THE EFFECTIVENESS OF THE IMPLEMENTATION OF THE GOLD STANDARD PROJECT BASED LEARNING MODEL TO increase the DIGITAL LITERACY INDEX OF TEACHERS

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Abstract. One way to improve the quality of learning today is the use of various types of digital media in learning properly and correctly, which is known as school digitization. To support this program, it is necessary to carry out various activities for teachers to be able to improve their index and digital literacy skills. This study aims to find out how the index level and digital literacy skills of teachers after being given training and assistance with the Gold Standard Project Based Learning (GS-PjBL) model. The study was conducted on 20 teachers who participated in online and offline education and training activities. The research data was taken using two google form-based questionnaires, namely (i) a digital literacy index questionnaire, (ii) a digital literacy skills questionnaire given before and after training and mentoring activities. Based on the results of the analysis, there was an increase in the percentage of the digital literacy index before and after the activity which was marked by the Gain value. Based on the results of the analysis, the increase in the digital literacy index is in the medium and low categories. Therefore, the impact is seen that there is an increase in the index and literacy skills of the teacher group in Makassar City after participating in training and mentoring activities with the GS-PjBL model.

Keywords**:** Digital Literacy Index; Digital Literacy Skills; GS-PjBL

I. INTRODUCTION

One important factor that supports the success of digital learning which is currently widely applied by all educational institutions is the level of digital literacy of teachers and students. Digital literacy is something that is needed in today's information age so that people can improve their abilities in the era of massive digital media use and can make maximum use of ICT. Digital literacy is closely related to life skills that have many benefits from all aspects. In the world of education, digital technology will facilitate the work of teachers and students. With good digital literacy skills, everyone will find it easy to use ICT, find, evaluate, utilize, create and communicate information with cognitive and technical skills.

Teachers are required not only to be able to transfer knowledge to students, but the various skills that students must possess in the 21st century are also the responsibility of the teacher. The role of the teacher changes to that of a facilitator (Li, 2018; Li & Chen, 2018). As facilitators, teachers are required to understand the techniques and characteristics of facilitating each student so that they are more active and able to work individually. Teachers must understand and know learning that prepares students for the challenges of the 21st century (Trisdiono et al., 2019), namely: (1) Teachers create interesting, relevant, and meaningful learning content for students' lives; (2) Teachers and students build learning competencies that combine critical thinking skills, problem solving, and information and communication technology (ICT) literacy; (3) The teacher facilitates learning by encouraging all students to be able to

find ways to learn, innovate, collaborate, and convey ideas; (4) health, financial literacy, awareness as a citizen, global community, and environmental awareness are among the learning materials; (7) linking the relevance of learning to society; (8) The teacher conducts learning reflection, assessment, and provides feedback to students; (9) Teachers encourage students to learn for life.

So far, research has only focused on improving students' abilities and skills compared to teachers. In fact, to achieve these 21st century skills, teachers must master and understand various competencies and then teach them to students. To be able to adapt and face challenges, teachers' mastery of information and communication technology is very much needed. Various studies show that the low digital literacy of teachers both in developing and using digital content in learning makes learning less interesting, monotonous, and boring so that it has an impact on students' mastery of material (Swandi, 2021). Likewise with students, even though teachers have presented the latest and tested ICT-based learning innovations, if they cannot use them well in online independent learning, the media will not be maximally useful.

The Learning From Home (BDR) Program which is currently being implemented by various educational institutions since the Covid-19 pandemic has attacked various countries in the world is greatly influenced by the ability of teachers to use information and communication technology. To provide quality online-based learning, teachers are expected to be able to develop and use various types of digital-based learning media. Therefore, teachers are required to improve digital skills and competencies, use the latest digital technologies in learning and change the format of learning and assessment using digital applications.

Various previous studies have shown that the quality of on-site learning (face to face in class) is more favored by students compared to online learning. Student learning outcomes during the Learning From Home Program applied were less satisfactory than the direct learning system in the classroom (Dhawan, 2020; Rahmatiah et al., 2021). The low quality of online learning is influenced by various factors such as (i) there are still many teachers who have not been able to adapt to the online learning system, the survey results show that many teachers do not teach online because they are unable to use various online learning applications (Pagarra et al., 2020), (2) the use of asynchronous learning media such as whatshaap groups which are widely used by teachers is less effective, according to students there are still many teachers who only send modules/textbooks and also tasks that students must do without virtual face-to-face meetings between teachers and students, (3) the lack of creativity and innovation of teachers in using various digital applications in learning makes online learning boring for students (Maqableh & Alia, 2021; Yuliana, 2021).

Various previous studies have shown that the digital literacy index and the ability of teachers in Indonesia to use ICT in learning are still very low. Research conducted by Liza shows that the digital literacy of prospective English teachers is still very low and they are not ready to use various learning applications and technologies in the classroom (Liza & Andriyanti, 2020). This is reinforced by other research which states that many teachers in several Asian countries, including Indonesia, still have a low digital literacy scale. Several studies claim that most professors only use digital technology connected to technical matters (eg operating computers, projectors, speakers, cameras, recorders, etc.) (Dashtestani, 2014; Fitriah, 2018). They have not been able to develop learning applications that are interesting and in accordance with the characteristics of their students. This is due to the lack of knowledge and skills they have (Muslem et al., 2018). Most research currently being conducted focuses only on increasing student literacy to improve outcomes their learning, but not many realize that learning outcomes are also influenced by the quality of teachers through increasing their digital literacy by providing various kinds of activities that are directed at being active in working on digital learning products/applications so that throughout the process teachers gain a lot of knowledge, skills and produce certain products that beneficial for them and students.

Therefore, various training and mentoring for teachers need to be carried out to increase the digital literacy index, creativity and innovation in developing and using various digital-based interactive learning applications. One form of activity is the application of the Gold Standard Project Based Learning (GS-PjBL) model. GS-PjBL is one of the training models for teachers that can be carried out to encourage teachers to produce media-based learning products. The Gold Standard Project Based Learning model consists of 7 steps, namely (1) Challenges Problems or Questions, (2) Continuous Studies, (3) Authenticity Testing, (4) Participant Roles, (5) Reflection, (6) Criticism and Revision, (7) Product Publication. With this model, various soft skills can be improved and are also product-based. GS-PjBL has been widely applied by teachers in learning to encourage students to solve problems and also produce a product as a result of learning (Candra et al., 2019; Swandi, Rahmadhanningsih, Putri, et al., 2021). Therefore, the formulation of the problem in this study is how to increase digital teacher literacy indexes and skills after receiving training and mentoring using the Gold Standard Project Based Learning learning model?

II. METHOD

The type of research used is pre-experimental research with a research design using One Shoot Case Design. The research was conducted online at the University of Bosowa where there were 20 teachers and teaching staff from several educational institutions in the city of Makassar as a sample. The following research design is used (Palloan et al., 2021; Sumarni & Kadarwati, 2020).

TABLE I
RESEARCH DESIGN

| X O | X : | Implementation of the Gold Standard Project Based Learning in training and learning activities for teachers |
| | O : | Results (Digital Literacy Index) |

In this design there is 1 group of teachers as a sample taken from the teacher population in the city of Makassar. Learning is carried out for 6 meetings directly involving instructors and participants, then followed by independent activities by groups of teachers according to subject areas. The application of learning activities follows the stages with the Gold Standard Project Based Learning (GS-PjBL) model. The following are the stages of the GS-PjBL model.
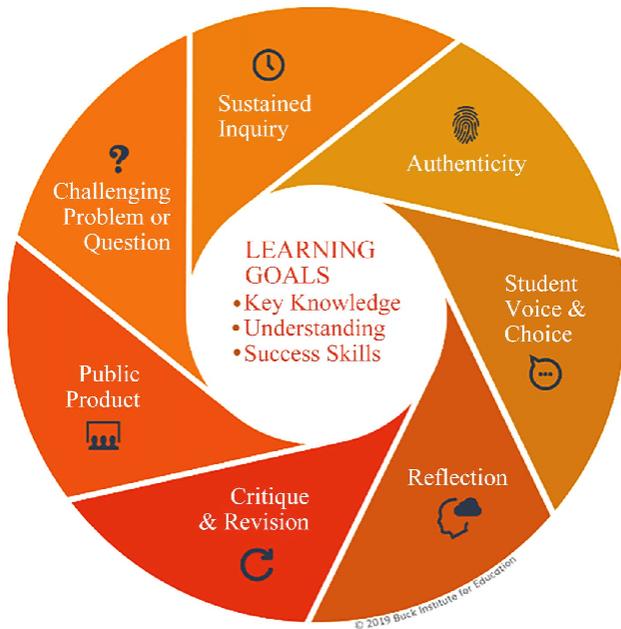

FIGURE II
STAGES OF PROJECT BASED LEARNING GOLD STANDARD

This model consists of 7 stages (Arsyad et al., 2022; Swandi, Rahmadhanningsih, Putri, et al., 2021) which are (1) giving challenging problems or questions. In this section high quality projects are framed with meaningful problems to be solved or questions to be answered by the teacher. In some cases, such as Genius Hour or self-projects, teachers may create important questions of their own that will guide their project writing and research. In this section, the instructor helps guide the teacher to find challenging problems or questions which will then be looked for to be addressed; (2) Continuous inquiry is a process in which teachers ask questions, find possible resources, and apply their learning to the driving questions. Ongoing investigation, in multiple projects; (3); The authenticity of the product produced is important. Therefore, it is necessary to test the product done by the teacher. High-quality projects exist in a

real-world context. These problems are authentic and even meaningful to the teacher's life. (4). Teacher voice and choice whereby they make some decisions about projects, allowing them to have voice and choice. This means they can choose how they work and what they create and also express their own ideas in their own voice. (5). Reflection i.e., teachers learn a lot from reflecting on their learning. Reflection occurs at the end of the project, but is also carried out throughout the project process. (6). Criticism and revision where both instructors and teachers give and receive feedback, and apply their learning from the feedback to improve their products which are ready for publication. (7). Products published by teachers where they create and share public products for the school or the larger community. Often, public products are presented outside the classroom and into the larger groups.

The digital literacy index instrument is divided into 8 components with the number of statement items, namely 35 items. The following components of the digital literacy index and their explanations are as in the table below (Larmer et al., 2015):

TABLE IIII
LITERACY DIGITAL COMPONENTS

Digital Literacy Component	Explanation
Practical and functional ability	Ability to make ICT products. Ability to use internet, software and hardware.
Creativity	Product creation/output in various formats and models with digital technology. Creative and imaginative thinking includes planning, knitting content, exploring ideas and controlling creativity.
Collaboration	Ability to participate in digital space, able to explain and negotiate ideas with others in the group
Communication	Able to communicate through digital technology. Able to understand and understand the audience.
Ability to find and select information	Able to find information by internet, Able to select information
Critical thinking and evaluation	Able to contribute, analyze and sharpen critical thinking when dealing with information
Cultural and social understanding	In line with the context of social and cultural understanding
E-Safety	Ensure security when users explore, create, collaborate with digital technology

After learning is complete, digital literacy index data is collected through filling out online questionnaires. To

determine the effect of using GS-PjBL, the data obtained from filling out the digital literacy skills survey were then analyzed. To see whether there was an increase in the literacy index level, comparisons and mapping of the percentage of each component of the literacy index were carried out before and after the treatment. Meanwhile, the categorization of the teacher's ability level in general before and after being treated was analyzed using the N-Gain equation following the equation below.

III. RESULT AND DISCUSSION

Before and after the learning process with the application of GS-PjBL was carried out on 20 teachers for 6 subjects, a mapping of the level of digital literacy skills was carried out based on each component. The following table shows the percentage of teachers based on digital literacy levels before and after being treated (L: Low; E: Enough; H: High; VH: Very High)

TABLE IIIV
FONT SIZES FOR PAPERS

Digital Literacy Component	Number of teachers at each digital literacy level before treatment				Number of teachers at each digital literacy level after treatment			
	L	E	H	VH	L	E	H	VH
Practical and functional ability (C1)	15	3	2	0	7	3	8	2
Creativity (C2)	12	5	3	0	9	5	6	2
Collaboration (C3)	0	2	14	4	0	1	14	5
Communication (C4)	0	0	15	5	0	0	16	5
Ability to find and select information (C5)	0	5	13	7	0	2	12	8
Critical thinking and evaluation (C6)	0	2	15	3	0	0	16	4
Cultural and social understanding (C7)	0	4	10	6	0	3	10	7
E-Safety (C8)	0	3	12	5	0	1	10	9

From the table above, it can be seen that there are two components of teacher digital literacy in the city of Makassar which are still low, namely the components of practical and functional abilities and components of creativity. Prior to the treatment, 15 of the 20 teachers had not been able to create ICT-based learning products and also 12 teachers had not been able to create existing products/outputs in various formats and models with digital technology. While in the communication component, the

majority of teachers have been able to communicate through digital technology and understand information from the audience when communicating digitally. Although not all components of digital literacy show positive changes before and after learning, in general it shows that there are differences in the number of teachers at each level of the digital literacy component where positive changes occur. This is in line with Harli's research which states that project-based learning can improve various skills such as thinking and communication skills (Trisdiono et al., 2019). Furthermore, an analysis is carried out to determine the average percentage of digital literacy ability of each component as shown in the table below.
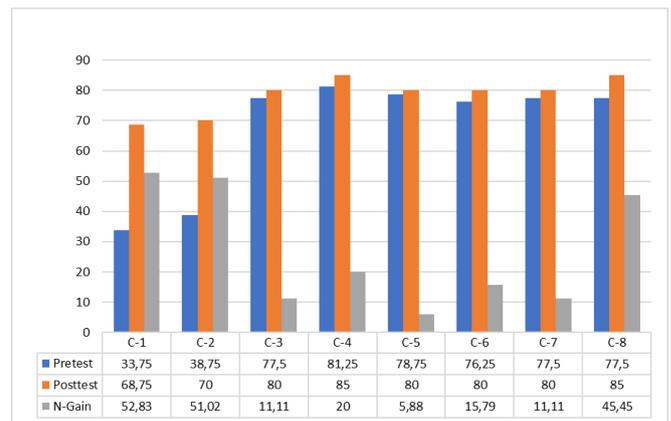

FIGURE V
COMPARISON OF PRETEST AND POSTTEST DIGITAL LITERACY SKILLS FOR EACH COMPONENT

	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8
Pretest	33,75	38,75	77,5	81,25	78,75	76,25	77,5	77,5
Posttest	68,75	70	80	85	80	80	80	85
N-Gain	52,83	51,02	11,11	20	5,88	15,79	11,11	45,45

Based on the graph, it can be seen that in general there has been an increase in digital literacy skills for all components of ability. The highest increase was in practical ability and functional ability with an n-gain value of 52.83% which was included in the medium category, while the ability to find and select information was included in the low improvement category with a gain value of 5.88% (lowest of 8 abilities). Based on the gain value, there are also only two categories of increasing digital literacy skills, namely the medium and low categories.

There is a significant decrease in the number of teachers who have low abilities in developing ICT-based learning media products and a significant increase in the number of teachers who have high and very high abilities, making the percentage of gain values in the practical and functional ability components higher than the others. This shows that the application of project-based models is able to encourage teachers to be able to develop various digital-based learning multimedia such as learning websites and Learning Management Systems (e-learning). This is in line with one of the characteristics of a project-based learning model where a product or output is produced from the activity. This result is also in accordance with the research conducted by the team where the application of GS-PjBL in learning makes students who are physics teachers at the Bandung Institute of Technology produce various digital-based learning media products and science learning teaching aids (Candra et al., 2019; Swandi, Rahmadhanningsih, Yusuf, et

al., 2021). The teachers are of the opinion that the learning model that they have applied in classroom learning can also be used for teachers through education and training activities.

The second component in digital literacy skills which also experienced an increase in the moderate category was creativity (51.02%), namely the ability to create digital learning media products that already exist and are developed in various formats and other models so that they have maximum benefits. The number of teachers who have this ability before being given treatment is still very low, most of the existing learning media are directly applied in learning without going through the development process. Various previous studies have shown that teacher creativity when facing a period of disruption (change in learning format from on-site to on-line) is still low. Various existing ICT-based learning media are not utilized optimally by teachers. With project-based training and learning, teachers are given the freedom to design and build learning media such as websites, e-learning and learning applications. Based on the deepening of information to several teachers, information was obtained that there are still many teachers who only use powerpoint presentations and books as the main learning resources. There are still many teachers who do not direct students to explore teaching materials from the internet. Some of the media obtained from the internet, especially YouTube and blogs, are given to students without evaluating the content of the media and their suitability with the characteristics of subjects and students. The results of this study are in line with previous research which states that in the application of project-based learning, students use the knowledge they already have (Jacques, 2017). Thus when they use a project-based learning model, creativity and critical thinking skills increase (Anazifa & Djukri, 2017; Desinta et al., 2017).

In all stages of GS-PjBL more involvement of participants than teachers is required, in other words, teachers as participants are required to always think creatively and imaginatively including analyzing problems and learning objectives, planning for ICT learning media development projects, knitting and compiling media content, exploring ideas and control creativity so as to produce a product in the project. Creativity and imagination will emerge when someone is charged with working on a project with a certain outcome. In this study, all teachers who had never previously developed digital-based learning media such as websites, LMS and learning applications, but after participating in training and teaching activities with the GS-PjBL model, most of the participants were able to develop these products. The first and second stages in GS-PjBL are providing challenges to problems and ongoing studies that require teachers to think more creatively, find solutions and feel competitive with other teams to work on producing targeted products. Increased critical thinking skills of teachers because during the learning process through training activities teachers are directly involved. Teachers have experience finding facts through information seeking activities and combining various knowledge from various subjects (Li, 2018). Florea & Hurjui (2015) found that learning that develops critical thinking skills must be

developed in a learning process that accommodates higher order thinking skills, taking into account the quality of questions, the quality of thinking, and the quality of responses (Florea & Hurjui, 2015).

The development of the digital world has targeted all sides of human life. Currently, almost all aspects of life have been affected by the digitalization process. However, there are still many internet users who are only able to receive information without the ability to understand and process the information properly, so that there are still many people who are exposed to untrue information. virtual. This problem is also experienced by many teachers, based on the initial test there are still teachers (3 out of 20 teachers) who are not sufficiently able to find and determine the correct information on the internet. Some teachers also often commit copyright infringement and plagiarism against various media and digital content. Providing personal information on social media is still mostly done by teachers. In education and training activities with the GS-PjBL model, teachers are not only required to work on digital-based learning media development projects, but they are also given briefings on how to use the internet safely. This material is given a lot when teachers develop learning websites, especially related to the characteristics of a website, types of trusted websites, managing the content of a website. Learning with the GS-PjBL model is effective in increasing teacher understanding regarding the ability to use the internet and digital media safely, this is indicated by an increase in the percentage from 77.5% to 85% with a gain value of 45.45% which is in the medium category. The results of this study show that the GS-PjBL learning model is not only effective in encouraging students to produce an output but is also able to provide a lot of education related to the theme of the given activity.

The use of digital media in learning also requires digital collaboration skills, namely the ability to participate in the digital space, be able to explain and negotiate ideas with other people in social media groups. For this ability, it is in the good category where before the activity took place the majority of teachers were able to communicate digitally through communication applications, both personal and social media groups. One of the important points in GS-PjBL is reflection at each stage of the activity where participants are required to report and discuss project progress through digital presentations using various digital conference platforms. This certainly helps teachers not only get to know digital conferencing applications such as Zoom but several other applications such as Google Meet. Collaborative activities carried out during the activity encourage collaboration and interactive discussions both between fellow teachers and with training instructors. According to Asan & Haliloglu project-based learning can improve the ability to work in groups, so as to improve collaboration skills (Asan, 2005).

As activity-based learning, project-based learning will be meaningful if it meets two criteria, namely: 1) participants feel the meaning personally, so they want to carry out the project well; 2) meet educational goals (Kaushik, 2020).

Implementation of GS-PjBL is important because project-based learning requires more effort than conventional learning, when trainees feel personal meaning is expected to provide a strong impetus to apply this model. Several conditions that can support meaningful learning according to (Larmer et al., 2015) can be achieved with the character of project-based learning, namely public exhibitions or presentations, producing products, need to know, choices and opinions of participants/students; investigation; input; revision; and criticism. Publication activities are activities carried out by students to convey their learning outcomes, which can be in the form of certain products to the public. After finishing learning, students criticize or evaluate the process and learning outcomes so that students can interpret them personally.

IV. CONCLUSIONS

The application of project-based learning is not only effective for improving student skills but can be used to improve teacher skills. The application of the training and learning model following the stages of the Gold Standard Project Based Learning has a positive impact on increasing teachers' digital literacy skills for all components. Based on the results of the analysis. the improvement of teachers' digital literacy skills through project-based learning that is applied in training activities is only categorized at medium and low levels. The improvement in the components of practical and functional abilities, creativity, and E-safety are in the medium category, while the components of collaboration, communication, finding and selecting information, critical thinking and evaluation, and cultural and social understanding are at a low level of improvement.

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