

**Muhaimin Abdullah**

Doctor of English Education  
Universitas Negeri Surabaya, Surabaya, Indonesia  
ORCID ID 0000-0003-4966-2534  
*abdullahmuhaimin24@gmail.com*

**Syarifuddin Dollah**

Professor of English Education  
Universitas Negeri Makassar, Makassar, Indonesia  
ORCID ID 0000-0001-5011-0695  
*syarifuddindollah@unm.ac.id*

**Haryanto Atmowardoyo**

Professor of English Education  
Universitas Negeri Makassar, Makassar, Indonesia  
ORCID ID 0000-0003-0492-5345  
*haryanto@unm.ac.id*

## PROTOTYPING A WEB-PUBLISHED ACADEMIC ENGLISH COURSEBOOK FOR INDONESIAN PRIMARY SCHOOL TEACHER EDUCATION STUDY PROGRAM STUDENTS

**Abstract.** This publication addresses the prototyping phase of a web-published academic English coursebook, which is exclusively designed and developed to assist the 6<sup>th</sup> semester primary school teacher education study program students at Universitas Negeri Makassar in learning academic English. Large-scale social restriction due to Covid-19 pandemic, which restricts any form of regular face-to-face meeting, and the fact that an English coursebook has not been developed yet at the locus of this study led the authors to set this as both an important and urgent goal to be reached through design-based research, which comprised (1) preliminary study; (2) prototyping; (3) assessment; and (4) systematic reflection. In prototyping the artefact, standard web programming languages including PHP, HTML, and CSS were synergized. The samples of this study were 5 classes consisting of 125 6<sup>th</sup> semester students majoring in primary school teacher education study program at Universitas Negeri Makassar, Indonesia. Through iterative cycle of prototyping, the findings of this study provide an ideal design of a web-published academic English coursebook exclusively addressed to solve a contextual educational issue detected in the locus of this research, as mandated by literature on design-based research. Besides, this publication discusses ideas of web design and development that work for academic English learning purposes. In addition, this publication also deals with the effectiveness issue of the web-published academic English coursebook in assisting non-English major students in learning academic English through online distance learning delivery mode. This publication theoretically contributes to the domain of teaching English as a foreign language (TEFL) and instructional learning design.

**Keywords:** web-published academic English coursebook; web-based language learning; open distance learning; English for specific academic purposes; design-based research.

### 1. INTRODUCTION

**The problem statement.** Covid-19 has changed the way educational institutions worldwide transfer knowledge in a formal educational setting. The prevention of virus transmission resulted in the prohibition of regular face-to-face classes, which, in turn, compelled teaching and learning activities to be shifted to the online realm. In responding to the sudden change of situation and to solve contextual educational issues experienced by primary school teacher education study program students at Universitas Negeri Makassar, which were found learning without assistance of a coursebook in learning English, this study offers a web-published academic English coursebook for academic English learning purposes.

This publication characterizes an effective web design for the learning of English for specific academic purposes.

**Analysis of recent studies and publications.** Reading in the target language deals with continual interactions between second language and first language and therefore it is a complex process requiring subskills [1]. Academic reading, which is characterized by the ability to perform such academic task as interpreting academic texts [2], is regarded crucial for higher education students as they are required to accomplish research, which involves reading a lot of academic texts. The teaching of academic reading is considered challenging – especially in the context of non-native English speakers – due to the fact that even native speakers of English still potentially encounter constraints in reading academic texts [2]. For Indonesian non-English major students, being able to comprehend academic texts is a must, as regulated by the Indonesian government.

Nowadays, during large-scale social restriction due to Covid-19 pandemic, internet technology is promoted as the only medium that allows teaching and learning to be practiced. One of the popular internet technologies which is commonly applied for online distance learning is a website [3] – provable through a 2007 publication revealing that a website is set as the primary source of reading for students [4].

The fact that majority of students today tend to find literature on websites rather than in books [5] implies that web design should become one of important concerns of web designers and developers aiming to psychologically engage students in learning. Regarding this point, a scholarly-published resource reports that responsive web design leads to efficiency in learning [6]. In the study, technical synergy between HTML and CSS is reported as the main contributor that leads to the reliability of the web. The superiority of responsive web design is inspired by the significant amount of students who access websites through mobile phones [7].

Prior to this study, previously published literature has successfully designed and developed a website physics academic course [8]. From the pedagogical perspectives, the publication stresses that academic domain is learnable through website. One of previously published scientific works considered closely related to variables discussed in this study is amplified in a 2019 study which concludes that a web-based foreign language coursebook has the potential to not only supplement traditional coursebooks but also to replace them [9].

Another claim is amplified through a 2018 study revealing that reading comprehension is possible to be developed through a website in the form of a content management system (CMS) or learning management system (LMS)[10], which is mainly composed by HTML, PHP, and CSS. In the publication, the author emphasizes that the key to enhancement is not in the learning medium applied but in the pedagogical treatment. Therefore, it is obvious that web design should not be considered as the primary goal.

For foreign language purposes, a website is applicable as a learning medium addressed exclusively for specific-population use [12]. It is further explained that a web designer should clarify skills that the web offers. The statement emphasizes that pedagogical concept should be set as the primary point that inspires web design.

**The research goals.** This publication aims to inform further researchers and professional educational practitioners in the field of foreign/second language learning about the design and development of a website for language learning purposes. Besides, it is also aimed at providing a practical solution which is open for replication. Theoretically, the content of this publication is expected to contribute to the domain of foreign/second language learning, more specifically, learning academic English reading. Practically, the educational artefact/product generated in this study is expected to be replicated and to be universally applied to teach reading focused on academic English.

## 2. RESEARCH METHODS

This study applied design-based research covering (1) preliminary study; (2) prototyping; (3) assessment; and (4) systematic reflection as iterative instructional system design. This publication features the design and development of a web-published academic English coursebook including instructional learning material.

The population of this study was the 6<sup>th</sup> semester students of the primary school teacher education study program at Fakultas Ilmu Pendidikan, Universitas Negeri Makassar, Indonesia. The sample was all students enrolled in the English for specific purposes (ESP) course. Students regarded as participants of this study were those who followed all prototyping phases applied in this study, including (1) pre-prototyping interview and questionnaire; (2) diagnostic test; (3) experiment; and (4) achievement test. From the total 144 students, only 125 students met the pre-determined criteria. This study lasted for 1 semester and consisted of 16 meetings.

In conducting this study, the authors firstly interviewed the participants. In addition, the participants were given a questionnaire to investigate their tendencies in learning during Covid-19 pandemic. The first meeting was allocated for the diagnostic test. Furthermore, the authors introduced the web-published academic English coursebook, explained its functions, and explained instructional learning design the students would follow in the running semester. Furthermore, the 2<sup>nd</sup> meeting until 15<sup>th</sup> meeting were allocated for field-testing. In the 16<sup>th</sup> meeting, an achievement test was conducted.

The test consisted of 5 items representing content (C) and 5 items representing language (L). The items were developed by the authors based on 3 academic journal abstracts. The criteria of journal abstracts selected as materials of the test were (1) published by a reputable journal publisher (to ensure the content quality and the grammatical use); (2) listed ‘teacher education’ and/or ‘primary teacher’ as keyword(s) (to ensure the familiarity of variables discussed in the abstracts with students’ major); and (3) published between 2018 to 2021 (to ensure the novelty of discussion). Before administering the test, the authors measured each item’s validity and reliability. Based on the statistical calculation conducted by Pusat Analisis Data, Universitas Negeri Makassar, 10 items were decided both valid and reliable.

In determining the effectiveness of the web-published academic English coursebook, the authors applied the following rubric.

*Table 1*

### Technical and pedagogical functions of the web-published academic English coursebook

Score	Interpretation	Verbal label
80.01 – 100	Very high	Very effective
60.01 – 80.00	High	Effective
40.01 – 60.00	Moderate	Moderately effective
20.01 – 40.00	Low	Less effective
0 – 20.00	Very low	Ineffective

In the design of the web-published academic English coursebook, PHP, HTML, and CSS as the most commonly used web programming languages [13]–[15] were synergized. Based on preliminary studies, all the participants were observed using smartphones in accessing the prototype of the web. However, most of them regularly used laptops for certain occasions. Based on preliminary studies, participants rated themselves as ‘digital natives’ who have been literally surrounded by technology since they were born [16]. The fact that the participants were digital natives led to the conclusion that training on how to operate internet-connected devices and how to access the web browser to access the website was unnecessary.

In prototyping the web-published academic English coursebook, the authors applied the web by using PHP, HTML, and CSS by carrying out responsive design as a core concept. Literature argues that responsive design allows the web to be dynamically resized and rearranged to best fit the dimension of the internet-connected device used [17]. Furthermore, it is treated as a crucial point to be considered for web design nowadays [18]. Figure 1 below visualizes the research flow executed in this study.

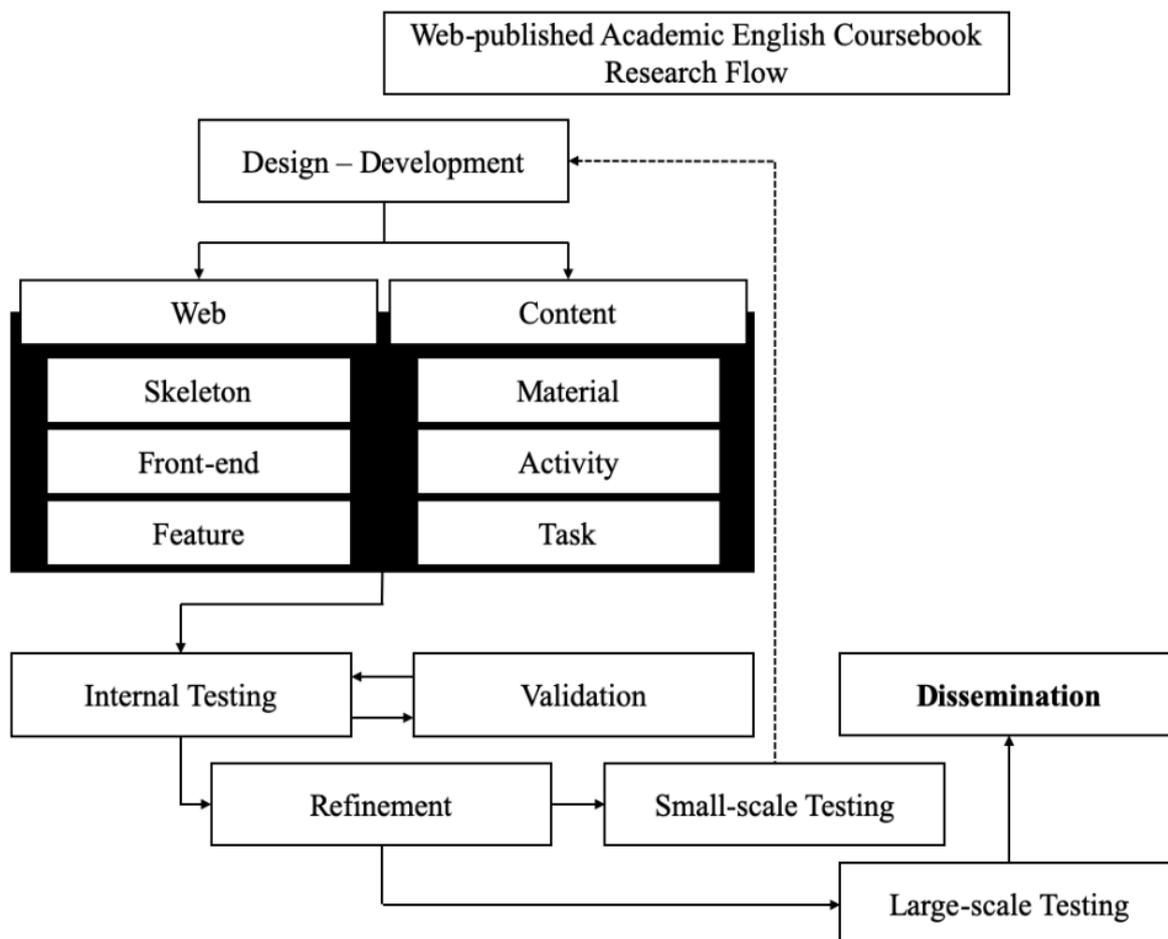


Figure 1. Research flow

### 3. THE RESULTS AND DISCUSSION

This part deals with ideas behind the design of the web-published academic English coursebook and the results of the test on its effectiveness.

#### 3.1. Technical design and development

Like any other popular website, the web-published academic English coursebook consists of the header, the body, and the footer. The web design process begins with drawing the web skeleton as illustrated in Figure 1.

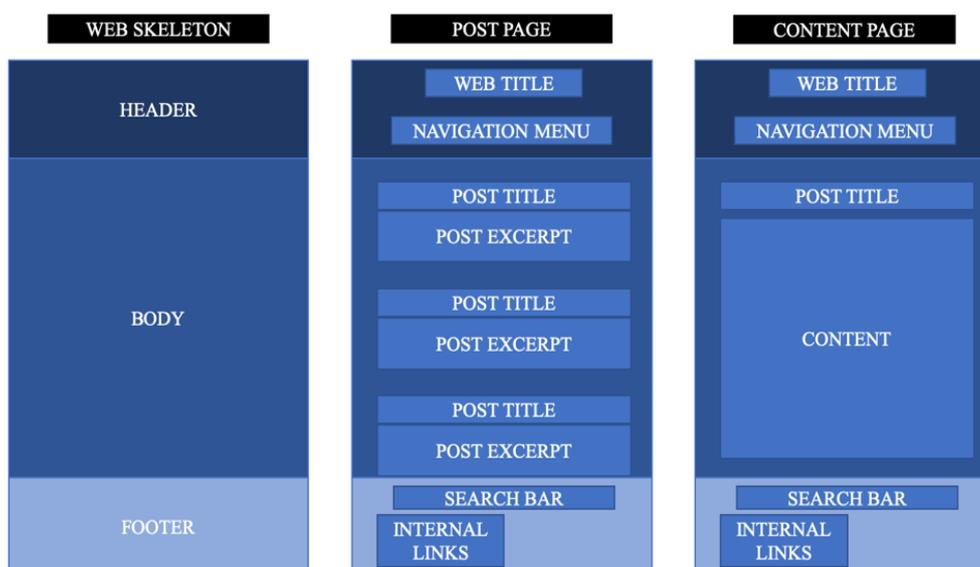


Figure 2. Skeleton, post page, and content page of the web-published academic English coursebook

All pages hosted in the web-published academic English coursebook follow the web skeleton as illustrated in Figure 2. The web-published academic English coursebook consists of the header ('header.html') containing the navigation menu ('navigation.html'), which is universally applicable for all pages of the web-published academic English coursebook. Furthermore, the navigation menu consists of activity, lesson, and blog, where the appearance of each is ruled by respectively 'activitycontent.html', 'lessoncontent.html' and 'blogcontent.html'.

Name	Size	Last Modified
 activity.html	1.38 KB	Aug 30, 2021, 1:59 AM
 activitycontent.html	1.24 KB	Aug 30, 2021, 2:00 AM
 blog.html	1.78 KB	May 9, 2021, 8:44 PM
 blogcontent.html	1.59 KB	Oct 19, 2020, 10:49 AM
 default.html	265 bytes	Mar 26, 2021, 10:36 AM
 error.html	265 bytes	Jan 19, 2021, 6:48 PM
 footer.html	514 bytes	Feb 4, 2021, 6:52 PM
 header.html	1.49 KB	May 9, 2021, 8:40 PM
 lesson.html	1.53 KB	Mar 24, 2021, 3:32 PM
 lessoncontent.html	1.23 KB	Mar 22, 2021, 9:50 AM
 navigation.html	713 bytes	Aug 17, 2021, 9:46 AM
 pagination.html	586 bytes	Jan 19, 2021, 6:48 PM
 search.html	1.56 KB	Aug 16, 2020, 10:03 AM
 sitemap.html	732 bytes	Aug 16, 2020, 10:04 AM

Figure 3. Technical structure of the web-published academic English coursebook

Based on the raw file forming the web-published academic English coursebook as shown in Figure 3, it is clear that the designed and developed web offers 2 pedagogical services, namely the 'lesson', which covers all learning materials for the running semester, and the 'activity', which covers a list of activities. In addition, the 'resources' page exists to provide the participants with a list of journal abstracts adopted as authentic materials.

Table 2

**Technical and pedagogical functions of the web-published academic English coursebook**

Pedagogical Menu	Pedagogical Function
Lesson	Providing lessons on basic grammar of English and other related lessons based on activity, including examples
Activity	Providing a list of activities for the running semester – composed based on the curriculum, the syllabus, and the lesson plan – under the supervision of an English lecturer
Resources	Providing a list of journal abstracts, adopted as authentic materials for both in-class and out-of-class activities, to the participants.

The web-published academic English coursebook applies responsive web design. To make the web adjust its width automatically based on the width of the internet connected device used by students, the following code is attached between ‘<head>’ and ‘</head>’.

```
<head>
...
<meta name="viewport" content="width=device-width, initial-scale=1" />
...
</head>
```

In the second prototype, the issue regarding responsiveness found in the content page was table width which did not fit the screen width. To prevent a table breaking the rules of responsiveness, the following lines apply in the CSS file.

```
.content table {
  display: block;
  overflow: auto;
  line-height: normal;
  margin-top: 1em;
  margin-bottom: 3em;
  font-size: 14px;
}
```

The above CSS file simply tells the web browser to adjust table width based on screen width of the internet-connected device used. In the case of the web-published academic English coursebook, the CSS rule that works is by setting the value of the overflow to auto. It enables the table to be horizontally scrollable. When the width of a table exceeds the width of content page, web visitors should horizontally scroll the table to see the content.

Other two potential features that potentially break the rule of responsiveness are the image that functions to enable students learn from picture and the iframe that enables students to learn from video. In the web-published academic English coursebook, a picture is applied to illustrate learning materials, which covers screen-captured material, photos, etc.

```
.content img {
  max-width: 100%;
  height: auto;
}
```

The above CSS rule simply tells the web browsers to adjust every picture embedded on the web to 100% while the height adjusts automatically.

```
.content .flexible iframe {
  position: absolute;
  top: 0;
  bottom: 0;
  left: 0;
```

```

right: 0;
width: 100%;
height: 100%;
}

```

The above CSS rule simply tells the web browser to adjust every content regarded as iframe based on the dimension of content page – signed by value 100% set on both iframe width and height.

The CSS rules attached above force the picture and iframe to keep horizontal and vertical consistency. Figure 4 below illustrates how the web-published academic English coursebook appears on the web browsers. The testing is done through online free service website accessible at <http://ami.responsivedesign.is>.

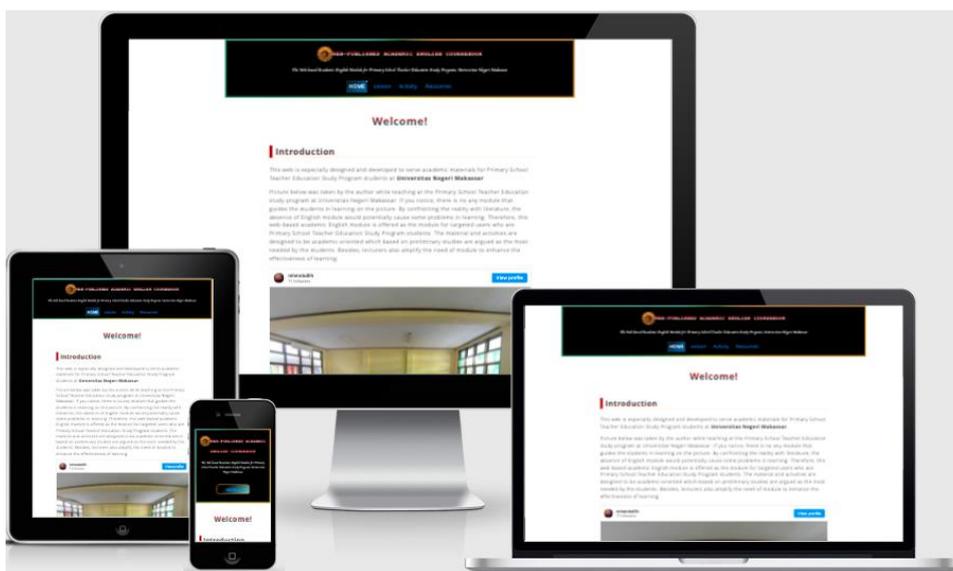


Figure 4. Responsiveness of the web-published academic English coursebook

Journal abstracts are adopted as authentic materials applied in both in-class and out-of-class activities. It is intended to provide participants with an authentic source of academic English. It is universally known that academic journals published by reputable journal publishers employ the double-blind review process conducted by scholars whose expertise is on variables researched, before the journal is officially published. Therefore, the content quality as well as the grammatical use are guaranteed. Thus, reputable academic journals can be considered the best representatives of academic writing, which guarantee the authenticity of both content and language aspects. In the experimentation phase, up to 285 open access academic journal titles were provided for the participants. The implementation of learning through the web-published academic English coursebook engaged participants in weekly reading activity.

### 3.2. The effectiveness of the web-published academic English coursebook

The web-published academic English coursebook was applied as intervention for 16 meetings by 125 6<sup>th</sup> semester students majoring in the primary school teacher education study program. In the 1<sup>st</sup> meeting, the participants were assigned a diagnostic test. In the 2<sup>nd</sup> meeting until 15<sup>th</sup> meeting, the participants were enrolled in the learning through the web-published academic English coursebook. In the 16<sup>th</sup> meeting, the participants took an achievement test. The table below reveals the central tendency based on calculation performed in Microsoft Excel for MacOS running Catalina version 10.15.7.

Table 3

**Result of intervention**

Test	Median	Mean Score	Standard Deviation	Std. Error	P-Value	N-Gain	Verbal Label
Diagnostic	40	43.28	15.28	1.37	.00	.78	Moderately Effective
Achievement	90	87.84	19.28	1.72	.00		Very Effective

Based on information revealed in Table 3, it is crystal clear that the web-published academic English coursebook successfully enhances participants' mean score from 43.28 (moderately effective) to 87.84 (very effective). Furthermore, the p-value calculated, which is .00, statistically confirms the proposition about the existence of significant difference in learning through the web-published academic English coursebook. In addition, based on calculation of n-gain score [19], which is greater than .70, we can make the conclusion that the intervention was effective.

Prior to this, scholars have qualitatively explored and quantitatively examined the superiority of websites in handling the learning of a foreign/second language. This study supports the assertion made in a 2018 publication that website-based learning can be an effective and efficient method for enhancing reading comprehension [10]. Besides, this study also supports the claim that online academic reading is a rewarding step [11] for university students by considering the fact that they will be required to work with academic texts for thesis writing purposes and for journal publications.

Through the lens of web design and development, this study agrees that web design and development should be oriented towards content reliability with intuitive user interface [20] and should begin with an appropriate concept [8]. In the case of this study, needs analysis aligned with course objectives and environment analysis aimed at ensuring web usability was set as the basis of design to acquire the concept of design and what the web covered. After dealing with the design and assessment, this study promotes the application of PHP, HTML, and CSS as engines running the web for their superiority in promoting reliability that leads to users' satisfaction [6]. In view of the increase in smart-phone use, any web-based resources should consider responsiveness that automatically adjusts the web appearance based on the device [7], [21], [22]. The findings of this study have shown an executable line which forces the web to adjust its appearance based on the width of internet-connected devices used to access the web. The designed and developed web is mostly accessed through mobile phones. From the lens of design, it potentially increases the web accessibility, which in turn potentially increases the content readability.

This study endorses the assertion that web-based coursebooks do not only serve as supplementary learning aids but also replace them, as evidenced by the improvement in the participants' mean scores after the experimentation [9]. This study also agrees that the creation of a coursebook in the form of a website needs expertise on instructional learning, materials design and development, and web design and development [23], [24]. However, educators do not really need in-depth knowledge on web programming languages, as there are now a lot of ready-to-use open source web engines which do not require any expertise on web coding. Furthermore, they are also equipped with complete guides on installation, technical use, and troubleshooting. One of the famous web engines that has been proven for its superiority in facilitating education is Wordpress [25]–[27].

#### 4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

This study has successfully designed and developed an online learning portal, namely a web-published academic English coursebook, which is found effective in enhancing the study participants' mean score. As nowadays students tend to access the internet through mobile phones [28], it is concluded that responsive web design which is mobile-friendly should be prioritized by web designers to comply with the current trends.

This study has demonstrated that online learning conducted through a website can effectively improve academic English skills, particularly in the area of reading. Based on experience in conducting this study, the major point to be considered regarding the instructional learning design is the suitability of learning materials and activities for students' level. Besides, academic vocabulary also matters [29], [30]. In the case of this study, the participants who are non-English major students learn autonomously through the web-published academic English module and their 1 semester learning entails on the enhancement of academic English score measured through a valid and reliable test.

Based on the findings, it is concluded that the educational artefact designed and developed in this study is beneficial in terms of promoting students' academic English mastery. Technically, the web-based academic English coursebook is available 24/7, which allows learners to access the content without any time or place restrictions. Furthermore, it is also economical because the students only need to spend the internet data package to access text-dominated content with one or two short videos embedded from Youtube for each lesson. Moreover, the virtual existence of the web-based academic English coursebook makes it physically durable.

For technical perspectives, this study has proven that the integration of fundamental web programming languages such as PHP, HTML, and CSS is still a dependable approach to developing effective web-based systems for academic English learning. It is recommended for educational professionals and researchers interested in utilizing websites as a medium for academic English learning to consider adopting PHP, HTML, and CSS – as either a supplemental aid or as the main resource – for at least three main reasons: (1) the ease of learning those three web programming languages; (2) open-source; and (3) the availability of documentations and resources. For professional educators and researchers who are not well-versed in web design and development, it is recommended that they use readily available open-source web engines or content management systems (CMS) such as Wordpress, Blogger, or Grav.

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## СТВОРЕННЯ ПРОТОТИПУ ВЕБПІДРУЧНИКА АКАДЕМІЧНОЇ АНГЛІЙСЬКОЇ МОВИ ДЛЯ ПІДГОТОВКИ МАЙБУТНІХ УЧИТЕЛІВ ПОЧАТКОВОЇ ШКОЛИ В ІНДОНЕЗІЇ

### **Мухаймін Абдулла**

PhD, англійська філологія

Державний університет Сурабая, Сурабая, Індонезія

ORCID ID 0000-0003-4966-2534

*abdullahmuhammad24@gmail.com*

### **Сяріфуддін Доллах**

професор, англійська філологія

Державний університет Макассара, Макассар, Індонезія

ORCID ID 0000-0001-5011-0695

*syarifuddindollah@unm.ac.id*

### **Гарянто Агмардоуо**

професор, англійська філологія

Державний університет Макассара, Макассар, Індонезія

ORCID ID 0000-0003-0492-5345

*haryanto@unm.ac.id*

**Анотація.** Стаття присвячена етапу створення прототипу навчального посібника з академічної англійської мови, опублікованого в Інтернеті, який розроблений для студентів 6-го семестру підготовки вчителів початкової школи з вивчення академічної англійської мови в Державному університеті Макассара. Масштабні соціальні обмеження, спричинені пандемією Covid-19, які значно зменшили очне спілкування, а також той факт, що в місці проведення цього дослідження ще не було розроблено підручника з англійської мови, спонукали авторів поставити перед собою важливу мету, досягнення якої уможливилось завдяки проведенню дизайн-дослідження і передбачає такі етапи: (1) попереднє дослідження; (2) створення прототипу; (3) оцінювання; і (4) систематична рефлексія. При створенні прототипу артефакту були використані стандартні мови вебпрограмування, зокрема PHP, HTML та CSS. У дослідженні взяли участь 5 груп із 125 студентів 6-го семестру, які навчаються за програмою підготовки вчителів початкової школи в Державному університеті Макассара, Індонезія. Завдяки ітеративному циклу розробки прототипів за результатами дослідження було створено якісний дизайн академічного підручника з англійської мови, розміщеного в Інтернеті, який призначений виключно для вирішення контекстуальної освітньої проблеми, виявленої під час дослідження, відповідно до наукових джерел з дизайн-орієнтованих досліджень. Крім того, у публікації обговорюються ідеї вебдизайну та розробки, які відповідають цілям навчання академічної англійської мови. У статті також розглянута ефективність вебпідручника з академічної англійської мови, який допомагає студентам неангломовних спеціальностей вивчати академічну англійську мову за допомогою дистанційної форми навчання в Інтернеті. Дослідження, представлене в статті, сприяє покращенню навчального процесу викладання англійської мови як іноземної (TEFL), а також розробці методики навчального проектування.

**Ключові слова:** вебпідручник з академічної англійської мови; вивчення мови в Інтернеті; відкрите дистанційне навчання; англійська мова для спеціальних академічних цілей; дизайн-дослідження.



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