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**1**  
**The Development and Effectiveness of Web Based Media  
Provider Costume by User to Improve Elementary School  
Students' Understanding**

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**Abstract**

The problem at elementary schools was the use of media that was not in accordance with the context and needs of teachers and students in the classroom through instructional design. The purpose of this study was to develop and evaluate the effectiveness of a web-based media provider costume by the user (Web-MPCU) to improve students' understanding of the material and test the effectiveness of its application through instructional design at elementary schools. The development model used was Huang's instructional design development model. The results of the study show that instructional design provided information needs that were appropriate to the problems of the school context and resolves them by developing and implementing the Web-MPCU. The results of the development and evaluation of the use of the Web-MPCU show that it was valid, feasible, and effectively applied to improve understanding of the material in elementary schools. The effectiveness of the use of the Web-MPCU was also shown from the ease with which the teacher asks and analyzes the media needs of his students.

**Keywords:** Website, Learning Media, Understanding, Instructional Design.

### Abstrak

Permasalahan di sekolah dasar adalah penggunaan media yang tidak sesuai dengan konteks dan kebutuhan guru dan siswa di kelas melalui desain pembelajaran. Tujuan dari penelitian ini adalah untuk mengembangkan dan mengevaluasi efektivitas penyediaan media pembelajaran web berbasis custom by user (Web-MPCU) untuk meningkatkan pemahaman materi dan menguji efektivitas penerapannya melalui desain pembelajaran di sekolah dasar. Model pengembangan yang digunakan adalah model pengembangan desain instruksional Huang. Hasil penelitian menunjukkan bahwa desain pembelajaran menyediakan kebutuhan informasi yang sesuai dengan masalah konteks sekolah dan menyelesaikannya dengan mengembangkan dan mengimplementasikan Web-MPCU. Hasil pengembangan dan evaluasi penggunaan Web-MPCU menunjukkan valid, layak, dan efektif diterapkan untuk meningkatkan pemahaman materi di sekolah dasar. Keefektifan penggunaan Web-MPCU juga ditunjukkan dari kemudahan guru dalam bertanya dan menganalisis kebutuhan media siswanya.

**Kata Kunci:** Website, Media Pembelajaran, Pemahaman, Desain Instruksional

### INTRODUCTION

Many schools and madrasas at the elementary school level in Indonesia have difficulty obtaining media that are in accordance with the school's needs and the objectives of the material presented, although there are already several online media sellers, the products produced are still common and have not been able to meet the needs of schools, teachers, and students.

The learning process should take place interactively, inspiring, fun, challenging, motivating students to participate actively, and providing sufficient space for the initiative, creativity, and independence in accordance with the talents and interests of students (Laakso *et al.*, 2021; Nurdyansyah *et al.*, 2021; Pienimäki *et al.*, 2021). The learning process must involve many parties balanced by technological developments to facilitate the achievement of a certain atmosphere in the learning process so that students are comfortable in learning (Chau *et al.*, 2021; Rodríguez-gulías *et al.*, 2022; Wardoyo *et al.*, 2021). Teaching materials are useful to help educators in carrying out learning activities. For educators, teaching materials are used to direct all instructional design of student activities and which should be taught to students in the instructional design process (Arifin *et al.*, 2021; Fitriani, 2020).



Children aged 3-10 years are in the playing phase so that almost all of their activities, including at school, are playing (Caskurlu *et al.*, 2021; Nirwana, 2021), however, what they play at home is often more complex and complicated, because it contains elements of science and technology (Crompton & Sykora, 2021; Hardman, 2019; Mlambo *et al.*, 2020) (Hardman, 2019; Malik *et al.*, 2018). This gap needs to be sought for the right media and instructional design, so as to be able to provide additional knowledge and improve student understanding.

As the results of preliminary research with the chairman of Regional Leadership Aisyiah of Sidoarjo, the Chair of the Asiyah Branch of Teachers Association, and elementary school teachers, data obtained that 1) educators in the Sidoarjo area are still minimal in developing media, so schools still buy media products from outside, 2) The number of educators who have not used the media and have skills in making media products, 3) The instructional design used by educators is still monotonous, 4) There is no innovation in instructional design using the media. The lack of human resource development for the manufacture of media products, 5) The absence of a comprehensive application that can assist schools in obtaining media that is in accordance with the material presented.

The urgency of this <sup>3</sup> research is that the existence of learning technology innovations in the form of a web-based custom by user (Web-MPCU) media provider will encourage students to continue learning because media can provide real experiences and are able to help students improve their skills, that is kinesthetic, visual, audiovisual and cognitive abilities of students. The specific objective of this research is to create an instructional design integrated with the Web-MPCU to help schools and educators at the elementary school level obtain media that are in accordance with the learning needs in elementary schools so that learning can run effectively, innovatively, and fun.

## **METHODS**

### **1. Research design**

The research design used was Research and Development (R & R&D), which was product-oriented in education. The development model used was the instructional design development model (Arifin, M.B.U.B.; Nurdyansyah, 2018; Gall, 1983). The benefits of this Web-MPCU product were to make it easier for teachers to deliver



learning materials to students and to improve Material Understanding and Learning Effectiveness. This research produced a product in the form of software (software), while the product in question was a mobile-based Web-MPCU that was intended for teachers and elementary school students.

Instructional design refers to the instructional design model (Arifin, M.B.U.B.; Nurdyansyah, 2018). The instructional design development model consists of 3 stages, namely: (1) Pre-analysis; (2) Media and resource design; and (3) Instructional assessment evaluation. The stages of Web-MPCU development and instructional design are in Figure 1 and detailed explanations are in Table 1. Web-MPCU design is guided by the basic theory of pedagogy, supported by Web-MPCU functions, and takes time as a horizontal coordinate.

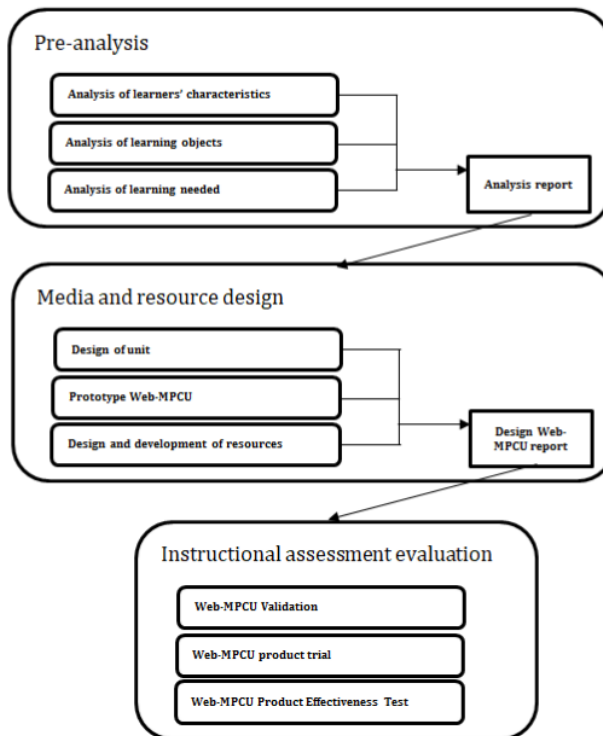


Figure 1. Stages of Web-MPCU development through instructional design



**Table 1.** Detailed stages of Web-MPCU through instructional design

Stages	Development Procedure
Pre-analysis	<p>This pre-analysis consists of three components:</p> <ol style="list-style-type: none"> <li>1. Analysis of student characteristics which include prior knowledge, learning styles, learning preferences, etc.</li> <li>2. Analysis of learning objects that define what should be taught about the taxonomy of knowledge</li> <li>3. 3. Analysis of the school environment in terms of knowing the characteristics of the environment.</li> </ol>
Media and resource design	<p>The design of media and resources can be divided into three: preparing Web-MPCU materials, designing Web-MPCU prototypes, and making media and resources available on Web-MPCU media. The Web-MPCU development design is carried out in the laboratory of the study workshop of the Faculty of Islamic Religion, Sidoarjo Muhammadiyah University.</p>
Instructional assessment evaluation	<p>These activities include media validation, evaluation of user satisfaction and evaluation of student learning competencies, each of which is measured through online tests.</p>

## 2. Instruments and data collection

The developer only used several data collection instruments as the data collection needs (Arifin, Moch. Bahak Udin By; Aunillah, 2021) . The instrument used in data collection in this development consisted of the Web-MPCU website validation sheets, user satisfaction questionnaires, and student learning competency tests. The Web-MPCU validation sheet consist of several assessed aspects: attractiveness, ease of tools, language, ordering system, product specifications, payment system, and delivery system. The result of product-moment correlation analysis was 0.004, while the result of Cronbach's Alpha analysis was 0.899. Therefore, the Web-MPCU website validation sheet was declared a valid and reliable instrument.

While the user satisfaction questionnaire consists of 10 questions related to attractiveness, ease of tools, language, ordering system, product specifications, payment system, and delivery system, which were distributed to users via a google form. The result of product-moment correlation analysis was 0.002, while the result





of Cronbach's Alpha analysis was 0.901. Therefore, the Web-MPCU website user satisfaction questionnaire was declared a valid and reliable instrument.

In addition, to review the effectiveness of the teaching aids provided by Web-MPCU on student learning competencies, a student learning competency test consisting of 7 questions was required. The result of product-moment correlation analysis was 0.003, while the result of Cronbach's Alpha analysis was 0.877. Therefore, the student learning competence test was declared a valid and reliable instrument.

### 3. Data analysis techniques

Data analysis on the student learning competency test used SPSS version 22.0 (IBM Corp. Released 2016) with a significance level of 0.05 to ensure that the pretest and posttest data showed the effectiveness of the use of Web-MPCU. Analysis of the data used in this study was a paired sample t-test with a p-value or sig. (2-tailed) value of <0.05, it could be concluded that  $H_0$  was rejected and  $H_a$  was accepted. In addition, each media used would be analyzed using multiple linear regression to measure the increase in students' understanding and learning effectiveness using media made according to the user.

## RESULTS AND DISCUSSION

### 1. Results of Web-MPCU product pre-analysis

The results of the pre-analysis of the Web-MPCU product consist of qualitative data taken from the results of observations, documentation, and filling out questionnaires from students. The results of the pre-analysis showed that at that time, teachers had limitations in developing learning innovations in making learning media so that learning become interesting. The limitations of this teacher innovation made learning competencies and students' understanding decline. So it was very important to provide media for teachers and students. Media could provide real experiences and help students to improve their kinesthetic, visual, audiovisual, and cognitive abilities (Mat *et al.*, 2020; Tyas & Safitri, 2017).



In this activity, interviews and observations were carried out with prospective users of the product, namely elementary school teachers in the Sidoarjo district. When users heard about the existence of a product, the consumer or user would form expectations about the product and service according to their perception. When consumers or users tried or used the product, they would make a comparison between their expectations and perceptions of the product (Kytö *et al.*, 2019; Schöniger, 2022). The expectations of consumers or users were formed based on messages received from product sellers/providers, friends, and other sources of information (Trimi & Berbegal-Mirabent, 2012) **entrepreneurs need to set up the boundaries of the business and define the product/service to offer. This is a very complex task, especially for new technology-based companies which usually require large investments and have a limited time span (avoiding product obsolescence. The** result of this stage was that making learning technology innovations in the form of Web-MPCU would encourage students to continue learning by providing opportunities for teachers to create Web-MPCUs that made it easier for teachers to make media according to the wishes and needs of the class.

## 2. Media design and Web-MPCU product resources

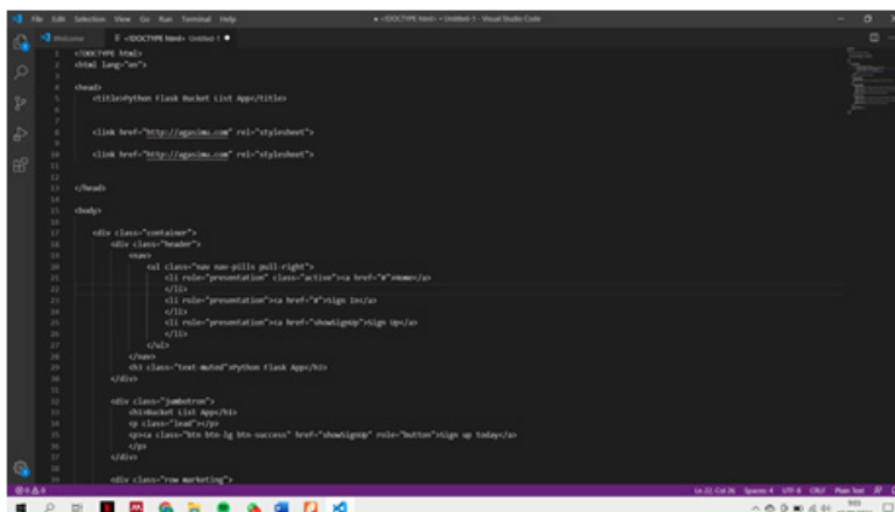
There was the result of the implementation of the Web-MPCU research. The collection of data and information was carried out to support the stage of increasing business and production capabilities. These increasing market development capabilities were used as references for product marketing planning. From the identification **results of the analysis of the ease of use of the** Web-MPCU products, there were three categories of design findings in the Web-MPCU resources; First, the word of mouth category, in this category users were satisfied with the product and felt that they had benefited from the product, and users felt the need to recommend the product to other institutions because it made it easier and helped educators. Second, exploratory category, this category user felt that Web-MPCU products were interesting and could help education. Third, the believability category, in this category users believed that the Web-MPCU product was useful for education and could be developed even better.

Furthermore, at the stage of making the Web-MPCU website using visual code studio with Python programming language which consist of 1) home tool, 2)





Media, 3) Institutional information, 4) Portfolio, 5) Registration and Login section, 6) Contact Person. The process of creating a Web-MPCU is depicted in Figure 2.



```
1 <doctype html>
2 <html lang="en">
3
4 <head>
5   <title>Python Flask Bucket List App</title>
6
7   <link href="http://agostino.com" rel="stylesheet">
8   <link href="http://agostino.com" rel="stylesheet">
9
10 </head>
11
12 <body>
13
14   <div class="container">
15     <div class="header">
16       <h1></h1>
17     </div>
18     <div class="row justify-content-between">
19       <div class="presentation" data-bbox="177 200 725 442">
20         </div>
21       <div class="presentation" data-bbox="177 200 725 442">
22         </div>
23       <div class="presentation" data-bbox="177 200 725 442">
24         </div>
25     </div>
26   </div>
27
28   <div class="text-center">
29     <div class="jumbotron">
30       <h2></h2>
31       <div class="row">
32         <div class="col">
33           </div>
34         <div class="col">
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100      <div class="col">
101        </div>
102    </div>
103  </div>
104
105 </body>
106 </html>
```

Figure 2. Web-MPCU creation process

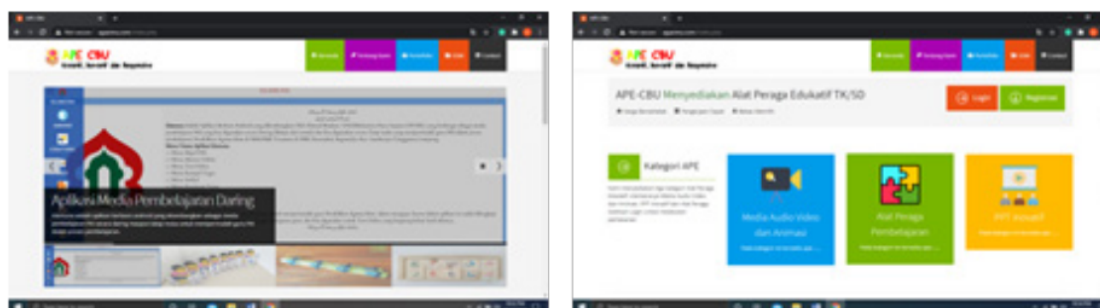


Figure 3. Web-MPCU usage on desktop

In Figure 3, this Web-MPCU already has various features and tools that make it easier for students to access this application, starting from the dashboard that has displayed 1) home tools, 2) Media, 3) Institutional Information, 4) Portfolios, 5)



Sections, registration and login, 6) Contact Person. While in Figure 4 is the result of making one of the products contained in the Web-MPCU.

Web-MPCU is a website-based education service provider that focuses on media. On the Web-MPCU, users can order educational needs, especially learning, according to the specifications specified by the user. Examples that users can order are interactive learning videos, textbooks, learning support media, and online learning media applications.

Web-MPCU carries a creative, innovative, and responsive tank line. The website of the Web-MPCU is [agasimu.com](http://agasimu.com) which is in the main menu see Figure 1. There is Home, About Us, Portfolio, Human Resources (HR), and Contact. On the main screen, the website displays several MEDIA that have been ordered by the user, as shown in Figure 4.



**Figure 4.** Product results from user orders via Web-MPCU

Web-MPCU consists of several features that can be used during remote learning. The features contained in the Web-MPCU are described in Table 2.

**Table 2.** Resources and features on WEB-MPCU

Resources		Activities
Home	Forum	Choice
About Us	Information	Chat
Portfolio	Assignment	Lesson
SDM	Profile	Database
Contact	Direct link	Chat

Before researchers carried out business capacity building, researchers conducted product trials to design experts, material experts, and content experts to ensure that the tools or tools on the product could be used and understood by potential users. The average value of the results of the feasibility of the Web-MPCU product in Table 3.

**Table 3.** Average value of Web-MPCU product feasibility results

No	Rated aspect	Media Expert	Material Expert	Content Expert	Mean	Criteria
1.	Attractiveness	3,5	3,7	3,8	3,6	Very Valid
2.	Ease of Tools	3,6	3,7	3,5	3,6	Very Valid
3.	Language	3,7	3,5	3,5	3,6	Very Valid
4.	Ordering System	3,5	3,4	3,5	3,5	Valid
5.	Product Specification	3,4	3,5	3,4	3,5	Valid
6.	Payment system	3,4	3,4	3,4	3,4	Valid
7.	Delivery System	3,5	3,3	3,3	3,3	Valid
<b>Total Aspect Mean Value</b>		3,6	3,5	3,5	3,6	Very Valid

Table 3 shows that the validation value of the WEB-MPCU is classified as very valid in terms of the validation results of media experts, material experts, and content experts. The highest score lies in the attractiveness aspect of content



experts, which is worth 3.8, which indicates that the WEB-MPCU media is very interesting to use in learning.

### 3. Instructional assessment evaluation Web-MPCU Products

To determine the effectiveness of product development, the product was tested on students, then calculated the increase in material understanding using the Web-MPCU, and tested the effectiveness of learning using the Web-MPCU through multiple linear regression as shown in Table 4.

**Table 4.** Multiple linear regression

IV	Media A			Media B			Media C		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
1	0.406	0.080	0.455	0.369	0.079	0.413	0.306	0.083	0.343
2	0.200	0.054	0.329	0.167	0.055	0.275	0.130	0.056	0.214
R2	0.360			0.401			0.433		
$\Delta F$	9.321			5.321			4.444		

Note: \* $p < 0.5$ . Independent variables (IV): 1 = understanding of the material, 2 = learning effectiveness

The results in Table 4 indicate that the three media customs by the user with statistically significant and moderate correlations with material understanding and learning effectiveness formed a statistically significant media C with a R2 value of 0.433. Therefore, this media C predicted 43.3% of the variance in material understanding and learning effectiveness as described by performance on the WEB-MPCU. Furthermore, this website was tested for the value of increasing students' understanding of the material and tested for learning effectiveness which is shown in Table 5.

**Table 5.** Results of pretest and posttest learning tests

Paired sample statistic					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	59,98	23	9,43	2,088
	Posttest	88,32	23	6,99	1,912

#### Paired Samples Correlations



		N	Correlation		Sig.				
Pair 1	Pretest posttest	23	0,876		0,000				
<b>Paired Differences Correlations</b>									
Mean	Std. Dev.	Std. Error Mean	Paired Differences			t	df	Sig. (2-tailed)	
			95% Confidence Interval of the Difference	Lower	Upper				
Pair 1	Pretest - Posttest	-28,34	7,111	1,691	-30,792	-13,741	-16,768	22	,000

Based on the mean value or average value in Table 5, it is known that there are differences between the learning outcomes of inclusive students' pretest and posttest, namely the pretest results show an average value of 59.98 and the posttest results show an average value of 88.32. Because of the p-value or sig. (2-tailed) is 0.00, which means (<0.05), it can be concluded that Ho is rejected and Ha is accepted. This means that WEB-MPCU has a significant effect on the average pretest and posttest scores.

#### 4. Discussion

The study's main results indicate that the Web-MPCU was very valid to be used in the education system that requires the development of learning media. Web-MPCU provided an important role in supporting the stage of increasing business and production capabilities, increasing market development capabilities which were used as a reference for product marketing planning. This was supported by relevant research which stated that the design of a mobile blended learning system had advantages, including providing orientation before online class activities, which could provide an initial opportunity for students to prepare themselves both physically and mentally to take part in learning activities (Suartama *et al.*, 2019).



1

The results of other studies indicate that diverse student learning resources in terms of multimedia content and multi-modal delivery channels meet student preferences. Caspi & Gorsky (Caspi & Gorsky, 2005) state that learning media should be used based on learning objectives and student needs so that careful planning is needed and should not use the same media but must-have multimedia properties. The learning resources provided are also easily accessible with mobile devices and can be retrieved whenever needed (learning enables instantaneous) to support individual learning and allow access to a wider range of learning materials via links to URLs/websites.

## CONCLUSION

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The results of the study indicated that needs analysis was the need for mobile-based media that could make learning technology innovations in the form of Web-MPCU, which would encourage students to continue learning by providing opportunities for teachers to create Web-MPCUs that made it easier for teachers to make media according to the wishes and needs of the class. The results of the effectiveness of the Web-MPCU were very valid, as evidenced by the results of the validation of experts and the results of the customer satisfaction questionnaire, which showed that the Web-MPCU helped in providing opportunities for teachers to create interesting media for students supported by significantly increased student learning competencies, which showed that the product of Web-MPCU was effective on student learning competence.





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