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Digital creativity-based professional learning communities' model to encourage differentiated learning design skills in elementary school teacher

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Abstract: The professional practice of Learning Communities (PLC) demonstrates ineffectiveness when collaborative work hinders innovation in understanding individual student needs. This study aims to describe design of digital creativity-based PLC models for teachers to support the skills of developing differentiated learning in elementary school. The research used the Borg & Gall development design. The research subjects consisted of 180 elementary school teachers who had at least five years of teaching experience. The research data were obtained through questionnaires and documentation. Research data analysis was carried out with an interactive model. The results show that the findings of the needs analysis show that teachers need software to implement PLC. Products in the form of PLCs can be accessed via the website. Prototype of application PLC model based on digital creativity has four main menus consisting of the "KKG Team", "Training", "Work Space", and "News" menus. The digital creativity-based PLC model was developed by producing an output in the form of an application that can be accessed via the website. The prototype model has not been validated by experts, so further studies are expected to be able to test the validity of the model and conduct field trials.

Keywords: *Differentiated learning, Digital creativity, Elementary school, Professional learning communities.*

1. Introduction

Professional learning communities (PLCs) have been cited as one pathway to achieving effective teacher professional development. PLCs utilize an ongoing process in which educators work collaboratively in iterative cycles of collective inquiry and action research to achieve better outcomes for the students they serve [1][2]. This is a practice that can encourage teacher collaboration which increases student achievement [3-6]. Therefore, the strategic role of PLCs leads to the skills and knowledge of educators through collaborative study and professional dialogue, and increases aspirations and achievements through improving the quality of learning [7-9]. However, in its implementation, PLC allows teachers to fall into collaborative work which hinders innovation. This can happen if PLCs focus too much on general assessment and general understanding of what students are learning, resulting in them all being the same. Students get the same learning plan in each class [10]. In fact, every student is born with a completely different learning style [11][12]. Therefore, teachers need to understand the characteristics of students in elementary schools to meet their learning needs.

Learning strategies that relate to the diverse needs of students are known as differentiated learning. This learning strategy recommended in the current Curriculum in Indonesia is differentiated learning, namely learning that is adapted to the needs and abilities of individual students [13][14]. Differentiated learning in the context of implementing the Independent Curriculum in elementary schools, conceptually by referring to relevant sources, is strongly suspected

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to be able to provide significant benefits in improving learning outcomes and students' learning motivation [15-17]. However, to obtain optimal differentiated learning results, implementing differentiated learning requires careful preparation and adjustments from school principals and teachers, including understanding the characteristics of students, the use of technology, as well as learning planning that focuses on the expected results [18].

The results of the initial study of this research show that the weak skills of teachers in designing differentiated learning in its implementation are due to weak creativity. Creative thinking skills as a mental phenomenon resulting from the application of ordinary cognitive processes such as working memory, and the ability to categorize and manipulate objects [19][20]. Creative thinking is not a fixed, innate trait and can be developed through appropriate teaching [21][22]. Teacher creativity in designing differentiated learning in current conditions requires creativity in organizing digital devices [23-26]. Therefore, it is possible to increase teachers' digital creativity in a sustainable manner through PLC platforms [27-31].

Based on the existing problems in the implementation of PLC, it indicates that the needs of teachers in implementing effective PLC based on creativity have not been met so it needs to be designed immediately. This study aims to analyze the needs of teachers for digital creativity-based PLC models and produce a digital creativity-based PLC model design for teachers to support the skills of developing differentiated learning. The resulting design is a prototype PLC model based on digital creativity which can be a framework for implementing PLC by elementary school teachers.

2. Literature Review

Professional Learning Communities (PLC) in elementary schools is a collaborative approach where teachers regularly gather to share experiences, strategies, and data on student learning outcomes. Teachers do not work alone but help each other to improve the quality of teaching [32][33]. The main focus of PLCs in Elementary Schools is on improving student learning through professional development of teachers through analysis of student learning outcome data, identifying areas for improvement, and designing more effective teaching strategies. Teachers can provide constructive feedback to each other and collaborate to create innovative solutions to overcome student learning challenges [34][35]. In addition, PLCs also play an important role in creating a more open school culture based on collective learning that supports the continuous development of teacher professionalism [9][34][36]. This collaboration is very important to ensure that each student gets the optimal learning experience through reflection, discussion, and ongoing collaboration.

In relation to the current curriculum that emphasizes differentiated learning in elementary schools, teachers' digital creativity is essential in implementing differentiated learning. Differentiated learning is a learning approach with the design of methods, materials, and evaluations based on the needs, interests, and abilities of each student [37-40]. Through digital creativity, teachers can use various technology tools and platforms to provide more varied and interactive materials, so as to meet the diverse learning needs of students [41][42]. For example, teachers can create video content, interactive presentations, or educational games that vary according to students' learning styles, be it visual, auditory, or kinesthetic. In addition, digital creativity also allows teachers to manage more flexible and dynamic formative assessments [43][44]. For example, teachers can utilize e-learning applications for assignment methods that can be adjusted to students' ability levels, as well as provide personal and constructive feedback so that each student's progress can be tracked and teachers can better adjust the next learning plan.

PLC can facilitate teachers' digital creativity, especially in today's digital learning era. Teachers can share and discuss the use of technology in teaching, as well as explore various digital tools that support classroom learning [45][46]. Through collaborative discussions in PLC, teachers can learn new digital applications or devices, such as e-learning platforms, interactive presentation applications, and applications for managing student assignments. PLC also functions as a space to test and evaluate

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digital innovations adopted in the learning process [47]. Teachers can provide feedback to each other regarding the successes or challenges in using digital technology in the classroom, allowing for continuous improvement and adjustment [27][48]. Thus, the context of digital creativity in PLC can help teachers integrate technology in more creative ways, utilize social media for learning, create interactive learning videos, or use simulation applications to facilitate collaborative learning so that they can provide a more engaging learning experience for students.

2. Methodology

This study uses the Research and Development model design using the Borg & Gall (1983) development model [49]. This development model uses a waterfall path at the development stage. The Borg and Gall development model has relatively long sets because there are ten implementation steps: research and information collecting, planning, develop preliminary form of product, preliminary field testing, main product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. This research is the first of a multi-year study that carries out the stages of research and information collecting, planning, developing preliminary form of product. The resulting initial product was built based on the needs of the teachers in designing differentiated learning.

Participants for this research were obtained purposively from five sub-districts in one city in Indonesia. Participant characteristics are teachers who have at least five years of teaching experience. This consideration was chosen to ensure researchers' access to reveal information on the needs of elementary school teachers. The data in this research is a description of teachers' needs for a PLC model that is effective in encouraging creative skills in developing differentiated learning. Therefore, the data collection technique for this research uses a questionnaire technique. The questionnaire was designed online with the help of Google Form. The questionnaire grid was developed to accommodate indicators: 1) teacher responses to the PLC model that has been implemented so far; 2) specifications of the PLC model required by teachers; 3) PLC model content needed by teachers to stimulate creative power in designing differentiated learning in elementary schools.

The data of this research were analyzed qualitatively. The analytical model used is an interactive model, consisting of data condensation, data presentation, and drawing conclusions [50]. Data condensation refers to the process of selecting, focusing, simplifying, abstracting, and transforming data. Presentation of data is an arrangement, a collection of information that has been pursed so that conclusions can be drawn. If the condensation stage and data presentation have been carried out, then the last step taken is to draw conclusions. Drawing conclusions is a process when researchers interpret teacher needs analysis data on the PLC model based on digital creativity.

3. Results Discussion

Analysis of the problem of the needs of elementary school teachers regarding professional learning communities (PLC) to encourage the creativity of elementary teachers in designing differentiated learning. The results of research on the problem analysis of Teacher Working Group activities have so far found that PLCs have not resumed work since the co-19 pandemic; time management and implementation of PLC motivation and discipline; communication in uniform learning; and incomplete material.

The results of a needs analysis study were carried out to find out what the teachers need in implementing the KKG to encourage creativity in designing differentiated learning in elementary schools. The needs analysis study presented on the scale of teacher needs obtained through a questionnaire on 180 teachers in Surakarta City showed that the model most needed by teachers is application, compared to methods, modules, and materials. Based on the results of the product needs analysis, the specifications of the application developed require the fulfillment of complete training and learning aspects; facilitating collaboration space; providing group discussion space; space to accommodate and manage works; and the latest education news space. Therefore, an initial product was

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developed in the form of a web-based application with the name of the "Guru Prof" application. This application is a prototype that is compiled based on the results of the teacher needs analysis of the PLC model design based on creativity in designing differentiated learning in elementary schools which is developed based on the results of the teacher needs analysis.

The prototype of the digital creativity-based professional learning community model has initial entry page. Users (teachers and headmaster) can create account as can be seen in Figure 1.

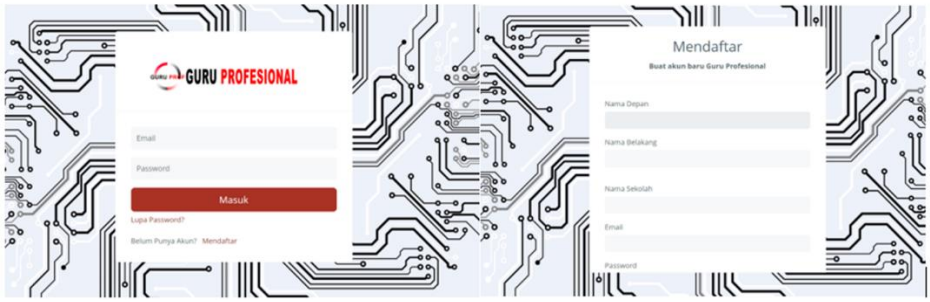

Figure 1.
Home application of PLC model based on digital creativity.

The prototype menu presentation was developed based on the specifications obtained at the needs analysis stage of the model that supports teachers' digital creativity in designing differentiated learning. An illustration of the menu list on the prototype PLC model based on digital creativity can be seen in Figure 2.

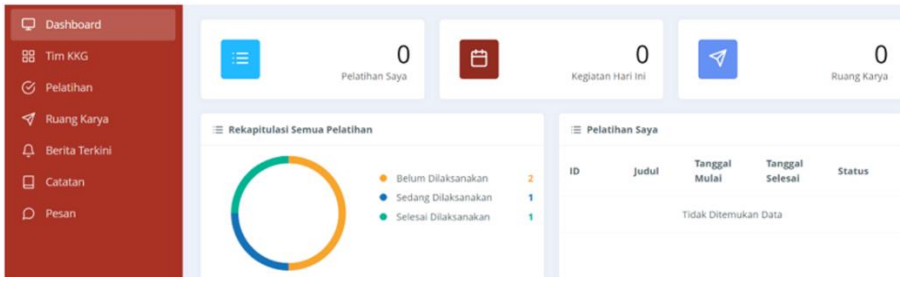

Figure 2.
Home application PLC model based on digital creativity.

Figure 2 shows an application that is a form of the Application PLC Model based on Digital Creativity prototype. There are four main menus consisting of the "KKG Team", "Training", "Work Space", and "News" menus. These four menus are considered to be in accordance with the needs of teachers in developing digital creativity. The digital creativity-based PLC model was developed by producing an output in the form of an application that can be accessed via the website. Users are elementary school teachers who agree on collaborative work to increase competence in designing differentiated learning (Osmond-Johnson & Fuhrmann, 2022).

4. Discussion

Prototype of application PLC model based on digital creativity has four main menus consisting of the "KKG Team", "Training", "Work Space", and "News" menus. Menu "KKG Team" is a group identity menu. This menu contains the identities of the names of teachers from one school or from different schools from different sub-districts, even different districts. The purpose of this menu is to make it easier for teachers to find out who is a friend of a particular training group. Thus, collaboration can run optimally.

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Menu "Training" was created with a background in creativity that often emerges through collaboration. This space allows teachers to discuss ideas, provide input, and create innovative learning materials together. This menu includes complete training tools, collaboration and discussion spaces. Complete training tools provide a variety of resources, including input instruments in the form of curriculum and government regulations. All teachers can access various digital materials and applications to create more varied and interesting learning. Training tools train teachers to adjust materials according to the needs and ability levels of students, supporting the concept of differentiated learning such as teachers can design learning with video support and interactive modules for various levels of difficulty and learning styles of students with visual tendencies. Teacher collaboration helps teachers to make maximum use of digital technology, such as integrating learning applications, creating interactive evaluations, or creating technology-based projects for students with various needs.

Menu "Work Space" as a social system facility for teachers that collectively reviews lesson plans or assessments that have been used in class, and then provides important feedback and recommendations for improvement. This menu helps teachers in the skills of designing and organizing digital learning more efficiently. Through the ability to save and modify lesson plans and evaluation tools, teachers can be more flexible in designing various activities that meet the individual needs of students easily because in this menu there are many references to work devices uploaded by other teachers.

The "News" menu refers to the latest education news. Creativity comes not only from internal ideas, but also from understanding the latest trends and innovations in education. Through this newsroom, teachers can stay up to date with educational technology, new policies, and learning innovations, which they can integrate into their teaching. This knowledge helps teachers to continuously update their teaching methods, making learning more relevant and effective. This menu also includes news of the latest research results. Access assistance to support teacher activities in analyzing previous research with the help of technology is one way to stimulate critical and creative thinking for teachers which has an impact on their competence [51-55].

5. Conclusion

The research findings lead to the conclusion that the results of the needs analysis show that teachers need software to implement PLC. Products in the form of PLCs can be accessed via the website. A prototype of the Digital Creativity-based Professional Learning Communities model to improve differentiation design skills in elementary school teachers has been produced. The prototype includes a complete learning device; collaboration space; group discussion room; creation room; Literacy and numeracy room; education latest newsroom. PLC Application Prototype Model based on Digital Creativity as an alternative learning model that can be applied to PLC implementation. Apart from that, the results of the development of the Application PLC Model based on Digital Creativity require the readiness of the cluster head regarding facilities and infrastructure, material readiness, and better time organization. This study used a sample of 200 elementary school teachers. However, in reality as many as 20 samples did not fill in due to illness, so future research should be able to use another scheme so that all participants have an impact.

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