International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Online Learning Platform Development

Agus Arifin[1], Asep Muhyidin[2], Yus Rama Denny M[3]

[1]Doctoral Program Students, Untirta Indonesia
[2,3]Lecturer, Untirta Indonesia

Abstract

This research focuses on enhancing the effectiveness of online learning platforms for language learning by integrating principles from software engineering, instructional design, and multimedia resources. Emphasizing the development of platforms conducive to transnational cultural engagement and equitable access, the study leverages the ADDIE model for instructional design, integrating task-based language teaching and online intercultural exchanges.

Key to this approach is the development of user-friendly interfaces and content that supports diverse learning styles through multimedia integration, including social media, gaming, and virtual environments. The study also addresses the digital divide by ensuring accessibility across different regions and socioeconomic groups.

The research methodology includes a comprehensive literature review, needs analysis focused on Arabic language learning, and the application of multimedia authoring principles. The ADDIE model guides the creation and evaluation of educational content, while software engineering principles ensure platform robustness and scalability.

Findings indicate a significant potential for these platforms to enhance cognitive learning outcomes. The research validates the effectiveness of these integrations through experimental designs, user feedback, and expert evaluations. The study underscores the importance of digital literacy and intercultural competence in online learning environments and suggests emerging technologies like virtual and augmented reality for immersive experiences.

In conclusion, the research demonstrates that well-designed online learning platforms, a synthesis of software engineering excellence, sound pedagogical frameworks, and engaging multimedia content, can substantially improve the learning experience and outcomes for language learners. The study recommends continuous integration of online methods with traditional learning to maximize educational benefits for language students.

Keywords: *online learning, cognitive, ADDIE.*

Introduction

Online learning platforms provide opportunities for language learning through participation in online communities, social media, gaming, and virtual worlds. These environments allow learners to access, remix, and propagate cultural practices in transnational ways. Issues to consider in platform design include ensuring equitable access across different regions and socioeconomic groups, as the "digital divide" remains a challenge. Platforms should also aim to foster inclusive participation.

Online learning platforms provide opportunities for language learning through participation in online communities, social media, gaming, and virtual worlds. These environments allow learners to access, remix, and propagate cultural practices in transnational ways (Steven L. Thorne, Stephen May. 2017)
Pedagogical approaches shown to be effective through online learning include task-based language teaching, data-driven learning through corpus exploration, and online intercultural exchange between internationally distributed classes.
Social media sites, gaming environments, and virtual worlds offer informal language socialization opportunities through affinity spaces and identity exploration if designed appropriately for language learning goals.
Platforms should aim to cultivate critical digital literacy in learners to analyze ideological biases and assumptions reproduced online. Intercultural competence is also important for online exchange. Emerging technologies like virtual and augmented reality hold promise for more immersive language learning experiences online. Overall, online platforms present opportunities to situate language learning within meaningful social contexts and communities of practice (Steven L. Thorne, Stephen May. (2017).
Salkind, Neil J. (2012) explained that research is a systematic process of collecting and analyzing information to increase understanding of a topic or issue. It involves asking questions, formulating hypotheses, collecting relevant information, testing hypotheses, and working to find solutions or answers. The scientific method involves asking a question, identifying important factors, formulating a hypothesis, collecting relevant information, testing the hypothesis, working with the hypothesis, reconsidering theories, and asking new questions. This iterative process moves research forward.
Different research methods are used depending on the question, including descriptive research to describe phenomena, correlational research to examine relationships, experimental research to test causal relationships, and qualitative research to examine phenomena in context.
Key considerations in research include defining problems, reviewing previous literature, developing sound methodology, ensuring reliability and validity of measurements, applying appropriate statistical analysis, and communicating findings.
The research aims to increase understanding and solve problems through a systematic, objective process of inquiry while upholding high ethical standards including informed consent and protecting participants. Both basic research that expands knowledge and applied research with practical goals are important for scientific advancement and societal benefit. The research process is iterative, with each study building on prior work and raising new questions.
Online tools now greatly enhance the literature reviews, data collection, and analysis capabilities of researchers. Future technologies may transform the research process in yet unknown ways.
The foundation of such development lies in the application of software engineering principles, which provide a framework for planning, modeling, construction, and deployment of software. This approach ensures that the platform is built on a solid technical base, capable of adapting to the evolving needs of learners and educators. In parallel, the instructional design process, particularly the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), guides the creation of educational content and learning activities. This model emphasizes the importance of understanding learners' needs, defining clear learning objectives, and evaluating the effectiveness of the learning experience. (Robert Maribe Branch. (2009).
Moreover, the integration of interactive multimedia content is crucial for engaging learners and enhancing the learning process. Authoring interactive multimedia involves a creative and technical process that

combines various digital media formats, supported by authoring tools and hardware platforms that facilitate content creation and assembly (Luther, Arch C. 1994).

The development of online learning platforms is an interdisciplinary effort that leverages the best practices from software engineering, instructional design, and multimedia authoring to create dynamic and effective learning environments. Through careful planning, execution, and evaluation, these platforms can provide valuable educational experiences that meet the needs of diverse learners.

Methodology

The primary goal of the research is to enhance the efficacy of online learning platforms by integrating instructional design, multimedia resources, and robust software engineering principles. The study aims to validate the impact of these integrations on cognitive learning outcomes, user experience, and the overall effectiveness of the online learning environment. By leveraging insights from the referenced documents, the research seeks to contribute to the advancement of online learning platforms and their ability to cater to diverse learning needs effectively.

The research aims to investigate and enhance the effectiveness of online learning platforms by integrating insights from instructional design, multimedia integration, and software engineering principles. The study seeks to validate the impact of these integrations on cognitive learning outcomes and user experience.

The research conducted by the researchers is a type of development research or Research and Development (R&D). The methodology stages are:

1. **Literature Review**: A comprehensive review of literature from referenced documents, to extract insights into instructional design, multimedia integration, and software engineering best practices for online learning platforms.
2. **Needs Analysis**: Conduct a needs analysis to understand the specific requirements of learners, with a focus on Arabic language learning needs, as outlined in the referenced documents and requirements of multimedia authoring. Multimedia authoring involves creating interactive applications that incorporate various media types like audio, video, images, animations, and more.

   The authoring process generally involves conceptualization, design, content collection, assembly, testing, and distribution of the multimedia application.

   Authoring software tools help automate and simplify this process. They range from command-based to object-based systems and can have text or graphical interfaces.

   Hardware platforms for authoring need powerful processors, large memory and storage, high-resolution displays, and advanced audio and graphics capabilities.

   Operating systems that support multimedia authoring provide features like multitasking, standard multimedia Application Programming Interface *standards* or APIs (e.g. MCI or Media Control Interface), and inter-process communication.

   Content materials need to be collected or created in appropriate digital formats. Tools exist for tasks like image capture, editing, processing, and format conversion.

   Elements like text, graphics, audio, video, and animations each require different authoring considerations and tools. Standards help ensure cross-platform compatibility.

   Applications can be linear presentations or more complex interactive programs. Different authoring interfaces and paradigms suit different application types.

   Factors like intended applications, author skills, and budget help determine the optimal authoring environment and tools for a given project.

3. **Content Structuring**: Organizing the curriculum and content in a logical sequence that aligns with the learning progression of Arabic language students, leveraging insights from the summarized content.
4. **Interactive, Instructional Design, and Multimedia Integration**: Incorporating interactive elements, multimedia authoring, and multimedia resources to create engaging and immersive learning experiences, drawing from the findings in the referenced documents.

The most basic form of the instructional systems design model is a five-step process of analysis, design, development, implementation, and evaluation (ADDIE) (George M. Piskurich, 2006:396).

The summary outlines the five phases of ADDIE: Analyse, Design, Develop, Implement, and Evaluate, detailing the common procedures involved in each phase. Figure 1.

This model is crucial for developing effective instructional materials and can be applied to the development of online learning platforms to ensure they meet educational goals and learner needs.

	Analyse	*Design*	*Develop*	*Implement*	*Evaluate*
CONCEPT	Identify the probable causes for a performance gap	Verify the desired performances and appropriate testing methods	Generate and validate the learning resources	Prepare the learning environment and engage the students	Assess the quality of the instructional products and processes, both before and after implementation
PROCEDURES	1. Validate the performance gap. 2. Determine instructional goals. 3. Confirm the intended audience. 4. Identify required resources. 5. Determine potential delivery systems (including cost estimate) 6. Compare a project	1. Conduct a task inventory. 2. Compose performance objectives. 3. Generate testing strategies. 4. Calculate return on investment.	1. Generate content. 2. Select or develop supporting media. 3. Develop guidance for the student. 4. Develop guidance for the teacher. 5. Conduct formative revisions. 6. Conduct a Pilot Test	1. Prepare the teacher. 2. Prepare the student	1. Determine evaluation criteria. 2. Select evaluation tools. 3. Conduct evaluation

management plan.				
Analysis Summary	***Design Brief***	***Learning Resources***	***Implementation Strategy***	***Evaluation Plan***

Figure 1. Common instructional design procedures organized by ADDIE.

A typical authoring project may involve the following major steps:

1. **Concept**—The objectives for the project are defined, and the type of application is specified. In movies, this is the stage at which the producer decides what kind of movie he wants to make and what die subject will be.
2. **Design**—This is the process of deciding in detail what will be in the project (what the content material is) and how it will be presented. In the movies, this would include the script writing, casting, and scene design steps.
3. **Obtaining content material**- During this stage all the data, audio, video, and images for the project are collected in appropriate digital formats. In the movies, this would be the production stage, where all the scenes for the movie are set up one by one and shot on film.
4. **Assembly**—In this step, the overall structure of the project is built, presentations are assembled, and any interactive features are built in. In the movies, this is the postproduction editing step, although it is much simpler because there is no interactivity in a movie. A tool for this stage of authoring is called an assembly program.
5. **Testing**—During testing, the application is run and checked to confirm that it does exactly what the author intended. In the movies, this is like screening, where the movie or parts of it are viewed and approved by management people.
6. **Distribution**—In this step, the application is reproduced and delivered to end users for their use. In the movies, this would be the release phase.

As you can see, there is a fairly good analogy between moviemaking and multimedia creation. It goes further than outlined above because a multimedia project can create the same excitement as a movie, and it requires many of the same talents and skills as the movies (Luther (1994: 6-7).

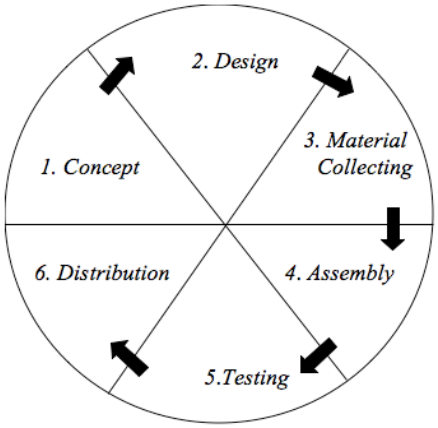

Figure 2. Stages of Multimedia Development according to Luther

O'Brien (2010:18) argues that in software development, there must be an analysis of end-user needs, the role of software experts or information system application designers, consideration of the economic

aspects and technical feasibility of the proposed application, as well as how to use or implement the new system or software and make improvements related to the business value of a system.
There is a focus and emphasis on the main work that must be managed and completed in one information systems development cycle, as shown in Figure 3.

Figure 3. Multistep Cycles in Information Systems Development

5. **Software Engineering Validation**: Validating the software engineering principles and architecture of online learning platforms, ensuring scalability, security, and modularity, as suggested by the programming expert validation results.
6. **Experimental Design**: Utilize knowledge from the research findings to design an experimental study that will evaluate the effect of the integrated approach on cognitive learning outcomes.
   The creation of online learning environments and the requirement for in-depth study to raise their effectiveness. It emphasizes how important it is to combine multimedia materials, strong software engineering concepts, and instructional design to build an all-encompassing and productive online learning environment.

Research Results and Discussion

The data in the study was obtained in the following stages:
In the first stage, data was extracted from:

1. An expert in software engineering would be someone who applies a systematic, disciplined, and quantifiable approach to the development, operation, and maintenance of software. They would be proficient in the software engineering process, including communication, planning, modeling, construction, and deployment, and would follow core principles of software engineering practice at different levels of abstraction. Additionally, an expert would be able to navigate the challenges of emerging technologies and legacy software, and use the layers of process, methods, and tools to develop high-quality software efficiently (Roger S. Pressman, Bruce R. Maxim, 2015).
2. Respondents consisting of 1) media experts; 2) material experts; 3) programming experts; and 4) users, with a test instrument in the dorm of the questionnaire with a calculation scale using *Likert.*

Score	Interpretation
1	Bad
2	Poor
3	Moderate

4	Good
5	Excellent

Score interpretation is calculated based on the acquisition score in each aspect:

$$\text{Score Interpretation Percentage} = \left(\frac{\sum \text{actual scores}}{\sum \text{maximum possible scores}}\right) \times 100\%$$

The data to be obtained from the questionnaire is then measured with the following score interpretation:

Score	%	Interpretation
1	0 - 20	Bad
2	21- 40	Poor
3	41- 60	Moderate
4	61- 80	Good
5	81-100	Excellent

Before carrying out research, researchers designed learning plans, which were outlined in *the mapping program*, *generic form,* and *computer-based form. The mapping program* contains information on core competencies, basic competencies, learning objectives, and methods.

The second stage was taken from the research population, namely students of the Agus Arifin Institute's Arabic language class, consisting of 30 students.

The learning method used is *blended learning.* Blended learning combines online learning with traditional face-to-face methods. It represents a natural evolution from traditional training approaches to more personalized learning.

Effective blended learning solutions require identifying learning needs, establishing demand and timelines, considering different learning styles, and creatively using different delivery methods.

Designing blended learning involves understanding how people learn, considering individual differences, and creating stimulating experiences that incorporate different media and support different preferences. Implementing blended learning requires strategic planning, identifying internal and external resources, educating stakeholders, piloting solutions, and evaluating effectiveness. Case studies demonstrate how organizations have integrated blended learning into their overall learning and development strategies to attract, retain, and develop talent. Blended learning provides opportunities to personalize learning, increase accessibility, incorporate the latest technologies, and supplement classroom training with online resources and coaching. When well-designed it can enhance learning outcomes.

Key factors for success include needs analysis, creative design matching content to delivery methods, support throughout the learning process, and evaluation of results. Blended learning needs to be implemented as part of an overall strategic approach.

Kaye Thorne 2003, 16–17) explains that blended learning is a learning method that uses multimedia, CD-ROM, video streaming, online text animation, video streaming, virtual classrooms, voicemail, email, and conference calls, combined with traditional classroom learning methods and one-to-one learning. Salkind (2012:247) says that the experimental design was a nonrandomized control group pretest-post-test design, which is also known as a non-equivalent control group design. This is the design that is most often used in quasi-experimental methods, which involve comparing two experimental class groups and a control class group.

The experimental design is presented in the following table:

Table 1. ***Nonrandomized control group pretest-post-test design***

Class Group	*Pretest*	Treatment	*Post-test*
Experiment	Y_1	X	Y_2
Control	Y_3	-	Y_4

Arabic language learning in the experimental class was given treatment (X) using website learning online, while in the control class, there was no treatment or learning Arabic in class (offline). Both class groups were given *a pretest* (Y_1 and Y_3) and *a post-test* (Y_2 and Y_4) with the same test questions.
Each group consists of students who have high, medium, and low initial abilities. This is intended to ensure that the two groups or classes have the same conditions before being given treatment, as planned to use a *non-randomized control group pretest-post-test design*.
The data collection technique in the second stage of this research is in the form of numbers or scores obtained from *the pretest* and *post-test* of the two groups of students.

Model Development Results

The research product is computer-based Arabic language learning media (Computer-Based Learning). The researcher details the activities carried out at each stage, both using the ADDIE method and the multistep cycles in software and information systems development. The development model is described in the following stages:

1. Analysis Stage

Information was obtained that students were less interested in the method of memorizing the rules of *nahwu* or *sharaf,* and nahwu rule material such as *Jumlah Fi'lîyah, Jumlah Ismîyah, Mubtada' Khabar,' Irâb,* and tashrîf are among those that are difficult to understand. Also, the involvement of language teachers in explaining concepts is necessary.
To develop a media model, the researcher designed menus that can be adapted to the learning implementation plan or *mapping program,* can be uploaded or downloaded, and function as language learning multimedia through the learning video menu, which can be made by the teacher himself in mp4 *format* or by downloading from *YouTube,* then uploaded to the website. Some key domains to consider in platform development include:

a) **Content Delivery** - Tools for instructors to upload materials like documents, and videos, and integrate other media. Interfaces for students to easily access assigned content.
b) **Assessments** - Quizzes, exams, and assignments that can be created, administered, and automatically graded online. Features for feedback and grading visibility.
c) **Collaboration** - Forums, chat, and video conferencing to foster interaction between students and instructors. Group workspaces and file-sharing capabilities.
d) **Analytics** - Dashboards with metrics on course and student performance. Insights into engagement, progress, and at-risk students. Ability to measure learning outcomes.
e) **Customization** - Options for custom branding and UI/UX (User Interface /User Experience). Flexibility to cater courses to different subjects, levels, and class sizes. Accessibility standards.

f) **Administration** - User management, enrolment tracking, calendar/scheduling functions. Reporting at course/program level. Payment integration if applicable.

2. *Design Stage*

These stages are designed to create a comprehensive and effective online learning platform tailored to the needs of Arabic language learners. Here are the proposed stages:

a) **Needs Analysis**: Begin by conducting a thorough needs analysis to understand the specific requirements of Arabic language learners. This includes identifying the target audience's proficiency levels, cultural nuances, and learning objectives.

b) **Content Structuring**: Organize the curriculum and content in a logical sequence that aligns with the learning progression of Arabic language students. This should include a mix of reading, writing, listening, and speaking exercises.

The presentation of this online learning media model is arranged on one full display of the personal computer or laptop monitor screen, which displays menus and sub-menus: instructional materials, dictionaries, learning videos, questions, help, and about (program or *software information*). The initial design of *the graphical user interface* is as follows:

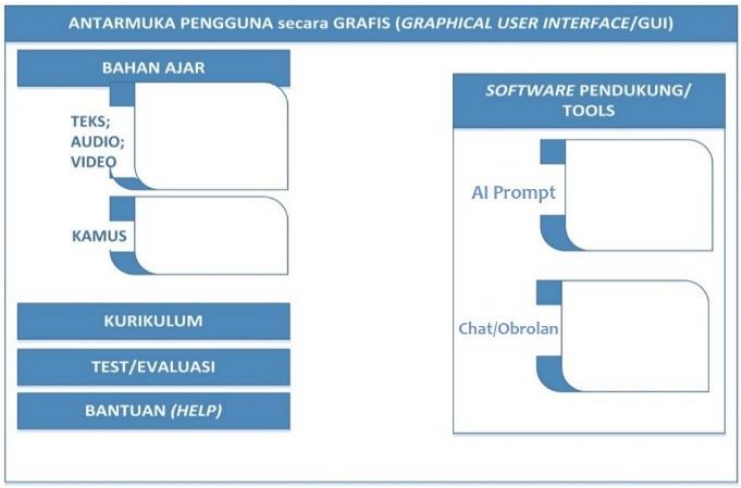

Figure 4. *Graphical User Interface Design*

c) **Interactive Design**: Incorporate interactive elements such as quizzes, flashcards, and pronunciation guides that cater to the unique aspects of the Arabic language, like its script and phonetics.

d) **Multimedia Integration**: To create engaging and immersive learning experiences. This can include videos, audio clips, and interactive dialogues.

e) **Cultural Relevance**: Ensure that the content is culturally relevant and provides contextual learning scenarios that enhance the understanding of the Arabic language within its cultural setting.

f) **User Interface (UI) Design**: Design a user-friendly interface that accommodates both native Arabic speakers and learners from different backgrounds. Consider right-to-left text support and intuitive navigation that aligns with Arabic reading patterns.

g) **Feedback Mechanisms**: Implement feedback mechanisms to provide learners with immediate and constructive feedback on their progress.

h) **Accessibility and Inclusivity**: Address accessibility standards to ensure that the platform is inclusive for all learners, including those with disabilities.

i) **Pilot Testing**: Conduct pilot testing with a group of Arabic language learners to gather feedback and make necessary adjustments to the platform's design and content.

Website testing stages on groups of University of Indonesia students, validation of material experts and programming experts/information and communication technology (ICT) practitioners, limited trials on students, as well as product revisions. The validation process is an assessment process by material experts and programming experts towards the product developed by researchers. Material Expert Assessment uses questionnaires as an authentic assessment tool that becomes a reference for improving the learning media being developed. The evaluation sheet is in the form of a questionnaire assessing several aspects, namely: preliminary information aspects, learning aspects, material aspects (teaching materials), assignment/evaluation/assessment aspects, and summary aspects. Programming Expert Assessment using *user acceptance testing* (UAT).

The finished product, namely *the website*, was tested on a group of University of Indonesia students who were treated as users, material experts, learning media experts, and programming experts. Programming experts carry out software product testing. The results of limited *user testing and* validation by experts concluded that the *website development product* is suitable for use in *online* learning.

In this development stage, *the website* underwent several revisions until it arrived at the product used for research, as shown in Figure 5.

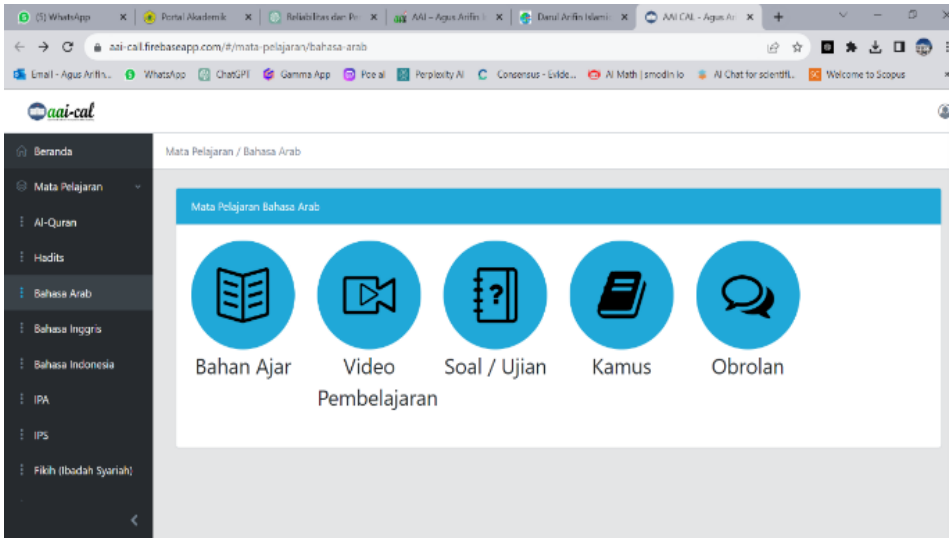

Figure 5. Home *Menu Website*

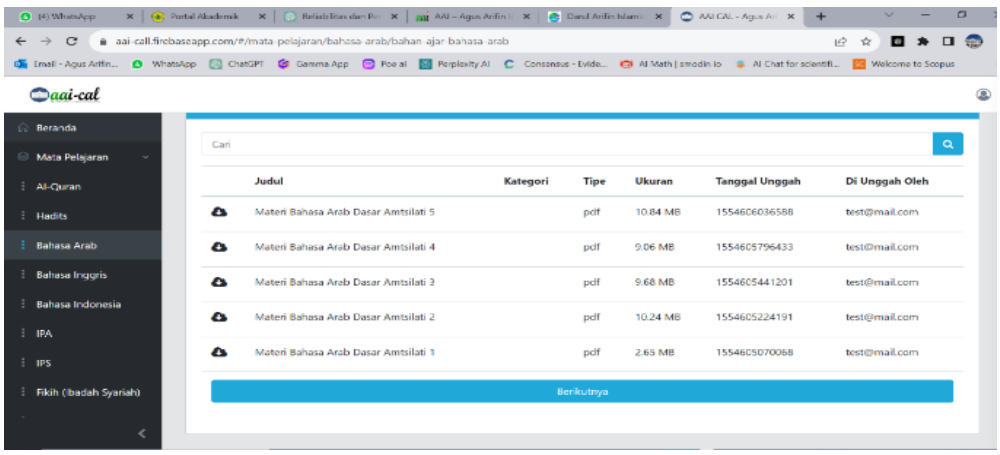

Figure 6. Website appearance of Arabic learning materials

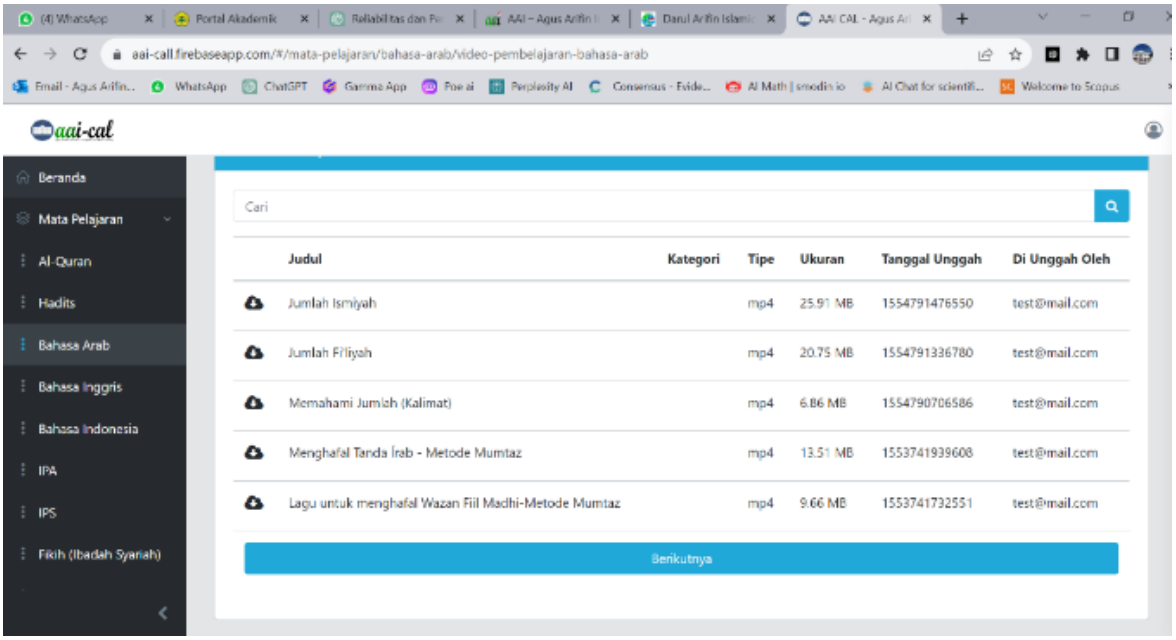

Figure 7. Arabic Language Learning Video Display

j) **Evaluation and Iteration**: Use the ADDIE model's evaluation phase to assess the effectiveness of the platform and iterate on the design based on learner feedback and performance data.

Overall learning effectiveness is measured at course completion. Collect learning feedback via online survey, email, or other media, and validate content accuracy and teaching methods. Revise as necessary. After the evaluation stage, various subjects can be added as needed, and *ChatGPT Artificial Intelligence Prompts* can be added to the website, as shown in Figure 8.

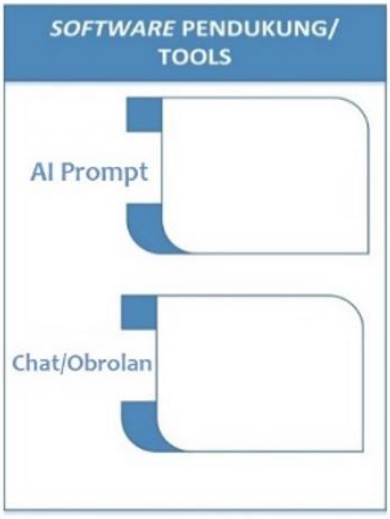

Figure 8. Tools menu

Figure 9. Menu of various subjects

Feasibility of Online Learning Websites

The user group carries out software testing, followed by validation by material experts and programming experts, and from the test and validation results, the following picture was obtained:

1. Test Results: *Website* Performance

Software testing is carried out by a student group at Depok, West Java, to get a response to the product. Groups of students who often operate various types of software are asked to provide an assessment of the testing aspects, such as the user interface, how to operate, content or instructional materials, benefits, and development. The response results from this user group were analyzed statistically.

From the results of trials carried out by user groups of students at the University of Indonesia, the following questionnaire response data were obtained:

Table 2. Summary of *website* trial results by users from the student group

No.	Aspect	Average Score	Interpretation
1	Interface	80%	Good
2	How to operate	86.7%	Excellent
3	Content	83.33%	Excellent
4	Benefit	86.7%	Excellent
5	Development	88.44%	Excellent

Of the five aspects asked, only the interface aspect received an average score of 80%, which means "good," and the other four aspects, namely how to operate, materials, benefits, and development, received an average score of between 83.33% and 88.44%. which means "excellent." From user responses, it can be concluded that this software is suitable for use in learning.

2. Description of Media Expert Validation Results

The website for online learning validation carried out by Media Experts uses a media selection assessment

format using *a checklist* towards five aspects, namely: preliminary information aspect, learning aspect, material aspect (teaching material), assignment/evaluation/assessment aspect, and summary aspect.
According to Sharon E. Smaldino, et al. (2004), to assess whether the learning medium being developed is good or not, it can be tested with questions on aspects such as suitability to the curriculum, clarity and correctness of the material, clarity of language, attracting and motivating students to learn, and so on. From the results of the assessment carried out by the Arabic Language Learning Material/Media Expert, the score data was obtained as follows:

Table 3. Summary of *Website* Trial Results by Media Experts.

No.	Aspect	Average Score	Interpretation
1	Preliminary Information	88%	Excellent
2	Instructional	88%	Excellent
3	Subject	91.43%	Excellent
4	Task/Evaluation	91.43%	Excellent
5	Summary	96%	Excellent

The learning website is good and appropriate for use as an online Arabic language learning medium, according to every question evaluated by specialists in Arabic language learning media.

3. Description of Programming Expert Validation Results

Programming experts have conducted a thorough validation of the online learning software (website):

a) Focus on educational technologies: The platform's architecture is robust, ensuring scalability and security, which are paramount for handling sensitive educational data. The software's modular design facilitates the integration of new features and content, adhering to the principles of software engineering best practices.
b) From an instructional design perspective, the platform aligns with the ADDIE model, supporting a comprehensive analysis of learning needs, systematic design and development of course materials, and effective implementation and evaluation strategies. The multimedia components are seamlessly integrated, offering a rich blend of text, audio, and video resources that cater to diverse learning styles.
c) The user interface is intuitive, promoting ease of navigation and accessibility, which is crucial for learners and educators alike. The platform also includes a range of assessment tools that provide immediate feedback, a feature that is essential for the cognitive development of learners.
d) In summary, the software meets the high standards required for online learning platforms, demonstrating a significant potential to enhance cognitive learning outcomes effectively.

4. The summary of the research findings

Online learning platforms aim to provide equal access to education by making learning opportunities independent of space and time (anytime anywhere learning). However, studies have found that merely providing technology does not guarantee its effective use or impact on learning outcomes. Early research compared online learning to classroom instruction and found no differences in learning outcomes. However, "blended learning" which combines online, and face-to-face learning has been found to have

small to moderate positive effects on learning compared to only classroom or only online instruction (Morgan, K., Morgan, M., Johansson, L., & Ruud, E. (2016)

Use the Wilcoxon Signed Rank Test, a non-parametric test to measure the significance of differences between two groups of paired data on an ordinal or interval scale that is not normally distributed, to ascertain the significance of learning outcomes using an online learning website and face-to-face methods, as in the opinion of (Paul H. Kvam and Brani Vidakovic 2007:129).

However, if the sample data is normally distributed, the independent sample t-test is used. The summary of the research findings indicates the following key points:

1. The data normality test Sig. The Pretest and post-test of 0.200 is greater than 0.05, indicating that the data is normally distributed.
2. The homogeneity test data obtained a Sig. of 0.254, which is greater than 0.05, signifying that the data is homogeneously distributed.
3. The Independent Sample T-Test produces a significance value of 0.0323, which is smaller than 0.05, leading to the rejection of the null hypothesis (H_0) and acceptance of the alternative hypothesis (H_a). This implies a significant effect of the use of online learning websites on cognitive learning outcomes. Group statistics reveal that the average post-test score for the experimental class is 90.65.

These findings suggest a statistically significant impact of online learning websites on cognitive learning outcomes, as evidenced by the rejection of the null hypothesis and the average post-test score of the experimental class.

Conclusion and Recommendation

The software satisfies the strict requirements needed for online learning environments and shows great promise for improving cognitive learning results.

Based on the results of the study, the use of an online learning website had a statistically significant positive impact on cognitive learning outcomes for Arabic language students. Testing showed the website was effective and easy to use.

It is recommended that online learning continue to be implemented and integrated with traditional methods to enhance learning for Arabic language students. Further development and testing of additional features is also recommended to improve the website and learning experience.

References

1. George M. Piskurich. *Rapid Instructional Design: Learning ID Fast and Right*. 2nd edition.
2. John Wiley & Sons, Inc. Published by Pfeiffer 2006. An Imprint of Wiley 989 Market Street, San Francisco, CA 94103-1741 www.pfeiffer.com
3. Kaye Thorne. *Blended Learning: How to Integrate Online and Traditional Learning.* Kogan Page Limited, 2003. 22883 Quicksilver Drive Sterling VA 20166-2012 USA.
4. Luther, Arch C. *Authoring Interactive Multimedia*, Academic Press, Inc. 1994. Massachusetts.
5. Morgan, K., Morgan, M., Johansson, L., & Ruud, E. *A systematic mapping of the effects of ICT on learning outcomes.* Knowledge Center for Education.2016. Oslo.
6. O'Brien, James A., and M. Marakas, George. *Management Information Systems.* McGraw-Hill/Irwin,2010. NY.
7. Paul H. Kvam, Brani Vidakovic. *Nonparametric Statistics with Applications to Science and Engineering*. Wiley-Interscience. 2007.

8. Robert Maribe Branch. *Instructional Design: The ADDIE Approach.* Springer Publishing Company, Inc.2009.
9. Roger S. Pressman, Bruce R. Maxim. *SOFTWARE ENGINEERING: A PRACTITIONER'S APPROACH*, 8th edition. Published by McGraw-Hill Education. 2015. 2 Penn Plaza, New York.
10. Salkind, Neil J. *Exploring Research*, 8th Edition. University of Kansas. 2012.Pearson.
11. Sharon E. Smaldino. *Instructional technology and media for learning* Pearson Merrill Prentice Hall, 2004.Upper Saddle River, New Jersey, Columbus, Ohio.
12. Sommerville. *Software Engineering, 9th Edition*, Addison Wesley Publishing.2011. Lancaster
13. Steven L. Thorne, Stephen May. *Language, Education, and Technology*. Third Edition. Springer International Publishing AG.2017.