The Intelligent Model Collaborative Project Based Learning uses Moodle to Improve Face-to-Face Online in the Covid-19 Period

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Abstract. The traditional learning is not effective in developing children's learning capacity as a whole, according to the conclusions of the needs analysis. The purpose of this study is to develop a Moodle-based intelligent CPjBL strategy that incorporates the technology to increase the face-to-face online contact during the new normal of covid-19. the educators can use the online learning paradigm to help students apply learning in the real world more actively, creatively and inventively. Moodle application can be used as an e-learning platform to provide educational activities in presenting course descriptions, materials, online discussion forums, quizzes, assignment collection, virtual laboratories, and online tests on the intelligent CPjBL model. The available Moodle plugins can be used to create an online collaborative learning environment for working on projects. The findings show that the Intelligent CPjBL model can be applied to the Moodle platform which represents synchronous and asynchronous online learning interactions in Higher Education.

Keywords: Intelligence; CPjBL model; Moodle; online learning; Higher Education

1 Introduction

The growth of the Covid-19 pandemic is being attributed to the closing of colleges and institutions around the world in order to conduct face-to-face online learning with a new innovative blended approach to ensure student education rights [1]. The Ministry of Culture, Education, Research, and Technology urges universities and schools to be able to conduct online learning during the Covid-19 outbreak. According to the requirements analysis, identifying the phenomena of traditional learning is not successful enough in fully developing students' learning potential during the Covid-19 pandemic. This phenomenon necessitates problem solving, as well as the application of a Collaborative Project Based Learning (CPjBL) paradigm, which can lead to successful online learning practices.

Researchers started a series of research studies on higher education's experience during the pandemic Covid-19 by creating a Moodle-based CPjBL learning model that uses technology to better face-to-face online learning during the new normal Covid-19. The CPjBL online learning paradigm helps educators facilitate students' active and innovative engagement in the construction of project-based real knowledge. The development of online learning at

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universities has been significantly accelerated due to the spread of Covid-19. The solution is internet-based learning services, artificial intelligence, Moodle platforms, cloud-based platforms, and other supporting technologies that allow institutions to conduct face-to-face online interactions.

However, infrastructure is only part of the equation when it comes to teaching and learning. In the new normal, infrastructure is merely the first step toward a new paradigm in the teaching and learning process. This paradigm can reflect a change away from traditional teacher-centered learning activities toward more student-centered activities such as group activities, discussions, direct learning activities, and the utilization of traditional lectures to a lesser extent. In digital-centered learning, teaching and learning activities necessitate the acquisition of concepts, roles, and relationships between educators and students, as well as the provision of teaching materials [2]. Online learning is a synchronous and asynchronous learning experience that takes place on mobile devices and laptops with internet connectivity [3].

During the Covid-19 pandemic, educators and students carry out a Work from Home (WFH) learning and teaching process so that the virus does not spread [4], [5], especially among future generations of students. To combat the spread of the Covid-19 virus, the approach was changed from lockdown to widespread social distancing. The use of social distancing can protect students, lecturers, teachers, and staff from Covid-19 to ensure continuity of education [6]. The global Covid-19 pandemic is wreaking havoc on academic procedures and poses challenges for students. Asynchronous media, such as WhatsApp, Facebook, Instagram, or other social media, as well as synchronous media, such as Zoom, WebEx, Google Meetings, or Hangouts, can help in problem solving and potential development of students [7].

This article explains how the online learning uses Moodle platform at university by implementing CPjBL learning model that is integrated with the technology. The educator can use E-learning on the Moodle platform to assist the students in improving their knowledge and soft skill in improving their employability. Collaborative learning has been found to assist in developing students' soft skill. On the other hand, collaborative is not something that happen naturally in a group [8].

The researchers want to use the Moodle platform to conduct the research on the development of online learning based on Collaborative Project Based Learning (CPjBL) in order to improve online communication in conducting face-to-face meeting in the new normal period of Covid-19. When the physical and virtual worlds collide, Moodle is the e-learning platform that combine the learning material by transferring and grading students work automatically, as well as promoting the unsupervised online learning. Distance learning provides a pedagogical model that emphasizes interactive content, interactive communication, collaboration, feedback, and shared knowledge creation [9].

Online Learning and Information Technology

The evolution of information and communication technology has shifted the learning process from traditional to technological. ICT has a significant impact on higher education teaching, learning, and research [10]. During The Covid-19 epidemic and the current new normal, where the use of ICT can increase the quality of learning [11]. ICT offers the ability to promote and strengthen learning, as well as monitor and track students and learning courses, all of which contribute to increased student motivation.

Educational approaches are an important component of the learning process that should not be disregarded. This pedagogical practice is especially useful in creating conditions that still use traditional educational methods, especially during the current covid-19 pandemic [12], where teaching and learning styles must be changed from traditional strategies to using technology

[13], and students develop knowledge about the utility of technology. The use of technology in universities is part of the teaching and learning environment of educators to learners can use digital technology, and the way they teach and learn will change, leading to the development of new pedagogies for learning methodologies. Currently, new learning strategies blend the pedagogy of traditional learning by offering information outside the classroom through educational technology, and then students can assess the knowledge learned in the classroom [14].

E-learning is one of the ways used at universities to support the delivery of learning by providing a variety of educational services [15]. E-learning can assist constructivist learning by utilizing the learning process of digital technologies and electronic media in online teaching and learning outside of the traditional classroom [16]. Constructivist learning is a learning theory that explains how to gain knowledge, gives rise to a variety of learning methods and strategies, and includes an instructional framework for a deeper degree of comprehension [17]. This constructivist approach is a learner-centered strategy that allows students to independently explore knowledge, articulate ideas, engage group discussions, and enhance student comprehension.

At the educational level, e-learning practices are commonly utilized as a methodology to build new learning aspects in the online teaching and learning process, either alone or with supervision. Online learning can mix face-to-face online tutoring in the form of a hybrid of real and virtual learning that takes place across platforms that combine course content with communication and assessment methods [9]. The Moodle platform was coupled with the Collaborative Project Based Learning (CPjBL) learning Moodle in this study.

For example, in this study know the progress of increasing the integration of technology in various departments of academic disciplines during the last few decades [18], [19], [20], [21]. With the emergence of various learning environments using online learning media technologies and mobile learning [22], [23], [24], cooperative learning via the internet [25], and cloud-based learning [26] have all been introduced as a result of the introduction of powerful revolutionary technologies. With the application of technology in student learning, various scenarios, communication technology has a great impact on technical communication in service-learning projects in academics [27].

A comprehensive review of the literature on online learning services demonstrated the benefits of incorporating technology into service-learning initiatives to increase learner engagement [28]. Learning services can use modern communication tools (eg, e-mail, instant messaging, and skype) which were very effective for students in a recent study [29]. When using their online services, that online collaboration platform and file sharing system is very valuable and easy to use in the learning process [30]. The educators concentrate on providing student-related teaching after which students manage their own learning service agency [27]. The findings revealed that the quality of electronic learning services, such as e-learning and electronic learning materials, had a favorable impact on educators' and students' satisfaction with electronic learning [31].

Various study revealed that communication technology is currently being used and integrated in educational service-learning programs [32], [33]. Using technology in service-learning projects enables effective communication between service providers and recipients, such as via email, skype, and other online technical communication courses [32]. According to another study [28], students can improve their critical thinking skills and generate more distinctive ideas by participating in online academic communities. Adopting Moodle for online learning, according to previous research, can help educators provide smarter online learning services and activities.

Model of Collaborative Project-Based Learning (CPjBL)

In the teaching and learning technique, Project Based Learning (PjBL) is employed, which focuses on project realization and seeks to blend theory, practice, and cooperative work; stimulate critical and creative thinking; and encourage active learning [34]. The PjBL technique is one of the most effective strategies for work skill development [35], as it builds skills and improves cognitive traits needed for success in the twenty-first century [36].

The notion of Learning Progress is related to the PjBL method, as a tool to assess and analyze the success of the PjBL model approach [37]. Where the PjBL model has many advantages in project-based learning progress, where learning progress is achieved through a project-based learning paradigm. As the main teaching style, Project-Based Learning is used by students working on difficult projects.

Using the Think-Pair-Share collaborative learning technique, designed a prototype model of an online collaborative learning system in a virtual environment [38]. Traditional lectures, collaborative learning guided by CIF (instructional framework for collaborative learning), and MoCAS tools (collaborative learning tools) are all relevant aspects in the context of collaborative learning to help improve the learning process [39].

Identify broad talents and attitudes linked to digital competencies and 21st-century skills, such as cognitive abilities and attitudes, linguistic abilities and attitudes, collaborative abilities and attitudes, and creative problem-solving abilities and attitudes [40]. Increasing cooperation by combining the development of laboratory activities with the use of collaborative work that is integrated with Moodle [41]. It needs to be implemented in the CPjBL model in online learning using the Moodle platform. The CPjBL model on e-learning using Moodle plugin which assisted with Virtual Remote Labs (VRLs) can collaborate in doing the project together in practicum learning activities virtually [42].

In the context of education, assessment refers to the criterion for providing test takers or instructors with feedback on an individual's development. Individuals can profit from this knowledge in the future by learning about their own strengths and limitations, and educators can use it to tailor teaching methods to meet the requirements of particular students. Intelligent teaching systems (ITS) are a computer-based platform that provides students with interactive exercises and step-by-step instructions to enhance traditional schooling [43]. Based on the ICAP concept that learning is most successful when done interactively [44]. ITS was founded with the objective of promoting learning through interactive exercises, which are often utilized in teaching Mathematics and Computer Science.

2 Research Methods

The creation of Collaborative Project Based Learning (CPjBL) learning models using Moodle has resulted in syntax and learning products, as well as supporting models to assist students in overcoming challenges in higher education courses. To aid learning utilizing the CPjBL idea, an e-learning system based on Moodle was constructed. The construction of the CPjBL model using Moodle has created the capacity to accept information technology in the context of online learning, particularly the ability to adopt e-learning using Moodle to aid the learning process in higher education.

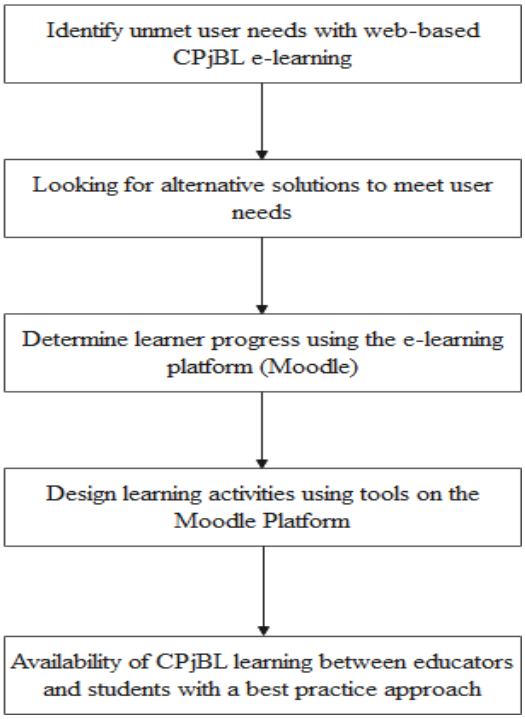

Fig.1. CPjBL's E-learning Development Model

The structure of the learning model generated reflects all steps of the approach for producing an e-learning model utilizing the Moodle platform for learning courses in universities.

3 Results and Discussion

The CPjBL E-learning Platform Concep

This study provided a method to assist students in using the e-learning platform and disseminating their courses according to the objectives of the Project-Based Collaborative Learning framework [43]. The Collaborative Project Built Learning (CPjBL) meta model was based on CPjBL empirical research principles and theories (theoretical and practical studies). The George's elements selected from the current literature on CPjBL was used to characterize the Project-Based Collaborative Learning in this study [44]. The UML class diagram in Figure 2 illustrates the construction approach for this CPjBL meta model in detail.

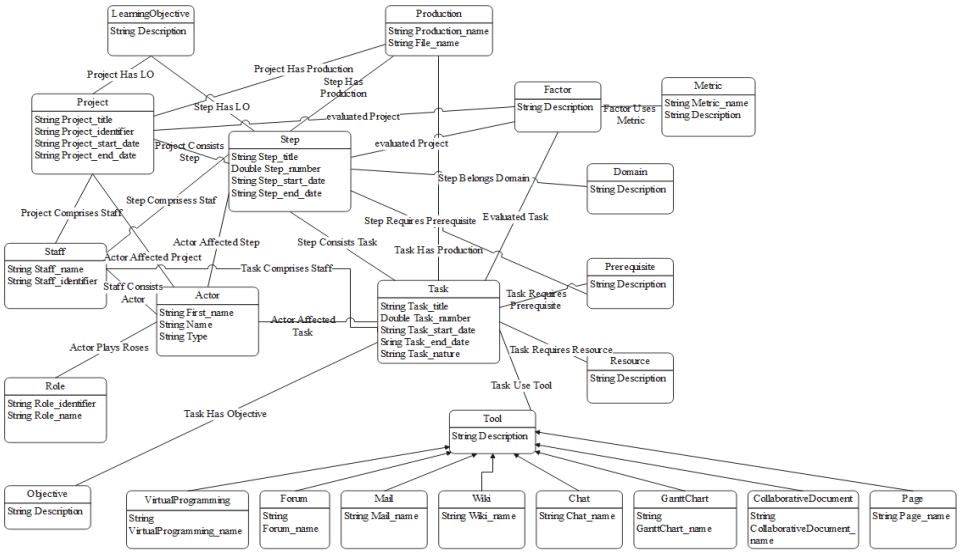

Fig.2. CPjBL Meta-Model (Adoption Revision [44])

The model transformation was performed on the abstract syntax and semantics of the source and target, using mapping rules between meta-model classes, descriptor attribute handling rules, and class connections. The source CPjBL meta-model is shown in Figure 2, while the Moodle target platform meta-model is shown in Figure 3.

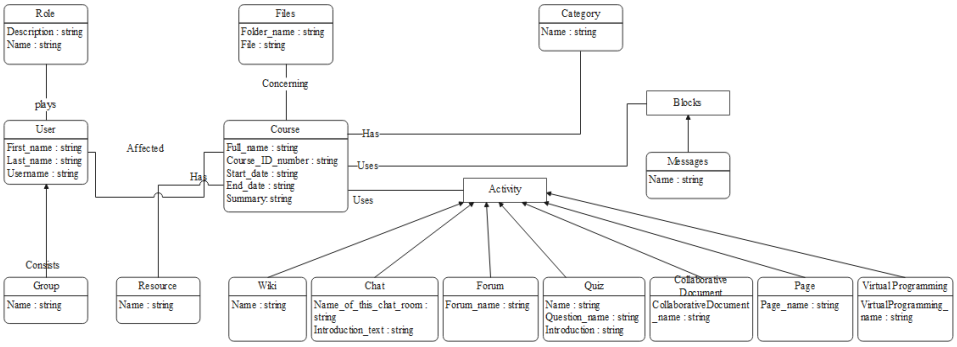

Fig. 3. Moodle Activity Meta-Model (Adoption Revision [44])

In terms of semantic distance, the two meta-models that defined the concepts and relationships of each domain can be close but also very far away [44]. From the CPjBL meta-model to the Moodle meta-model, twelve transformation rules were described. The initial goal of this transformation rule was to implement CPjBL scenarios in a world based on Moodle platform technology. The second step was to qualify the semantic loss of each rule application compared to CPjBL.

5.2 Implementation of the System

The consequence of the implementation of the CPjBL Meta-model scenario loaded in E-learning utilizing the Moodle platform. After logging into the Moodle-based CPjBL E-learning application, Figure 4 shows the main page from the lecturer's perspective

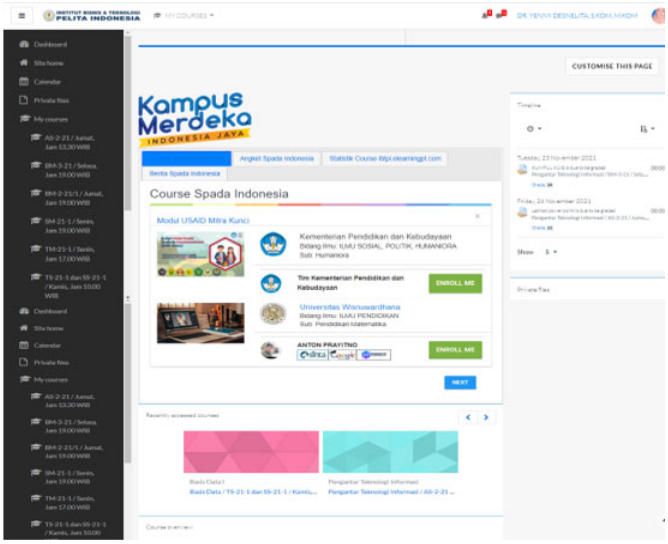

Fig.4. After Login Display

Faculty and students uses Moodle to create and embed resources as well as deliver instructional activities including forums, quizzes, workshops, and assignments. Figure 5 depicts the activities that instructors deliver to kids with the appropriate characteristics.

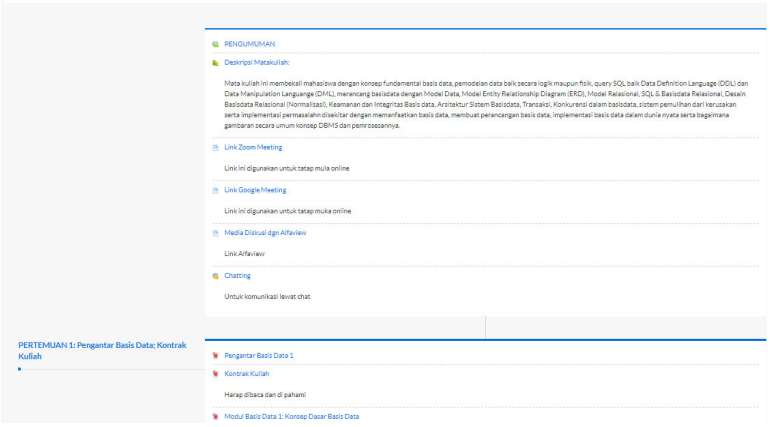

Fig.5. CPjBL E-learning Activity Display

Figure 6 shows a Moodle feature that is utilized to provide engaging and successful online learning through well-structured learning scenarios, substantial logging data on student interactions, evaluation techniques, rubrics, and learning activity integration tools.

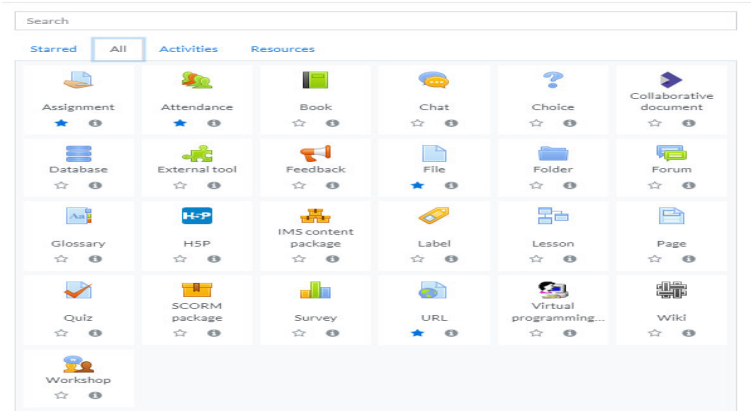

Fig.6. Moodle tool for CPjBL E-learning Activities

Moodle learning activities are depicted in Figure 6 Moodle can assist educators and students in interacting and building knowledge together during online learning sessions. To have a speedier and more efficient contact with one other, students seeked information and conducted investigations while assessing their discoveries using synchronous and asynchronous activities. Moodle could provide the activity tools necessary to arrange online sessions and track student involvement and online learning behavior.

4 Conclusion

The invention and deployment of CPjBL scenarios that may be distributed via the Moodle platform allowed the face-to-face learning process between educators and students to rise online in the new normal time of the Covid-19. Educators and students in the CPjBL domain can characterize the scenario using the suggested meta-model, which can be implemented on the Moodle platform, and the accompanying transformation rules. The activities utilized in Moodle E-learning created a number of plugins that educators and students can use to further their education. Teachers were provided with a graphical interface to assist them in conducting online learning activities with their students. A smart CPjBL model employed Moodle to improve face-to-face online during the new normal era of Covid-19 on assisting learning in higher education was found.

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