the presentation of the contents received a good validation score of 4.2. Additionally, the Wilcoxon test results indicated that the use of PDF hyperlink media significantly influences learning outcomes and receives positive feedback from students. Thus, the use of PDF hyperlink media is recommended for educational institutions experiencing digital divides, as well as those implementing asynchronous learning.

Keywords: Arabic learning, asynchronous, learning media, online learning, PDF hyperlink

Introduction

Despite progress in integrating digital technology into Arabic language learning in Indonesia, there are still several problems. One major issue is limited access to the required infrastructure, especially in rural or remote areas (Simamora et al., 2020). There is a digital divide in Indonesia, both in terms of geography and economy (Rasmitadila et al., 2020). Some students may not have access to adequate digital devices or internet at their homes. This can create inequality in learning and deepen the gap between affluent and less privileged students.

Effective integration of digital technology might be hindered in certain areas due to insufficient internet connectivity and inadequate hardware which present obstacles (Turnbull et al., 2021). Both students and teachers often experience problems gaining the requisite skills for using applications, online platforms, or specific software. Sufficient curriculum and training are crucial to guarantee student and teacher expertise in using technology.

Although there are many digital learning tools available, it can be difficult to discover suitable and excellent materials for studying the Arabic language in Indonesia (Reimers et al., 2020). The lack of digital material that is connected with the curriculum and suitable for local needs can impede the effective integration of technology (Bonfield et al., 2020). It is crucial to acknowledge that failed technology integration might happen when online learning just duplicates conventional classroom approaches (Chand et al., 2020). Efficient incorporation of technology should entail a deliberate choice of platforms and tools, guided by educational objectives rather than technological demands (Christopoulos & Sprangers, 2021).

Research has shown that digital technology has the potential to provide a worldwide learning environment that gives students a wide range of materials. This promotes efficiency in terms of cost and time, and also improves the interaction between students and teachers (Haleem et al., 2022; Serrano et al., 2019). Nonetheless, the shift to online learning must be a methodical and meticulously organised procedure, given that traditional and online learning have distinct planning phases and supporting elements. Furthermore, the preparedness and competencies of both teachers and learners have a substantial impact. Madrasah Aliyah Negeri 4 in Hulu Sungai Tengah District, South Kalimantan (MAN 4 HST), lacks preparation for online learning among its students (Riwanda et al., 2022, 2021).

In the initial phases of online learning adoption at MAN 4 HST, we discovered significant insights regarding the difficulties they encountered in this novel educational environment. Our investigation revealed that the shift to online learning led to an increased burden on students, as they had to handle a larger volume of assignments and independently engage with learning materials. Additionally, they encounter challenges when it comes to utilizing digital tools and navigating online learning platforms. This underscored the necessity for proper direction in using digital resources.

Furthermore, we observed that students encountered device constraints, such as insufficient storage and RAM, which impeded their capacity to access and preserve digital content. In addition, students exhibited passive learning tendencies, mainly depending on content provided by teachers, which may be less successful in an online setting that requires active participation. The volatile internet connections in the

region exacerbated the difficulties, and students faced limited access to online contents due to internet restrictions.

Theoretical Framework

To ensure successful self-directed Arabic language learning at MAN 4 HST amidst digital disparities, we implemented a comprehensive strategy. This approach prioritized engagement through interactive activities, collaborative assignments, and discussion platforms, acknowledging variations in technology and Internet access. It aimed to ensure usability across diverse devices, including those with limited specifications. To accommodate students with restricted data, educational contents were optimized for reduced data usage, featuring compressed formats and offline access options. The ability to access resources on multiple devices provided flexibility for diverse learning preferences. This strategy offered a resilient solution for continuous learning during the COVID-19 pandemic, effectively addressing digital divide challenges.

The digital divide greatly affects the efficacy of online education. The insufficiency of device specs and the subpar quality of Internet connection provide challenges for students to engage in online learning and avail of learning contents. In the context of online learning, the PDF (portable document format) is significant for its potential to address these obstacles. PDF is a versatile file format that aids in achieving significant goals in online education, including promoting active student participation, ensuring accessibility, enabling data conservation, and facilitating compatibility across platforms (Hadaya & Hanif, 2019). Furthermore, PDF ensures a consistent format across many devices and operating systems (Triyason et al., 2020).

Hyperlinks are a valuable feature of PDF documents. Embedded hyperlinks in PDF publications establish linkages with external resources, such as websites or supplementary reading contents, thus enhancing the educational experience (Gurevych et al., 2022; Håkansson Lindqvist, 2019). PDFs enable teachers to generate engaging and comprehensive resources, guaranteeing universal access and seamless navigation for all students, irrespective of their device specs. Hyperlinks facilitate convenient access to external resources, augmenting engagement and fostering self-directed research.

The inclusion of hyperlinks inside PDFs can seamlessly incorporate diverse contents, providing students with an engaging and interactive educational experience (Alpizar-Chacon et al., 2020; Alpizar-Chacon & Sosnovsky, 2021). This methodology establishes a connection between fundamental ideas and additional resources, such as films and interactive games, which encourages active engagement from students (Lang & Baehr, 2023). PDF hyperlinks facilitate both asynchronous online learning in low-resource environments and the transmission of content in several formats, promoting meaningful interactions between teachers and students (Abou-Khalil et al., 2021).

The research questions are as follows:

1. What is the quality of PDF hyperlink learning contents for the purpose of Arabic language acquisition?

2. What is the efficacy of using the PDF hyperlink learning medium for the purpose of Arabic language acquisition?

Methodology

Research and Development Design

This research and development study was conducted on students taking 10th grade Arabic language at MAN 4 HST and followed four stages: defining, designing, developing, and disseminating (Thiagarajan, 1974).

Front-End Analysis

First, we conducted a front-end analysis to ensure the specifications of the PDF hyperlink learning media would be aligned with the challenges and characteristics of the students, including initial Arabic language competency, motivation to participate in Arabic language learning, and ability to use digital devices in learning. In this stage, we also performed a concept and task analysis to determine what would be needed to achieve the desired Arabic language learning goals, formulate specific learning objectives based on the previous analysis of tasks and concepts, determine the evaluation measurement format, and establish the learning contents to be delivered.

Learning Media Design

Based on the analysis conducted in the first stage, we took the following steps to design the learning media:

1. Determined the form and appearance of the developed media, which is PDF hyperlink;

2. Determined whether the learning contents would be best presented through narration or text;

3. Prepared the script, for explaining the contents, to be presented in video format; and

4. Developed evaluation instruments to measure learning outcomes.

In the third stage, we submitted the developed PDF hyperlink media product to two experts for validation: a learning media expert and a content expert. After the product was validated, we made revisions based on the experts' feedback and proceeded to the next stage.

PDF Hyperlink Implementation

In the fourth stage, we implemented the PDF hyperlink learning media in the 10th grade Arabic language class at MAN 4 HST. There were 32 students chosen randomly to take part in this stage. Implementation used an experimental method one-group pretest-posttest design to determine the effect of using the PDF hyperlink media on learning outcomes.

Results

Learning Conditions Faced by Students in Arabic Language Learning

We began with an exploration of the learning conditions faced by students through front-end and learner analysis. The migration to online learning posed a significant challenge for students because learning contents were previously available only in printed form. Following in-depth student interviews, we found six categories of online Arabic learning challenges as translated from Indonesian language below:

1. Difficulty managing study time due to the increased workload of reading assignments and completing tasks on student worksheets.

2. Struggles in finding additional learning contents, as students were not accustomed to online content searches and relied on printed textbooks.

3. Difficulty comprehending learning contents independently, as students were used to teachers' explanations.

4. Issues with device compatibility and storage limitations, hindering the use of certain digital learning files and new applications.

5. Adaptation challenges from the previous use of the grammar translation method in Arabic language education, making independent text translation using a digital dictionary unfamiliar.

6. Challenges with practice and product-based assessments, as students were more accustomed to formative evaluations involving fill-in-the-blank or multiple-choice questions.

The frequency of each category and sample statements are shown in Table 1.

Table 1

Online Learning Conditions Faced by the 10th Grade Students

Category	Frequency, n	Sample Statement
Numerous assignments make time management challenging	28	"The teacher consistently assigns tasks in every session, making it challenging to manage time to complete them all."
Finding additional references or learning contents	22	"Normally, learning contents are provided by the teacher. However, during online learning, we are required to find additional contents on our own, but we were never taught how to search for them."

Category	Frequency, n	Sample Statement
Focused on Grammar and Translation method (*Qawaid wa Tarjamah*)	18	"Usually, the teacher guides us by reading and translating directly. However, during online learning, we are asked to translate on our own, making it difficult."
Product-based assessment	26	"Usually, exams are only in the form of multiple-choice questions. However, during online learning, there are various types of assessments, such as creating videos and others."
Incompatible device	30	"The teacher once sent learning contents in EPUB format, but we were unable to access them."
Inadequate self-directed learning skills	25	"Self-studying at home is challenging because we are usually guided directly by the teacher."

Note. N = 149.

Challenging Content in Arabic Language Learning

We conducted an analysis of the essential concepts and tasks required to achieve the desired objectives in the Arabic language course. To conduct this analysis, we asked students to complete an online questionnaire, focusing on the most challenging learning contents and tasks. These are shown in Table 2.

Table 2

Most Challenging Contents and Tasks and Their Frequency According to the 10th Grade Students

Content	Frequency, n	Task	Frequency, n
Grammar (*Qawaid*)	127	Make sentences using the rules of the language you have learned	141
Reading text (*Qiraah*)	86	Analyze the rules of language in sentences	102
Conversation (*Hiwar*)	77	Practice conversations using existing language rules	95

Note. N = 149.

Based on these analyses, we defined the most suitable media for Arabic language learning, taking into consideration the current conditions of online learning during the COVID-19 pandemic and the characteristics of the 10th grade students at MAN 4 HST. The specifications for this online Arabic language learning media were as follows:

1. Accessible flexibly anywhere and anytime.

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2. Accessible on all Android/iOS-based devices without requiring additional new applications.

The developed PDF hyperlink media also offered several benefits for asynchronous Arabic language learning adaptation. These advantages include the following:

1. Supports active student participation and collaboration in learning.

2. Focuses on Arabic language rules and provides progressively challenging tasks based on higher order thinking skills (HOTS).

3. Integrates teacher explanations elaborated with project tasks and other learning resources as scaffolding for students' transition to independent learning.

Product Overview

In this stage, we developed PDF hyperlink media that could be accessed without requiring a large amount of data and without the need for specific application installations, thus suitable for low-end devices. The file size of the developed PDF hyperlink media was only around 500 kilobytes. Despite its relatively small size, it included learning identity, learning objectives, and probing questions to stimulate students' curiosity. Additionally, we embedded links in the PDF, including video explanations of the content, instructional material, and assessment via Google Forms. An example of the media is shown in Figure 1.

Figure 1

Sample PDF Hyperlink Media Home View for 10th Grade Arabic Language Class

Note. Learning identity is in the yellow box, learning objectives in the blue box, big questions related to learning topics to stimulate students' curiosity in the green box. Hyperlinks to access contents are embedded in video, book and assessment paper icons.

The PDF included hyperlinks to videos housed on Google Drive, allowing for immediate streaming or downloading. The videos had file sizes ranging from 40 to 60 megabytes. These videos, produced using the Filmora and Kinemaster programmes, provided concise discussions and illustrations. A still frame from one of the videos is shown in Figure 2.

The instructional material links led to documents, published on Google Drive, that had a file size of less than 1 megabytes. They included mind maps, pertinent examples, and graphics to facilitate students' rapid and succinct comprehension of the information.

The assessment links directed users to Google Forms where evaluation tools were presented in the form of quizzes that could only be accessed once to deter cheating. These quizzes offered instant response, showing scores and marking accurate and inaccurate answers. Furthermore, also through Google Forms, we offered project-based exams, allowing students to submit videos, photos, or other project forms. The evaluation categories in the PDF hyperlink sheet corresponded to particular rubrics customised for each item, governed by competency standards and learning objectives.

Figure 2

Still Frame From Video Learning Media Developed for 10th Grade Arabic Language Class
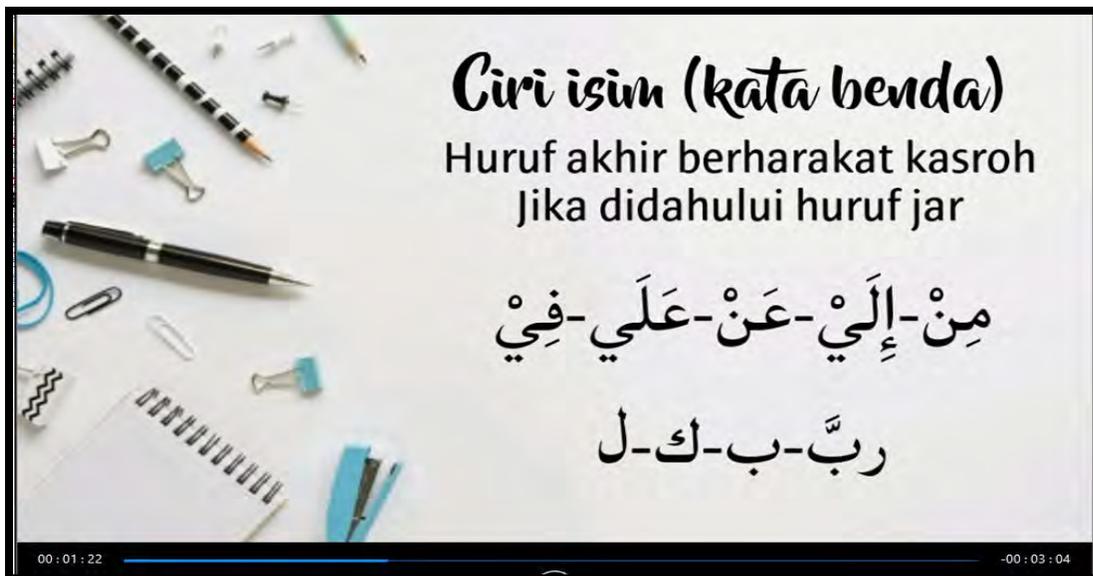
Note. Taken from the video on preposition in Arabic.

We decided to deliver this course asynchronously, knowing that it might be strange to students accustomed to rigid timetables in conventional classrooms. With the asynchronous model, students have flexibility to learn at their own speed, while still meeting specific deadlines for reading contents, pre-recorded lectures, assignments, and tests. This model enables students to exert control over their allocation of study time based on their own choices and circumstances. We implemented a mandatory, organised language rule practise within each one-week timeframe, without the conventional process of taking attendance. Student attendance was determined instead by the prompt completion of evaluations.

In order to facilitate the use of learning contents and support the transition, we also created separate WhatsApp groups for each class, enabling students and teachers to engage.

The PDF hyperlink sheets for each content were shared through those WhatsApp groups. These sheets provided interactive resources for supplementary information and helped to enhance understanding of linguistic norms. Students were urged to engage with teacher and classmates during specific time periods, promoting cooperative learning and significant conversations.

To provide further assistance to students, the teacher arranged videoconference sessions using Google Meet. These facilitated immediate engagement, allowing students to inquire and participate in live discourse. This tailored strategy mitigated the constraints of asynchronous learning by guaranteeing prompt and all-encompassing instruction. It facilitated the bridging of potential disparities in social contact and immediate feedback, which sometimes arise in asynchronous learning.

Quality of the PDF Hyperlink Media

The researcher submitted the developed product to a learning media and a content expert. The scoring guidelines used by the two experts to assess the suitability of the developed media are shown in Table 3.

Table 3

Experts' Assessment Criteria for PDF Hyperlink Media Developed for 10th Grade Arabic Language Classes

| Score	Assessment	Criteria
5	Very good	Meet the criteria of Accuracy and fact-checking, objectivity, relevance and context, clarity and structure, creativity and originality, technical quality
4	Good	Meet the criteria of objectivity, relevance and context, clarity and structure, creativity and originality, technical quality
3	Enough	Meet the criteria of relevance and context, clarity and structure, creativity and originality, technical quality
2	Not enough	Meet the criteria of accuracy and fact-checking, objectivity, creativity and originality, technical quality
1	Bad	Meet the criteria of accuracy and fact-checking, objectivity, relevance and context

The content expert provided some improvement notes. First, the variety of evaluations should be enriched. Second, the cognitive taxonomy in evaluations should be raised to a higher thinking skill. Third, new content should be related to previous content to ensure coherence. Lastly, the probing questions should be designed to be implementable according to students' knowledge level.

The media expert also suggested several improvements to the PDF hyperlink media, including increasing the size of the text to highlights their importance and grab attention, rearranging the layout for links, and using formal language.

We then made minor revisions based on the feedback and again had the experts assess the content using the same criteria as shown in Table 3. Our experts found there were further improvements. Comparative results, pre- and post-revision, are shown in Figure 3.

Figure 3

Results of PDF Hyperlink Media and Content Expert Validation Pre- and Post-Revision
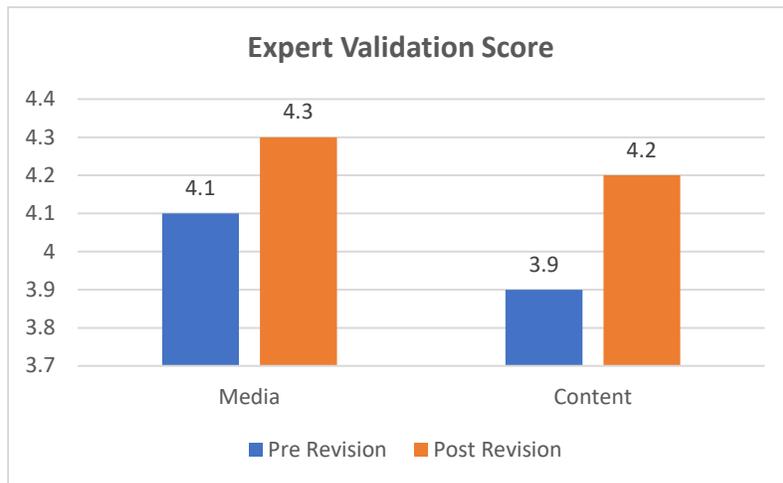
Note. Assessment scores: 5 = very good; 4 = good; 3 = enough; 2 = not enough; 1 = bad.

See Table 3 for explicit criteria used in assessment. The media validation score increased from 4.1 to 4.3 after the adjustment, indicating a positive outcome within the good category. The content validation score increased from 3.9 to 4.2 after revision, indicating a positive improvement and placing it in the good category.

The Effectiveness of PDF Hyperlink Media

After revision and reassessment, we implemented the PDF hyperlink media product into the Arabic language course for the 10th grade students. This PDF hyperlink media focused on the topic of types of sentences (*aqsamul kalam*) during the first semester. The objective of this implementation was to assess the influence and efficacy of the PDF hyperlink media on students' comprehension and engagement.

A group of 32 students were randomly selected from the 10th grade was given the PDF hyperlink media, which was specifically designed to cater to individual needs and difficulties. By using the PDF hyperlinks, these students could conveniently access supplementary resources such as instructional materials, videos, and audio recordings to enhance their understanding of types of sentences (*aqsamul kalam)*, thereby having an engaging and interactive learning experience.

Throughout the implementation process, we evaluated the influence of the PDF hyperlink media on student learning outcomes. Our data came from conducting evaluations, gathering student feedback, and collecting teacher responses. The outcomes were expected to offer valuable understanding on the efficacy of this educational content.

For this evaluation, we used a one-group pre-test post-test model consisting of three steps. First, an evaluation was carried out to measure students' understanding of different sentence forms. Subsequently, the PDF hyperlink media was implemented in an asynchronous learning environment. Finally, the identical evaluation was conducted again to gauge enhancements in student scores between the pre-test and post-test. The results of this three-step evaluation, showing improvement in test scores, are displayed in Table 4.

Table 4

Pre- and Post-Test Scores of Students Using PDF Hyperlink Media on Aqsamul Kalam

	Pre-test	Post-test
M	62.50	85.16
Mdn	60.00	85.00
Mode	60	80
Minimum	50	75
Maximum	75	100

Note. N = 32.

Before data analysis, we evaluated the normality of our data, a requirement for parametric statistics. If the data were normally distributed, the analysis would use the paired sample *t*-test formula. However, if the data distribution were not normal, the analysis would use non-parametric statistics with the Wilcoxon formula. The normality test was conducted using the Shapiro-Wilk formula. Our decision-making for the test results was as follows: if the significance value (Sig.) was greater than 0.05, then the data would be considered normally distributed. Since we calculated Sig. values less than 0.05, we deemed the data distribution not normal, and therefore, we used the Wilcoxon formula in the next steps of our analysis. The results of the normality test are shown in Table. 5.

Table 5

Results of the Data Normality Test on Student Scores Pre- and Post-Test

Test type	Shapiro-Wilk normality test		
	Statistic	*df*	Sig.
Pre-test	.930	32	.039
Post-test	.911	32	.012

The Wilcoxon test was applied to this research as follows: if the Sig. was less than 0.05, then there would have been a significant influence of the media usage on learning improvement. However, if the Sig. was greater than 0.05, then the generated influence would not have been significant. The results of the Wilcoxon test, displayed in Table 6, showed an Asymp. Sig. (2-tailed) value of 0.000, which is smaller than 0.05.

Therefore, it can be concluded that there was a significant influence of using the PDF hyperlink media to improve Arabic language learning outcomes.

Table 6

Wilcoxon Test Results Measuring the Effect of the PDF Hyperlink Media on Student Scores

Test statistic	Post-test – Pre-test
Z	−4.989[a]
Asymp. Sig. (2-tailed)	.000

Note. [a] Based on negative ranks.

Students' Feedback and Teacher Responses

During post-implementation interviews, students reported the PDF hyperlink media was highly accessible and user friendly. They highlighted the convenience of being able to open PDF files on their smartphones without the need to install additional applications. This ease of use contributed to a seamless learning experience.

Students also expressed satisfaction with the numerous learning resources, encompassing videos, and instructional material. The short videos, ranging from 5 to 10 minutes in length and featuring concise explanations, were accompanied by background music, enhancing the learning experience by making it more engaging. The instructional material provided comprehensive explanations and abundant examples and were accompanied by useful mind maps to facilitate understanding.

Students valued the diverse assessment techniques and the ability to track their progress in real-time, which allowed them to adapt their learning approaches. The students emphasized the advantages of asynchronous learning, which enabled them to effectively allocate study time and modify their learning environment in order to guarantee a reliable Internet connection. This method catered to various learning styles and preferences, allowing students to study while engaging in activities such as listening to music or snacking, as long as their main objective of getting favourable evaluation outcomes was fulfilled.

Further details of student feedback post implementation are shown in Table 7.

Table 7

Student Feedback Grouped by Theme and Category Post Implementation of the PDF Hyperlink Media

Theme	Category	Frequency, n	Example quotation
Accessibility	User-friendly	32	"It's easy to use." "Even low-spec smartphones can access learning." "I just tap the book or video icon, and I can learn leisurely."
	Adaptive to digital divide	22	"It does not require additional applications to access." "It's accessible even without a high-quality Internet connection, and it saves mobile data."
Student engagement	Emotional engagement	28	"I become more enthusiastic about learning." "Online learning is now more than just doing assignments from teachers." "I look forward to the next learning because I quickly receive feedback from the previous one."
	Behavioral engagement	30	"I appreciate the flexibility in completing assessments." "Receiving relatively quick feedback is great." "I can adapt my learning style through video explanations and accessible text contents." "Online learning becomes more relaxed; no need for face-to-face via Zoom."
	Cognitive engagement	17	"The presence of concept maps really helps me understand the content." "The integration of interactive simulations enhances my understanding of abstract concepts."
	Agentic engagement	21	"This media supports me to learn independently."

Following the implementation, we conducted interviews with teachers to gather responses on the PDF hyperlink media. The teachers highlighted two significant insights. Meaningful learning interactions are facilitated when students have acquired the necessary knowledge prior to online class sessions. Furthermore, the allocation of learning time is adaptable due to the ability to overcome the need for direct content explanation through the use of learning videos and concept maps.

Discussion

Educational institutions highlight multiple crucial factors while implementing distance learning. First, their primary priority is on improving their educational technology infrastructure (Almaiah et al., 2020; Batmetan et al., 2023; Joseph, 2023). This includes enhancing technological resources, providing stable Internet access, and optimizing digital platforms and learning management systems (Azlan et al., 2020; El Firdoussi et al., 2020; Heng & Sol, 2021) to create a smooth online learning experience for both teachers and students.

Educational institutions prioritize addressing the issue of Internet connectivity during the implementation of distance learning (Adedoyin & Soykan, 2023; Sofi-Karim et al., 2023). Their efforts include enhancing and broadening Internet accessibility, engaging in partnerships with service providers, providing subsidies for Internet usage or allowances for mobile data, and investigating connectivity options in regions with restricted access.

Furthermore, educational institutions facilitate the preparation of and assistance for teachers and students in adapting to online learning. They offer professional development initiatives for teachers to improve their proficiency in digital literacy and pedagogical expertise (Falloon, 2020; Kasperski et al., 2022; Li & Yu, 2022). Students are provided with instruction and assistance to effectively traverse online platforms, use digital tools, and adjust to the virtual learning environment (Blau et al., 2020). In addition, educational institutions prioritize the mental well-being of students, teachers, and stakeholders by offering emotional support, counselling services, and mental health resources to address the potential difficulties and stressors that may arise from distance learning (Lee et al., 2021; Liu et al., 2022; World Health Organization, 2020). The objective is to establish a nurturing and all-encompassing online learning atmosphere that fosters mental and emotional health and a feeling of being part of a community.

Almanthari et al (2020) research emphasized the obstacles encountered in online education, such as restricted device capabilities, unreliable Internet connections, and the necessity to quickly adjust to novel learning methods. Teachers also encounter difficulties when creating and executing online instructional procedures. The research conducted by Azhari and Fajri (2022) highlighted the obstacles that prevent instructors from effectively using Information and Communication Technologies (ICT) devices and online learning platforms. These barriers are mostly caused by variables such as the teachers' skills and abilities, the economic conditions of parents, restricted Internet access, and the absence of proper direction. Wahyuni and Komariah (2021) proposed several solutions, including ongoing assessment of learning plans, providing customized resources and media for rural learning, and modifying tests to prioritize the mastery of specific topics for reliable analysis of learning outcomes.

The disparity in the quality and availability of digital learning spaces requires teachers to implement asynchronous learning (Al-Husban & Tawalbeh, 2023; Soydan Oktay & Yüzer, 2023). Asynchronous learning is the best alternative to ensure continuous learning during the COVID-19 pandemic, which implements distance restrictions. However, Huang (2020) reminded us that during the pandemic, one of the determining factors in generating students' interest in asynchronous learning was selecting the appropriate learning media. Therefore, the creativity of teachers in designing and implementing online learning, including methods, media, and evaluation stages, plays a crucial role in the meaningfulness and success of learning.

Challenges in online learning, such as limited data quotas and unstable Internet connections, must be addressed by providing digital learning media that are low data and easily accessible (Cheshmehzangi et al., 2022; Lembani et al., 2020). Teachers are also advised to choose and use learning media that are suitable and easily accessible for students according to their specific conditions (Ali, 2020; Churiyah et al., 2020), such as using module-based media. One common and user-friendly format for learning modules is the Portable Document Format (PDF). PDF can package and link various content elements such as images, fillable forms, audio, and video through hyperlinks.

In online learning, the interaction between teachers and students, as well as the interaction between students and learning content integrated within a learning media, is crucial. Therefore, media selection is an essential component of instructional design. Kustyarini et al. (2020) stated that learning media that integrate text, audio, and video elements play a vital role in achieving learning objectives, especially in the current digital era. Thus, delivering learning content in the form of text and integrating it with explanatory videos becomes crucial. Media enriches learning when well-designed and relevant to the instructional methods used (Abou-Khalil et al., 2021; Tuma, 2021). Afolabi (2021) stated that the features of a medium determine the success of learning because the format and features of media are directly related to students' learning styles and teaching strategies implemented by teachers. Previous studies have identified several attributes, including interactivity, flexibility, media richness, synchronicity, navigability, responsiveness, symmetry, display, participation, complexity, ease of use, feedback, demonstration ability, and individualization (Kristiana et al., 2023; Lusiyani & Anindya, 2021; Setiaji & Santoso, 2023).

In both synchronous and asynchronous online learning, the use of digital learning media tends to be more engaging and effective compared to print media. A study by Vo et al. (2019) on asynchronous learning revealed that students prefer and are more satisfied with learning through videos as compared to textbooks. More than three quarters (78.4%) of students expressed a preference for video-based learning over textbooks. Most students also expressed a high level of satisfaction with learning through videos. Asynchronous learning using electronic module media provides opportunities for students to access learning contents more flexibly, especially in conditions of unstable Internet connections and limited data quotas. Packaging learning contents in the form of asynchronous digital modules can be done, for example, by recording explanations from teachers in the form of videos or other audio formats. However, it is crucial to ensure active student participation by adding active strategies such as a series of questions to be answered while watching videos or listening to audio, making reflective notes, making statements, and similar activities (Chen et al., 2019; Hoang Oanh, 2020; Wang et al., 2019). A study conducted by Azlan et al. (2020)

also confirmed that 72.73% of students who watched instructional videos while answering short questions found that it improved their understanding of the presented topics.

Conclusion

Based on the validation results from learning media and content experts, the PDF hyperlink media developed received good ratings. The implementation results revealed that based on the Wilcoxon test, the significance value (Sig.) in the Asymp. Sig. (2-tailed) row was 0.000, which is smaller than 0.05. Therefore, it can be concluded that there is a significant influence in using PDF hyperlink media to improve Arabic language learning outcomes for 10th grade students at MAN 4 HST in the first semester, specifically on the topic of types of sentences (*aqsamul kalam)*. Additionally, students also expressed that this media is easily accessible, provides multi-platform learning resources, and offers real-time evaluation. Furthermore, the asynchronous learning method applied in the use of PDF hyperlink media allows students to manage their time, place, and preferred learning style conveniently. This study emphasises the significance of adaptability and availability in the creation of online educational resources, particularly in regions impacted by the digital divide. Implementing technologies such as PDF hyperlink can address the issue of inadequate specifications of digital devices, poor Internet connection quality, and limited data quotas that affect students.

Acknowledgment

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