Usability and aesthetics of website design to measure Indonesian teacher competency 4.0

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Abstract. Website development that considers usability and aesthetics will have an impact on achieving the website development goals themselves. Ease of users in using the features provided and the appearance of beauty that will increase user comfort becomes an important factor that must be considered in the website development process. This research is an attempt to incorporate the concepts of usability and aesthetics in the development of the Teacher Competencies 4.0 website, which is a website aimed at Indonesian teachers in conducting self-assessment of their competencies whether they are in accordance with the competency needs of 4.0. This research used Neuroresearch and Website Development Life Cycle as the research methods. The results of the research are website designs that have taken into account the usability and aesthetics so that the website is expected to be able to be felt by the teacher and continue to continuously use the website to carry out continuous assessment.

Keywords: usability, aesthetic, Teacher Competencies 4.0, Neuroresearch

1. Introduction
Era 4.0 marked by the rapid advancement of technology has resulted in the increasing use of websites. Therefore, the development of a site in order to achieve its goals must consider the usability and aesthetics so as to make users interested easily in using the site. The usability is related to website functionality whereas aesthetics addresses the look and feel of the website [1]. In the Human Computer Interaction field, consideration of the use of interactive systems is the basis for evaluating system development [2].

Teacher Competencies Website 4.0 is a site that was developed starting in 2019 to see the teacher competency profile. Teachers as educators must have basic competencies namely pedagogical competencies, competencies, social competencies, and professional competencies [3]. The basic philosophy of developing the Teacher Competency 4.0 site is that teachers feel it is necessary to develop various competencies needed in Era 4.0 that have been able to transform various fields including...
education. Graduates produced must be able to compete so teachers should be willing to improve their competencies, so they will able to give their students all the competencies needed in era 4.0 [4], [5].

Teacher Competencies Website 4.0 is built with the aim that teachers can conduct self-assessments of the competencies needed in order to continue to carry out the necessary competency improvement program. To be able to achieve this goal, the website must make users interested and easy to use various existing tools. In the concept of usability, the cognitive elements "interesting" and "exciting," are the most important characteristics to consider [6]. The concept of use is related to user perception will facilitate the use of the website so that the website built does not require a great effort both physically and psychologically [7].

Teacher Competencies Website 4.0 must also consider the aesthetics of being able to increase user involvement in which proactive teachers can continue to improve themselves through increased competency competencies [7]. Websites that are included in aesthetics are the selection of fonts, colors, shapes, animations and also layout so as to provide user comfort while surfing the website [8], [9].

2. Methodology

The method used in the website development process is to combine the Neuroresearch and Website Development Life Cycle (WDLC) methods. The Neuroresearch method is carried out when developing teacher competencies 4.0 constructs so that it produces a valid and reliable instrument through 3 stages of research, namely exploratory, explanatory and confirmatory research [10], [11]. Exploratory is the development phase of the construct of teacher competencies to find instruments to be developed through the website. As seen in Figure 1, explanatory research is carried out when testing instruments through the website while confirmatory research is carried out through various analyzes of the results of filling in the website-based research instruments.

Whereas WDLC is a system development process that is carried out by a system analyst and then conveyed to the user. WDLC is an integral part of the process of developing and maintaining a website where website usability and aesthetics are highly considered [12].
Some of the steps carried out in WDLC are

- Website feasibility
- Website Analysis
- Website Design
- Website Implementation
- Website Testing
- Website Coding
- Website Maintenance

**Figure 2. Stages of Website Development Life Cycle [12]**

### 3. Results and discussions

Based on what is provided in Figure 2, several stages of WDLC carried out during the website development process have resulted in several details that include the website usability and aesthetic considerations as follows.

#### 3.1 Website feasibility

Website feasibility is the initial stage of website planning that is carried out to set the website creation goals and the technology that will be used. The Teacher Competencies 4.0 website is designed as an education website with the aim of helping teachers make a self-assessment of their competencies. While the technology used in building this website is PHP. PHP technology is widely used to build dynamic websites [13].

#### 3.2 Website analysis

Website analysis is conducted by collecting data needed in website development. These data include teacher demographic data needed when filling out an online questionnaire listed on the website. Examples of data needed and displayed in the teacher's profile that must be filled in on the website are provided in Table 1.

| Profile                          | Option                        |
|----------------------------------|-------------------------------|
| Full Name                        | Free text                     |
| Gender                           | Male/Female                   |
| Age                              | <20                           |
| Educational Background           | 21-30                         |
| Identification Number            | 31-40                         |
| Employment Status                | 41-50                         |
| School Level                     | >50                           |
| School Status                    | Permanent                     |
| School Name                      | Kindergarten                  |
| Province                         | Public School                 |
| Country Town                     | Free text                     |
| Teacher Type                     | There are 34 choices          |
|                                  | Free Text                     |
|                                  | Classroom teacher             |
|                                  | Subject teacher               |
3.3 Website design
After all stages of preparation and analysis of data are completed, it will enter into the preparation of website design. This website design becomes the main stage in fulfilling the website usability and aesthetics that must be planned carefully. The quality and function of the menu on the website must be well designed because it will affect the user's ability to understand the information presented on the website [14]. On the Teacher Competencies 4.0 website, menu placement is done horizontally at the top of the website with easy-to-understand word choices (see Figure 3).

- Home
  This menu contains an explanation of the purpose of the website and the prologue about the purpose of the importance of self-assessment of teacher competence. This menu is also equipped with attractive images that can enhance the aesthetics of the website.

- Information
  This menu contains an explanation of the intellectual property of the instrument displayed on the website. In addition, this menu also contains a profile of researchers and frequently asked questions.

- Article
  This menu contains various articles that support the teacher's knowledge about competencies, research that has been done and various other popular news in the field of education. With the article menu, it is expected that teacher engagement in using the website will increase because the need for knowledge can be met through this menu.

- Publication
  This menu contains papers that have been published by researchers relating to Teacher Competencies 4.0, both published through conference proceedings, scientific journals, books, and so on.

- Gallery
  This menu contains photo documentation carried out by researchers relating to various activities that support the development of instruments, websites, seminars, workshops or whatever is done by the research team. Gallery menu is displayed to add to the beauty of the website so that the website is not boring.

- About Us
  This menu contains an explanation of the definition of teacher competency, why teacher competence is important and also an explanation of the identity of researchers as well as numbers and emails that can be contacted so that users interact with the author or researchers involved in instrument development and website development.

![Figure 3. Color and Button Design on the Website Teacher Competencies 4.0](image-url)
To improve the quality of the user interface, website development refers to the Eight Golden Rules of Interface Design [15], [16], [17].

The first principle is the emphasis on consistency. The Teacher Competencies 4.0 website has used consistent terminology in both the prompt, menu, and various overall information on the website.

The second principle that is fulfilled is allowing users to use the shortcut menu so that it will be easier for users to access according to their needs. Teacher Competencies 4.0 website is designed with a menu at the top as a means for users to do shortcuts.

The third principle is the existence of menus that allow users to provide feedback. Feedback given by users will enable improvements that can increase the ease and satisfaction of users in surfing.

Better feedback is an interactive feedback that is part of the fourth principle of the need for design of dialogue on the website. The Teacher Competencies 4.0 website has provided a contact us feature to obtain feedback provided by users.

The fifth principle is that website design allows for simple user error handling. The Teacher Competencies 4.0 website can detect errors, for example, users who forget a password can independently reset a password connected to a user's email.

The ease of this feature at the same time implements the sixth and seventh principle that allows users to take corrective actions to support internal locus of control.

The Teacher Competencies 4.0 website seeks to reduce the burden of short-term memory as the eighth principle implementation. This is manifested through website design with a simple appearance and a very minimal window motion frequency so that memory capacity is maintained [15], [16], [17].

3.4. Website coding
Website coding is an advanced stage of website development. Coding is done using PHP so that the website creation process is easier with a number of simple functions that are developed.

3.5. Website testing, website implementation and website maintenance
The next stage after the website is realized is website testing, implementation and maintenance which will be carried out in the next phase. Testing will use the user experience and user interface. User experience is carried out to test the experience while using website features as well as the process while surfing the website. While the user interface is used to see the appearance of the website interface capable of connecting users with the system being built.

4. Conclusions
The findings in this study indicate that the teacher competencies 4.0 website was developed with efforts to meet usability and aesthetics that are expected to improve the process of user interaction so as to feel the ease and comfort in utilizing the website [18], [19]. The fact that this website is a necessary tool for teachers to carry out self-assessment on an ongoing basis has shown the importance of website design that is able to increase website user engagement so that the website development goals can be achieved.

As part of website education, the content that contains knowledge and stimulates cognitive development has become a unity in the usability and aesthetics of the website that is manifested in articles, photo documentation with attractive visual colors. This consideration is also based on the understanding that learning and the process of human memory are closely related to the attachment to the object displayed so that visualization becomes important [20], [21], [22].

The usefulness felt by the user and the aesthetic comfort will determine the intention of the user to continue to visit the website so that the usefulness of the website will increasingly be felt widely by teachers in Indonesia [23].

Acknowledgment
This work is supported by the Research and Technology Transfer Office, Bina Nusantara University as a part of the Multi-Year Grant Ministry of Research and Technology/BRIN 2020 entitled Teacher Competencies. We also want to say thanks to the Indonesian Directorate of Teachers and Educational
Manpower and National Board Teachers Association of the Republic of Indonesia for the participation in this research.

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