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**EFFECT OF BASE PROJECT LEARNING AND INTELLIGENCE  
LOGICAL-MATHEMATICAL COMPETENCE OF WEB DESIGN**

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*Abstract*

Development of information technology in the formal and nonformal education in the field of information technology has put web programming as a lesson that must be given to students in the field of computer science. This study aims to determine the effect of the project base learning approach to web designing competence, to determine the effect of logical-mathematical intelligence against the competence of designing web and to determine the effect of interaction between the project base learning with logical-mathematical intelligence to the competence of web designing. These samples included 41 people were divided into two treatment classes. Data was analyzed using Analysis of Variance (ANOVA) 2 way design with treatment by level 2x2. The results showed that: (1) there are significant project base learning approach to web designing competence; (2) there is the influence of logical-mathematical intelligence to web designing competence; (3) there is an interaction effect between the project base learning with logical-mathematical intelligence to the competence of web designing.

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**Keywords:** Project Base Learning, Logical-Mathematical Intelligence, Web Designing.

## **1. Introduction**

Development of information technology (IT) in the formal and non formal education in the field of computer or communications and information technology has put lessons web programming as a lesson that must be given to students in the field of computer science, information systems or informatics techniques. Reflecting on one of the development of information technology, the researchers found the facts that occurred on project-based learning strategies implemented in the web designing courses or Web Programming Internet Programming. Learners (lecturer) and educational institutions to students in the field of computer or informatics, which affects at the end of the competencies of students who are not expected and not in accordance with the purpose of learning web programming courses. In studying the material web programming, there are a few tools (tools used) to create or design a web. But of the many tools which can be considered a tool of manual or practical tools and automated, meaning that in designing a web student can use a technique programming language, engineering graphical user interface (GUI) of course there are advantages and disadvantages of each - each strategy project-based learning design. Actually it does not become a problem if they were to learn web programming is among the not expertise in the field of computers, but it becomes something that is not appropriate and not expected if derived from the field of computer or informatics.

The negative impact also happens to graduates who will take the advanced course of web programming, namely Advanced Web Programming (PHP & MySQL). PHP programming has a purpose to create a website that is dynamic and distributed into a database, of course, this programming requires the design of project-based learning strategies that are fundamental to support the design and in the insertion instructions - special instructions on designing a website. How the student is able to follow the course of the advanced web programming if they did not understand basic or HTML code that should have been applied in previous courses, namely web programming. In the reality in the lecture that happened, when the lecturer instructs to create a web framework, they are using project-based learning strategies that are practical web design and automatic (in this case using Dreamweaver or Joomla).

At the time lecturer questioned the reason they use project-based learning strategies and the practical design of the automatic, the students responded that they were already accustomed to implementing learning strategies based on the design project is on course web programming before. Furthermore, when professors ask students to change the design of their web framework that has been designed before, almost as a whole that no one can change one bit web framework they had designed with project-based learning strategies and the practical design of such automated. This is what makes the quality of graduates is very low within the competence of web designing, quality of graduates will be highly related to employment or web developers who will use the competence of graduates, however a company engaged in the field of web development (web developer), will require web programmer expertise to serve a variety of customer demand is very diverse.

Researchers have observed the competence of the students through the video footage on one high school in the field of computers, researchers also conducted interviews to students who have completed a course Web Programming in order to obtain information in support of this study, the researchers did this in order to give a clear picture and empirical evidence in the field. Based on the observations and the results of these interviews, researchers found the empirical data that a web programming course graduate student

in the class was not able to complete the design of a web framework that has researchers drawing on the blackboard (whiteboard). In addition, interviews that researchers do to students commented that by using a strategy based learning design projects that are practical and automated, they will be facilitated in designing web framework such as arranging the layout, logos, and makes them faster in developing web framework. They also say that using project-based learning strategies that are practical design and automatic, they do not know coding (program code) from web design, but this technique provides convenience and speed in the settings (setting) the design of a web.

They also often use the more practical uses that are already available database such as Joomla, Wordpress, Moodle, Blogger, and others. At the core competencies of web programming course, students are expected to be able to create or design a web that is static programming language. Previous students have completed the course of algorithms and programming, as well as the internet which are basic competencies that have been possessed by students in following the course web programming. Researchers argue, it can be said that the indicators of competence achieved if students in this course will be able to explain and implement components - components such as HTML tags, attributes, css, javascript, and other - other. Students can be said to be competent if it can design or create a web page programming language, and this will also affect the students who will follow the further course of web programming.

### **1.1. HTML**

HTML attributes are further components that must be understood by the students in designing a web, with the attributes they will complement the functions of the tags that were previously discussed become more alive. Examples such as `body bgcolor = "yellow"` to make the background color to yellow, `img src = "kelinci.gif"` to display images of rabbits, then `font face = arial` to change the shape of the letter into arial, and so forth. Cascading Style Sheet (CSS) and Javascript also complements the learning on the course web programming. Learn CSS aims to enhance the look of the web to be designed to be more attractive and beautiful to look at, while studying Javascript is intended that within a web page that will we design can provide an additional component, for example, make a confirmation on a web page, make a calculation logic or arithmetic in web pages, making causal conditions (if-then) in web pages, and so forth.

Based on advanced web programming course objectives (PHP & MySQL), students should be able to master code - HTML code or unfamiliar with project-based learning strategies programming language design. That is because students have to insert instructions - instructions or code HTML and PHP programming in web design process, especially when they designed the database functions with Structured Query Language (SQL). Examples such as data input, see the data, edit data, delete data, and search data in a database, which is built with engineering functions programming language. How the students are able to do so if they are familiar with the design of project-based learning strategies that are practical and automated without the understanding and mastering the basic programming language. This happens in fact in the process of learning on the course web programming, especially the design of project-based learning strategies are implemented, so that there gapatau significant difference between the competence of students on the course web programming with the competence of students at the advanced courses of the course web programming.

## **1.2. MySQL**

Often lecturers include researchers must repeat and practice re-design project-based learning strategies which they are understood and mastered. Whereas on web programming with PHP, besides studying the PHP programming language, students will study the function of conditioning causation (IF), the function loop (Loop), Array, Variable, Function. Students then will get to know and learn the software (software) database that is used as Xampp, and its application using MySQL.

On the matter of MySQL, students will create a database, tables, fields, and attributes contained in the database, for example office database, there is a table of employees, the employee table contained field personal identification number (nip), name, address, phone, email, etc. Attribute on the field earlier example, the number of characters in the field personal identification number (nip), name or address, then the data which serves to primary key data in the field should not be the same or duplicated, eg personal identification number (nip). The learning continues until the component or another function that can support the students competent in designing a website that is dynamic and can be distributed into a database.

## **2. Problem Statement**

The problems that occurred, understand and master code - HTML programming code alone is not enough in the competence of web designing. Students must also be able to analyze, using logic groove properly, evaluate and improve, and can solve the problem (problem solving) that occur in designing a website.

### **2.1. Implementation**

Franklin University for example also prepare graduates who are ready to manage the whole web development process, whether overseeing contractors, manage internal team, or collaborate in partnership with others. Based curriculum, they also apply the principle of programming in problem solving, program structure, algorithms, components - other components, and also to implement the code or basic programming language that can be used in programming, testing, and analyzing errors (bugs) that occurs in the process of making program.

### **2.2. Planning**

Planning project-based learning strategies implemented by Franklin University has been in the right direction, they do not just think about an attractive design but also teaches how to design it formed with the programming language code (programming language). It is also interesting to note, Franklin University is very concerned with graduates who will face the real world of work, so they aim to establish competencies for graduates of web designing very well.

## **3. Research Questions**

Research relating to technology is emerging (Blanchard et al., 2008; Kasuga et al., 2004; Kirschner, and Karpinski, 2010). Currently the technology continue to experience rapid growth, the phenomenon that we can not deny we even avoid. Technology has crept into various domains, both the realm of social, political, information, education, and so forth. But over time, the public is also continuously equip and

renew its technological knowledge by learning how to make some of these technologies. Web or commonly known by the name of the website, we can always share information, be it text information, images, videos, and so forth. Web or World Wide Web (WWW) is a service that is very widely used in the Internet, consists of a collection of electronic documents from all over the country.

### **3.1. Web Programming**

Based on the above, how a web programmer is able to serve the demand of customers who will order a web project if the programmer is not competent to design web, see the booking requests a web project is certainly very diverse. This is the problem that students or graduates who will be working in a web development company (web developer), it is not competent in designing a website because they do not understand and master the basic web programming.

### **3.2. Designing of Programme**

Both strategies project-based learning design programming language, graphical user interface (GUI) has advantages and disadvantages, but in learning, each technique should be placed in learning to be applied by the learner. Is not appropriate if the student is given a project-based learning strategies and practical designing web granted automatically without basic program code that is the basis of how the web was designing and form, but not the right also does not introduce media web design that automatically and efficiently. The third strategy design project based learning is important, and must have place and the right portion in the practice and delivery of learning material to be applied.

## **4. Purpose of the Study**

Especially if the web programmer techniques utilizing graphical user interface (GUI) which has limitations on the use of tools (tools) in designing the web. The third strategy of project-based learning web design that has researchers explained before it can design a website, but all three of these techniques have an effect or a different impact on student competence in designing the web, should graduate course web programming given strategy project-based learning design basic or as a programming language, as this will have a positive impact on cognitive aspects of students. In the design of project-based learning strategies programming language, students will be able to analyze, experiment, and create or design a good web, and it certainly will be able to serve any customers who want to order requests a web project in the world of work.

### **4.1. Support The Students**

The learning continues until the component or another function that can support the students competent in designing a web that is static and has not been distributed into a database, and of course in the hope of components and function - this function controlled very well by the students by implementing strategies project-based learning programming language design. In fact in the lecture, the students actually asked by the lecturer or institution that organizes the course web programming implement project-based learning strategies that are practical and automatic design such as Macromedia Dreamweaver, Drupal, Frontpage, and so on.

## **4.2. Coding**

In the advanced courses in web programming, namely Advanced Web Programming (PHP & MySQL), this course will be found the student after completing the course web programming before. PHP (PHP Hypertext Preprocessor) is a language or code of web programming that will enhance the web framework that we have designed into a web that is dynamic, and it certainly can be distributed into a database, examples of which will be generated by this programming is a hotel reservation, ticket reservation, online ordering, inventory items or inventory, employee data processing, the data lecturers, students, and others. The facts that occurred, the student is unable to follow the instructions given by the lecturers in the process of web designing, the students are familiar with strategies based learning design projects that are practical and automated like Dreamweaver and Joomla which makes the student does not need to master programming code web, while subjects continued PHP is associated with manual programming (coding).

## **5. Research Methods**

This study uses a quasi-experimental method with 2-way ANOVA design treatment by the level of 2x2. The research variables consisted of: (1) The dependent variable is the competence of designing web; (2) the independent variable is the variable treatment that project base learning approach consisting of A1: programming language (PL), A2: graphical user interface (GUI); and (3) the logical-mathematical intelligence.

### **5.1. Population and Samples**

The target population of this research is all the students of STMIK Indonesia Banjarmasin many as 160 people. The research sample is set on a course that follows the class web programming that consists of two classes through simple random sampling technique. The number of students in the experimental class (A1 = 22) and control group (A2 = 19). Bringing the total sample is 31 people.

### **5.2. Hypothesis**

Hypothesis testing is done by analysis of variance (ANOVA) of two roads. Further test performed using Scheffe test (Glass & Hopkins, 1984: 391-392). Before testing the hypothesis first tested analysis requirements consist of: (1) test for normality; (2) test of homogeneity (Kadir, 2015: 146-147, 160-162).

## **6. Findings**

The test results web project is the acquisition of learning outcomes competences web design students who use the strategy of project base learning design programming language, highest score of 96, the lowest score 58, the average score of 80.55, standard deviation 11:10, with a mode of 80, and the median 80. see the test results web project is the acquisition of learning outcomes competences web design students who use the strategy of project base learning the design of graphical user interface, the highest score of 88, the lowest score of 68, the average score of 76.42, standard deviation of 6:17, with a mode of 74 and a median of 76. Looking at the test results of a web project is the acquisition of learning outcomes competences web designing students who have logical-mathematical intelligence is high, the highest score of 96, the lowest score of 66, the average score of 79.13, standard deviation of 8.86, with 74 modes, and the median 78.

Viewing test results web project is the acquisition of learning outcomes competences web designing students who have logical-mathematical intelligence is low, the highest score of 88, the lowest score 58, the average score of 74.88, standard deviation of 7.60, with 74 mode, and median 75.

Based on the results of ANOVA calculation can be seen in the source of variance between A which indicates that the value of  $F = 4.24$  is greater than the  $F$  table = 3.16 (58: 2) at significance level  $\alpha = 0.05$ ; then the null hypothesis is rejected. These results apply to the variance as a whole of between A (A1 and A2), so there are differences in learning outcomes competency of designing web between groups of students who use the strategy of project base learning design programming language (A1) with a group of students who use the strategy of project base learning design of graphical user interface (A2).

The results of the above hypothesis test calculations have shown that the variance source AxB interaction, significantly there is interaction between the design of project-based learning strategies (A) and logical-mathematical intelligence (B), as evidenced by the value of  $F_o = 4.21$  is greater than the  $F$ table value = 3.16 (58: 2) at significance level  $\alpha = 0.05$ ; then  $H_0$  is rejected on the part of testing the effect of the interaction.

Based on the results of ANOVA calculation can be seen in the source of variance between A which indicates that the value of  $F = 4.24$  is greater than the  $F$  table = 3.16 (58: 2) at significance level  $\alpha = 0.05$ . It can be concluded that there is a difference between web designing competency learning outcomes in a group of students who use the strategy of learning design project base programming language (PL) with a group of students who use the project base learning strategies designing graphical user interface (GUI).

Programming language have an advantage for a person in designing a program. Researchers find relevant opinions to it, propose to understand the programming language, a programmer can be a solution to solve the problem. They said the programmer prepares the instructions that make up a program, runs the instructions on the computer to see whether they produce the correct result, makes any necessary corrections, and then writes a report on the program (Johnson and Capron 2004, 444).

The above explanation states that the programmer prepares the instruction of making a program, execute the instructions on the computer to see if they produce the correct results, it is necessary corrections in the making of the program, and then write a report on the program.

### **6.1. Result of the Intelligence Logical-Mathematical High**

The test results further by Scheffe test shows that the comparison of the results of learning competencies of designing web in the group of students who use the strategy of project-based learning design programming language (PL) and the graphical user interface (GUI) that has the intelligence logical-mathematical high indicates the value of  $F = 11.13 > F$  table = 2.81 (17: 5) at significance level  $\alpha = 0.05$ . Thus it can be concluded that there are differences in learning outcomes competences web designing in the group of students who use the strategy of project-based learning design programming language (PL) and intelligent logic-mathematical high with a group of students who use the strategy of project-based learning design of graphical user interface (GUI) and has a logical-mathematical intelligence is high.

### **6.2. Result of the Intelligence Logical-Mathematical Low**

The test results further by Scheffé test the comparison of the results of learning competencies of designing web in the group of students who use the strategy of project-based learning design programming language (PL) and the graphical user interface (GUI) that has the intelligence logical-mathematical lower demonstrate the value of  $F = 0,10 < F_{table} = 3.11 (12: 5)$  at significance level  $\alpha = 0.05$ . Thereby can concluded that there is no difference in learning outcomes competences web designing in the group of students who use the strategy of project-based learning design programming language (PL) and intelligent logic-mathematical low with a group of students who use the strategy of project-based learning design of graphical user interface (GUI) and have logical-mathematical intelligence is low.

## 7. Conclusion

The results showed that: (1) there are significant project base learning approach to web designing competence; (2) there is the influence of logical-mathematical intelligence to web designing competence; (3) there is an interaction effect between the project base learning with logical-mathematical intelligence to the competence of web designing.

Based on the results of the research, data analysis, hypothesis testing, and discussion of the results of research on a project base learning strategies influence the design of the web designing competence. can be given the following conclusion:

Results of the study group of students taught using the strategy design project base learning programming language (PL) higher compared with group learning results of students taught using learning strategies base project design graphical user interface (GUI).

### 7.1. Intelligent Logic-Mathematical High

Learning outcomes competences web designing in the group of students who use the strategy of project-based learning design programming language (PL) and intelligent logic-mathematical high is higher than the group of students who use the strategy of project-based learning design of graphical user interface (GUI) and has the intelligence logical-mathematical high.

### 7.2. Intelligent Logic-Mathematical Low

Learning outcomes competences web designing in the group of students who use the strategy of project-based learning design programming language (PL) and intelligent logic-mathematical low is lower than the group of students who use the strategy of project-based learning design of graphical user interface (GUI) and has the intelligence logical-mathematical low.

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