

Improving Evaluation Skills Through Flipped-Problem-Based Learning With Digital Storytelling Task: A Systematic Review

Silvita
Universitas Sebelas Maret

Sutarno
Universitas Sebelas Maret

Meti Indrowati
Universitas Sebelas Maret

Evaluation skills can assist students in effectively dealing with social, scientific, and practical problems. This study aims to review whether the Flipped-Problem Based Learning model with Digital Storytelling Task can improve evaluation skills. This research is a systematic review with the PRISMA method. Twenty-three articles were selected based on the inclusion criteria such as articles included in journals in the field of education and science for further analysis. The results of this study showed that the Flipped-Problem Based Learning with digital storytelling task can improve students' evaluation skills which have the sub-skills of assess claims and assess arguments. This study concluded that the Flipped-Problem Based Learning model with Digital Storytelling Task can improve evaluation skills. This is because the syntax of Flipped-Problem Based Learning model and the step to create a Digital Storytelling are integrated to the indicators of evaluation skills.

Keywords: flipped learning, problem-based learning, digital storytelling, evaluation skills, flipped-problem-based learning

INTRODUCTION

Critical thinking skills are one of the most vital skills amid the explosion of information that can be accessed through emerging technologies, especially in the 21st century (Din, 2020). Critical thinking skills are skills in making claims and assumptions supported by evidence and skills in concluding accompanied by the proof presented (el Soufi & See, 2019). These skills can help students effectively deal with social, scientific, and practical problems (Mahanal et al., 2019).

Evaluation skills are one of the essential components because evaluation skills is the skills to assess the credibility of statements or other representations that describe a person's perception, experience, situation, judgment, beliefs, or opinions and to assess the logical strength of relationships between statements, descriptions, questions, or other forms (Facione, 2015). According to (Shields et al., 2020), the basis of critical thinking is the student's skills to evaluate. This statement is also supported by Siegel's opinion in

(Shields et al., 2020) a person who is considered ‘critical thinking’ not only accepts conclusions but can also evaluate reasons and evidence.

Evaluation skills have sub-skills, namely assessing claims and assessing arguments (Facione, 2015). Assessing claims is concerned with identifying essential factors to determine the degree of credibility of a source of information or opinion (Facione, 2015). The components in assessing claims consist of fact, value, and policy claims (Martenev, 2020). While assessing arguments is related to assessing whether a conclusion is correct based on the premises held and, assessing the strength of logic of a force for an argument, and assessing whether an argument is relevant, valid or has implications for a situation (Gelerstein et al., 2016). According to the Toulmin Argument Pattern (TAP) in (Erduran et al., 2004), components in assessing arguments consist of claim, ground, and warrant. Based on this, it is essential to empower evaluation skills by integrating them through the learning process and combining them with learning task to develop problem-solving, decision-making, and communication skills that are formed between students and educators (Wale & Bishaw, 2020).

The Problem-Based Learning model is a model that can stimulate students’ skills in solving ill-structured problems so that students can develop their knowledge, especially in critical skills (Tadesse et al., 2022). Problem-Based Learning (PBL) is a dynamic process in which students are actively responsible for their learning and involved in problem-solving (Fidan & Tuncel, 2019). The Problem-Based Learning model has several limitations, such as time constraints, and students also do not have an idea related to learning, so when students are asked to provide solutions to problems, it will take a long time, and difficult to make students active in education (Wyness & Dalton, 2018). Therefore, innovation is needed in this model, such as changes in learning methods, and one example is the Flipped Learning method or ‘reverse’ learning (Latorre-Coscolluela et al., 2021).

Flipped Learning or ‘reverse’ learning is a learning method in which there is a change in the learning process to the contrary (Alten et al., 2019). Learners should learn the learning content before attending class, and during the course, the teacher will instruct the students to do homework or practice skills (Bond, 2020). Flipped Learning, as an innovation in learning, is expected to overcome various problems that arise in the classroom.

In Flipped-Problem Based Learning also needs a task that can help the teacher make sure that student can improve their evaluation skills. One of the tasks is Digital Storytelling, digital storytelling is the art of storytelling by combining various digital multimedia, such as text, images, narrative recordings, audio, video, and music, resulting in an engaging short movie to present information on a specific topic (Maddin, 2017). Digital storytelling is intended as learning media in the form of educational films that illustrate students’ daily lives where several topics are on a material (Zarifsanaiey et al., 2022).

Digital storytelling is an educational method formed with technology’s development (Zarifsanaiey et al., 2022). It combines storytelling with multimedia capabilities (such as text, audio, video, animation, and movies), makes learning concepts easier and more interesting, and enhances active learning and learner collaboration. Digital storytelling is an effective tool to help teachers motivate students to engage in discussions, participate in teaching, and support content understanding. Integrating flipped learning into the Problem-Based Learning model with Digital Storytelling Task can improve students’ evaluation skills (Çevikbaş & Argün, 2017).

In studying the integration of Flipped Learning in the Problem-Based Learning model into Flipped-Problem Based Learning with Digital Storytelling Task, literature studies are needed to prove whether Flipped-Problem Based Learning with Digital Storytelling Task can improve students’ evaluation skills. Therefore, this research will focus on literature studies of flipped-problem-based learning, digital storytelling, and evaluation skills components so that the relationship between that is known and how these innovations can improve evaluation skills.

METHOD

The method used in conducting this literature review research is the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-analyses) (Handayani et al., 2018). Based on this method, several stages will be carried out, namely:

Defining Literature Eligibility Criteria

The Inclusion Criteria in this article consist of the following:

1. Articles are articles written in English and have an international reputation
2. Articles included in journals in the field of education and science
3. The year of publication of the journal from 2013-2022
4. Journals that can be accessed in full

Defining Sources of Information

This study used of information derived from Elsevier (SCOPUS).

Literature Selection/Screening

The selection of this literature consists of:

1. Keyword selection consisting of the words “Flipped learning”, “Flipped Classroom”, “Problem Based Learning”, “Digital Storytelling” and “Evaluation Skills”.
2. Read the complete journal obtained to determine whether the journal is by the eligibility criteria.

Data Collection

Data collection is carried out manually by extracting the journal title, article name, author, year, type of research, and results.

Data Selection

The information taken from each journal consists of the following:

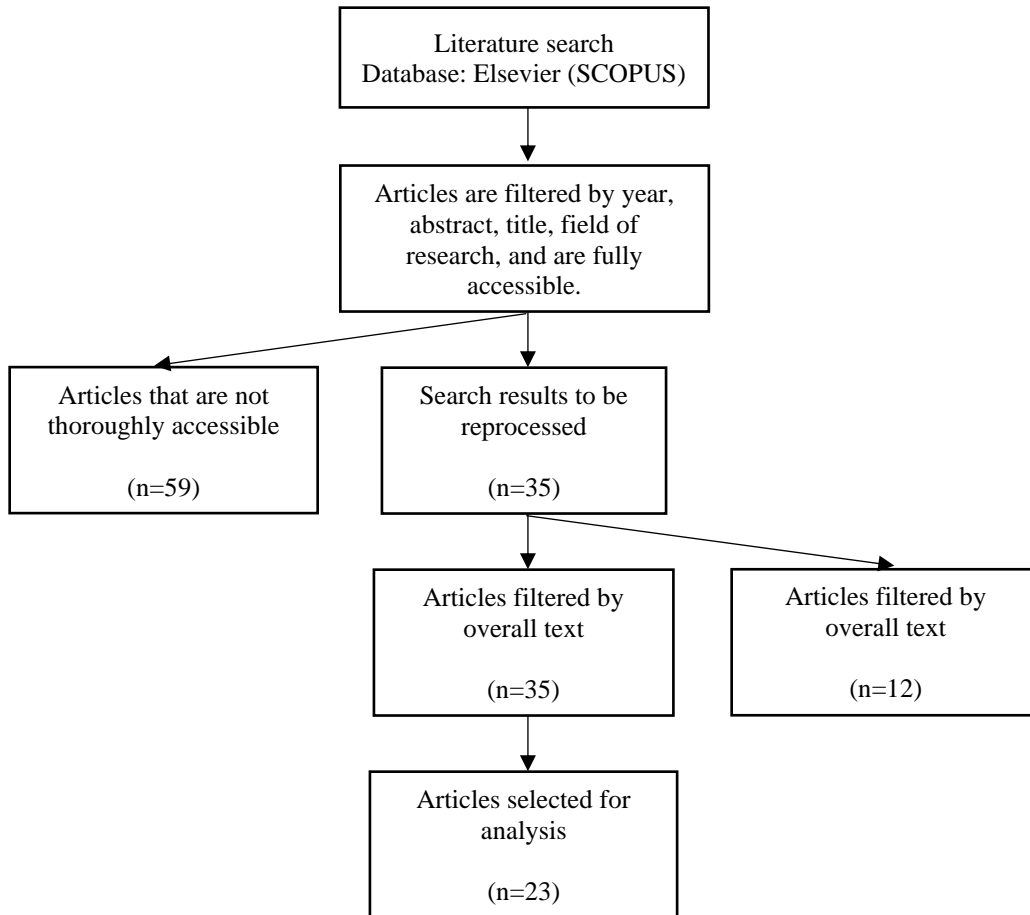
1. Flipped learning integration on Problem based Learning models
2. Digital Storytelling Task
3. Indicators of evaluation skills
4. The influence of flipped-problem-based learning with Digital Storytelling Task on evaluation skills

RESULT AND DISCUSSION

Result

Based on the method used in the study, namely the PRISMA method. A result will be obtained as described in Figure 1.

FIGURE 1
PRISMA FLOW DIAGRAM



Using the PRISMA method, articles that meet the eligibility criteria are obtained, namely 23 articles. The following table will discuss all articles that have met the following eligibility criteria.

TABLE 1
LITERATURE LIST

No.	Journal Title	Writer	Year	Types of Research	Research Results
1	Assessment as Learning in Medical Education: Feasibility and Perceived Impact of Student-Generated Formative Assessments	Ritu Lakhtakia, Farah Otaki, Laila Alsuwaidi, Nabil Zary	2022	Mix Method	The combination of Flipped learning and Problem-based Learning provides a fun and challenging opportunity for students to explore content, be creative in designing questions, and improve exam-taking skills to improve students' evaluation skills (Lakhtakia et al., 2022).
2	Implementation of flipped classroom combined with case-based learning: A promising and effective teaching modality in undergraduate pathology education	Li Cai, Yan-li Li, Xiangyang Hu, Rong Li	2022	Quantitative (Experiment)	Flipped learning innovations in case-based learning can create a learning environment that does not pressure students to be more confident in education. Therefore, the combination of flipped learning and case-based learning can be used as a forum to help students in improving student knowledge and thinking ability, as evidenced by student post-test results higher than the post-test results of class students with traditional methods (Cai et al., 2022).
3	Flipping the Classroom in Senior High School Textile Education to Enhance Students' Learning Achievement and Self-Efficacy	Annette Akuamoah Boateng, Harry Barton Essel, Dimitrios Vlachopoulos, Esi Eduafua Johnson, Vincentia Okpattah	2022	Quasi Experimental	Flipped Classroom can improve students' self-efficacy. Flipped Classroom provides a pleasant environment for students to enhance problem-solving competence, reflective thinking, critical thinking, and learning engagement (Boateng et al., 2022).

4	Comparing the use of flipped classroom in combination with problem-based learning or with case-based learning for improving academic performance and satisfaction	Bárbara Oliván-Blázquez, Alejandra Aguilar-Latorre, Santiago Gascón-Santos, M ^a José Gómez-Poyato, Diana Valero-Errazu, Rosa Magallón-Botaya, Rachel Heah, Ana Porroche-Escudero	2022	Quasi Experimental	The students who applied the Flipped Classroom method combined with Problem Based Learning achieved higher academic achievement than those who used the Flipped Classroom method combined with Problem Based Learning. This method helps stimulate critical thinking especially evaluation skills and allows students to apply theory to assessment (Oliván-Blázquez et al., 2022).
5	Using a virtual flipped classroom model to promote critical thinking in online graduate courses in the United States: a case presentation	Tomesko, J., Cohen, D., Bridenbaugh, J.	2022	Qualitative	Flipped Classroom can improve critical thinking especially evaluation skills in students' health professions. With flipped classrooms, it can guide students in synthesizing and analyzing basic materials, which students have reviewed in preparation for face-to-face class sessions. Flipped Classroom also allows for more "hands-on" activities and simulations during face-to-face class sessions emphasizing active learning and improving student understanding (Tomesko et al., 2022).
6	Flipped classroom combined with case-based learning is an effective teaching modality in nephrology clerkship	Yang, F., Lin, W., Wang, Y.	2021	Qualitative	Flipped Classroom combined with Case Based Learning is an approach effective and flexible in medical education. It can be customized to meet a variety of educational situations as a framework for improving students' skills (Yang et al., 2021).
7	Efficacy of flipped classroom method	Patkar, K.U., Patkar, U.S., Kolte, V.S.	2021	Quasi Experimental	The Flipped Classroom method needs to be

	in teaching-learning physiology				applied because it can empower students to develop higher cognitive skills and engage students in meaningful learning (Patkar et al., 2021).
8	Flipped-ocn method in mathematics learning to analyze the attitudes of pre-service teachers	Jeong, J.S., González-Gómez, D.	2021	Qualitative	Flipped Learning methods can support the improvement and maturity of competencies as well as logical and critical thinking toward the development of children (Jeong & González-Gómez, 2021)
9	Mixed-mode instruction using active learning in small teams improves generic problem-solving skills of university students	Andis Klegeris	2021	Qualitative	The Flipped Classroom method in the Problem Based Learning model can transfer most of the content delivery discussed with students. This mixed-mode instruction allows students to use most of the time in the classroom to advance problem-solving, critical thinking, teamwork, and communication skills (Klegeris, 2021).
10	Flipped classroom improves nursing students' theoretical learning in China: A meta-analysis	Bao-Zhu Li, Nv-Wei Cao, Chun-Xia Ren, Xiu-Jie Chu, Hao-Yue Zhou, Biao Guo	2020	Systematic review	The flipped classroom can improve the cognitive learning outcomes of nursing students in China (Li et al., 2020)
11	Creating ESP-based language learning environment to foster critical thinking capabilities in students' papers	Alina O. Karapetian	2020	Mix method	This research found that the "flipped classroom" method used to deliver ESP and Business English to students majoring in Economics has the potential to provide a better learning experience for students and a teaching experience for teachers. This method fosters students' critical thinking skills by involving students in problem-solving-based

					learning and increasing students' responsibility to stimulate learning outcomes, and free students to use different learning styles (Karapetian, 2020)
12	Existing contradictions and suggestions: Flipped classroom in radiology courses of musculoskeletal disease under Chinese medical educational mode from medical imaging student perspective	Su Wu, Shinong Pan, Ying Ren, Hong Yu, Qi Chen, Zhaoyu Liu, dan Qiyong Guo	2020	Qualitative	The Flipped Classroom method can show advantages in radiology classes; this method can overcome various shortcomings in learning and provide students with a better learning experience (Wu et al., 2020).
13	Using interactive e-based flipped learning to enhance EFL literature students' critical reading	Khonamri, F., Azizi, M., Kralik, R.	2020	Quasi Experimental	The use of Flipped Classroom can have a positive impact such as efficient use of time, improving problem-solving activities, increasing interaction between students and teachers, assisting students in taking responsibility for independent learning, and helping to improve students' critical thinking skills and problem-solving skills (Khonamri et al., 2020).
14	Learning with technology in physiotherapy education: design, implementation, and evaluation of a flipped classroom teaching approach	Yngve Røe, Michael Rowe, Nina B. Ødegaard, Hilde Sylliaas, dan Tone Dahl-Michelsen	2019	Qualitative	The Flipped classroom method provides an opportunity for students to improve students skills compared to conventional teaching methods. This method offers a collaborative learning environment, especially about autonomy and flexibility (Røe et al., 2019)

15	Implementation of Problem-based Learning – Flipped Classroom Model in Chemistry and Its Effect on Scientific Literacy	Maria Paristiwati, Ucu Cahyana, Bening Irsa Setara Bulan	2019	True-Experiment	The flipped classroom learning method is more effectively applied to students with high critical thinking, while the Problem-based learning method is more effectively applied to students with low critical thinking (Paristiwati et al., 2019).
16	Active learning in flipped life science courses promotes the development of critical thinking skills.	Melanie L. Styers, Peter A. Van Zandt, dan Katherine L. Hayden	2018	Qualitative	Students in the classroom with Flipped learning method shows advantages in critical thinking. The results of this study show that applying active learning with Flipped learning strategies can improve critical thinking skills (Styers et al., 2018).
17	The Case-Based Collaborative Learning Peer Observation Worksheet and Compendium: An Evaluation Tool for Flipped Classroom Facilitators	Susan Frankl, Lori Newman, Susan Burgin, Ayse Atasoylu, Laurie Fishman, Holly Gooding, Daniel Kamin, Alberto Puig, Ann-Marie Thomas, David Cohen, Richard Schwartzstein	2017	Qualitative	The Flipped Classroom method can reduce the level of student passivity so that students can be more active in learning (Frankl et al., 2017).
18	Can blended learning and the flipped classroom improve student learning and satisfaction in Saudi Arabia?	Muhammad R. Sajid, Abrar F. Laheji, Fayha Abothenain, Yezan Salam, Dina AlJayar, Akef Obeidat	2016	Qualitative	The learning experience can be enriched by adopting flipped classroom teaching methods at various stages of undergraduate and graduate education. Flipped classroom replaces passive lectures with active, student-centered learning that improves critical thinking skills and applications, including information storage (Sajid et al., 2016).

19	The flipped classroom allows for more class time devoted to critical thinking	Lara R. DeRuisseau	2016	Qualitative	The flipped classroom can give students more time to learn, so it can improve students' critical thinking skills. A flipped classroom can improve high-level thinking and assessment by utilizing more time for students and teachers (Deruisseau, 2016).
20	Flipping for success: evaluating the effectiveness of a novel teaching approach in a graduate-level setting	John Moraros, Adiba Islam, Stan Yu, Ryan Banow, dan Barbara Schindelka	2015	Qualitative	Flipped Classroom provides more opportunities for students to engage in critical thinking, independently facilitate their learning, and more effectively interact with and learn from their peers. In addition, instructors are given more flexibility to cover a broader range and depth of material, provide applied learning opportunities in the classroom based on problem-solving activities and offer timely feedback to students (Moraros et al., 2015).
21	Flipping content to improve student examination performance in a pharmacogenomics course	Amanda Munson, Richard Pierce	2015	Qualitative	Flipped classroom learning methods include active learning activities and formative assessments that provide students with repetitive curricular space and engagement (Munson & Pierce, 2015).
22	Synthesis of Problem-Based Interactive Digital Storytelling Learning Model Under Gamification Environment Promotes Students' Problem-Solving Skills	Akarapon Poonsawad, Jiraphan Srisomphan, Charun Sanrach	2022	Quantitative	Problem-Based Learning uses interactive digital storytelling to achieve meaningful learning from telling the solution that has been thought (Poonsawad et al., 2022).

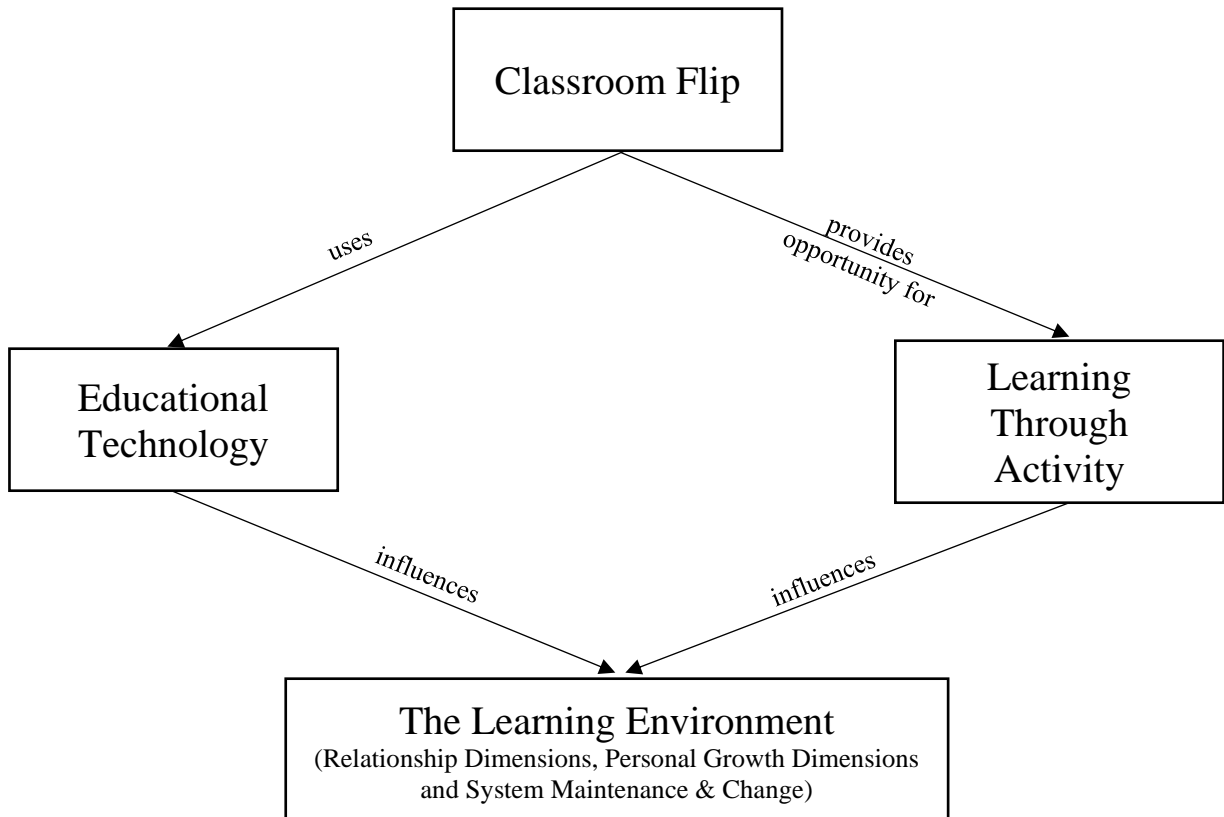
23	Improving undergraduate competence in multicultural gerontology practice with fresh pedagogies: a digital storytelling case example	Justine McGovern	2019	Qualitative	Pembelajaran dengan menggunakan digital storytelling dapat meningkatkan kemampuan evaluasi pada siswa (McGovern, 2019).
----	---	------------------	------	-------------	---

Discussion

Flipped Learning

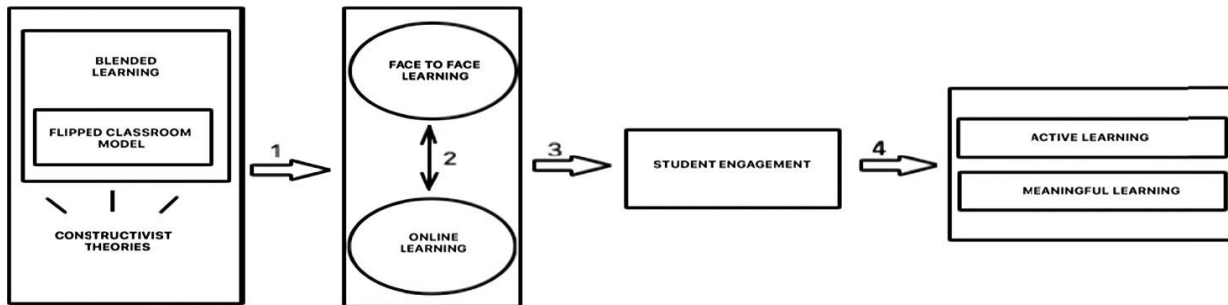
Flipped learning, or reverse learning, is a blended learning method. This learning is a change in the learning process to the contrary. Learners should know the teaching content before attending class, and during the course, the teacher will instruct the students to do homework or practice skills (Alten et al., 2019). This will allow learners to control their study time while the classroom will be a place to do homework or solve problems so that students can do it at once in school.

**FIGURE 2
FLIPPED LEARNING METHOD DIAGRAM**



Flipped Learning is currently getting significant attention in the world of education because flipped learning is an innovation that can be applied to learning. This is in line with the application of flipped learning as a new paradigm in the world of education, especially in the field of pedagogy in the world of education, and analyzing several frameworks in education as connected to flipped learning (Ahmed, 2016).

FIGURE 3
THE INFLUENCE OF FLIPPED LEARNING ON LEARNING DIAGRAMS



In Figure 3 can be seen the following details:

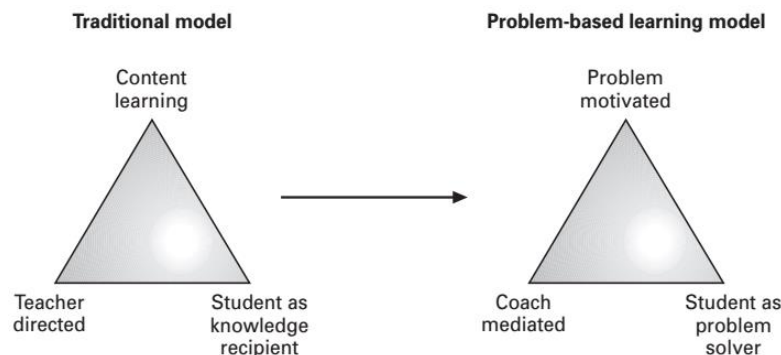
1. Flipped Learning is one of the methods in the Blended Learning model and can support constructivism learning theory
2. Flipped Learning involves two activities: online learning and face-to-face learning.
3. Flipped learning can increase students' interest in learning.
4. Flipped Learning can develop 21st-century skills to produce active and meaningful learning (Çevikbaş & Argün, 2017)

Flipping learning is a good innovation because it can prepare students before learning so that when teaching, students do not know much; they just sit in class listening to the teacher, remembering assignments, and mentioning answers perfunctorily. Students should talk about learning, write about it, relate it to past experiences, and apply it to what they feel is essential. Students must make what students learn part of themselves. Equally important is the need to make students explicit about the learning process that occurs in the learning environment and why specific strategies can be used (Daud et al., 2008)

Problem-Based Learning

The Problem-Based Learning Model is a learning model that can allow students to think critically in the face of problems that are not structural and new. This learning model involves student activity, student cooperation, and student self-reflection.

FIGURE 4
LEARNING PARADIGM SHIFT



The Syntax of the Problem-Based Learning model consists of (Tan, 2003)

1. Finding a Problem. At this stage, the problem scenario acts as a stimulus to expand the realistic context that students may face. The activity steps in this first tutorial include:

- develop cooperation
 - reflection and inquiry
 - commitment to the role of teams and groups
 - brainstorming and articulation of possible problems
 - consensus on the problem statement
 - commitment to consider problem scenarios and problem analysis
2. Analysis of Problems and Problems in Learning. Students are required to work independently, searching for information through various sources. Thus, this tutorial involves:
 - brainstorming and analysis of problems (e.g., possible explanations and hypotheses)
 - identification of learning problems and formulation of learning objectives
 - assignment of independent learning

The groups then proceeded to list the problems among themselves. They agreed to seek information from books, journals, Internet resources, and so on and to return with a better explanation of the issues and questions posed.

3. Discovery and Reporting. After independent research and learning, students report learning findings to their group. At this stage of peer teaching, students come together to share new information they encounter individually. Students practice group collaboration and communication skills through questions and the search for more information. Teachers help ensure that critical areas to be studied are not ignored and question students about the accuracy, reliability, and validity of the information obtained.
4. Presentation and Reflection of Solutions. Students present solutions to problem scenarios by contextualizing and applying knowledge to problems. Students demonstrate their new abilities. The teacher helps students clarify doubts, be careful of gaps, and correct misunderstandings or excessive generalizations.
5. Overview, Integration, and Evaluation. Integrating science from different disciplines and sources and synthesizing ideas brought the PBL process to closure. Students are encouraged to criticize their learning resources (their value, reliability, and usefulness for future learning). They reflect on the new knowledge they have learned due to problems. The teacher helps to summarize and integrate the main principles and concepts at this stage. Group members also evaluate how they do it as learners: being problem solvers, independent learners, and team members.

Integration Flipped-Problem Based Learning

The integration of Flipped Learning on problem-based learning models into Flipped-Problem Based Learning can be described in Table 2 below:

TABLE 2
INTEGRATION FLIPPED-PROBLEM BASED LEARNING

Syntax Problem-Based Learning	Activity Flipped Learning	Learning Activities	
		Teacher Activities	Student Activities
Meeting The Problem	Before Class	Before learning, teachers share ill-structured problem stimuli related to learning through the LMS, and students are asked to formulate problems based on experiences that have been experienced through google docs.	Students formulate problems based on experiences they have experienced in google docs.
Problem Analysis and Learning Issues	In Class	During classroom learning, the teacher displays a list of problem formulations that students have posed, selects the problem formulation that corresponds to learning objectives, and asks students to look for references that support the problem posed.	Students in groups search for information from books, journals, the Internet, and so on to return with a better explanation of the problems and questions posed.
Discovery and Reporting	In Class	The teacher asks students to display the results of finding information related to problem data and converts the data into digital storytelling.	Students display the results of finding information related to the data obtained and turn the data into digital storytelling.
Solution Presentation and Reflection	In Class	The teacher asks the student to present their digital storytelling.	Students present the results of their digital storytelling.
Overview, Integration, and Evaluation	In Class	The teacher asks the students to ask questions, summarize, and integrate the main principles and concepts.	Students ask questions and present problem-solving decisions made.

Digital Storytelling

Digital storytelling is the art of storytelling by combining various digital multimedia, such as text, images, narrative recordings, audio, video, and music, resulting in an engaging short movie to present information on a specific topic (Maddin, 2017). Digital storytelling is intended as a learning media in the form of educational films that illustrate students' daily lives where several topics are on a material (Zarifsanaiey et al., 2022).

Digital storytelling is an educational method that has taken shape with the development of technology (Zarifsanaiey et al., 2022). It combines storytelling with multimedia capabilities (such as text, audio, video, animation, and movies), makes learning concepts easier and more engaging, and enhances active learning

and learner collaboration. Digital storytelling is an effective tool to help teachers motivate their students to engage in discussions, participate in teaching, and support content understanding.

Digital Storytelling offers distinct advantages that different experts have recognized. Storytelling has great potential to assist students in learning languages due to the interaction between writing, speaking, and listening, empowering students to become confident communicators and media makers as they acquire 21st-century literacy skills and a deeper understanding of the curriculum and foster creativity and stimulate reflection on learning and life processes (Kasami, 2018).

Many studies have investigated the effectiveness of Digital Storytelling on students, and many have shown that Digital Storytelling has a greater impact on creativity learning (Starčić et al., 2016), motivation, social intelligence and emotional intelligence (Mashalpourfard, 2019) and critical thinking skills (Dewi et al., 2019). Digital storytelling developed with a contextual basis can improve students' critical thinking (Komalasari, 2009).

Digital storytelling allows students to be active in the learning process so that students are not just passive listeners (Al-Shaye, 2021). With Digital storytelling, students can design their learning, as a form of constructivist, student-centered approach, students can own their learning. Therefore, they are responsible for their learning with minimal teacher authority, students' active role in learning is maximized while the teacher's dominating role remains minimal (Al-Shaye, 2021).

According to (Robin, 2016) the stages of Digital Storytelling consist of:

- a. Analysis Phase. At this stage, the teacher will help learners identify instructional objectives, analyze aspects of the story related to the topic, and select an interesting topic (Robin, 2016).
- b. Design Phase. At this stage, the teacher will help learners to finalize the script and storyboard related to the story design as collected and organized in terms of images, audio, and video. At this stage, learners will also consider the important things from the script so that the audience can interpret the story that has been compiled (Robin, 2016).
- c. Development Phase. The teacher will help learners use appropriate technology to build the story at this stage. Provide additional sentences to give the story meaning and consider other storylines (Robin, 2016).
- d. Implementation Phase. At this stage, the teacher will help learners plan how the story will be used and provide additional resources such as lesson plans and other supporting components (Robin, 2016).
- e. Evaluation Phase. At this stage, the teacher will measure to determine whether the story that students have compiled has met the expected objectives. Learners can evaluate the story that has been compiled and revise the story according to the resulting output (Robin, 2016).

Evaluation Skills

Evaluation skills is one aspect of critical thinking skills (Facione, 2015). Evaluation skills assess the credibility of statements or other representations that describe a person's perceptions, experiences, situations, judgments, beliefs or opinions and assess the logical strength of the relationship between statements, descriptions, questions, or other forms (Facione, 2015). In addition, the American Evaluation Association in (Wanzer, 2021), evaluation is a systematic process to determine the appropriateness, value, or significance of the results obtained.

According to Stufflebeam in (Wanzer, 2021), evaluation is a process to describe, obtain, and provide information to assess alternative decisions. Evaluation skills is the basis of critical thinking skills to apply the knowledge and experience students gain (Fesler-Birch, 2005). Someone who can develop optimal problem-solving solutions also needs evaluation skills (Ahern et al., 2019).

Evaluation skills have the sub-skills of assessing claims and assess arguments (Facione, 2015). This is described as follows:

- a. Assess Claims. Assess claims relate to recognizing important factors to determine the degree of credibility of a source of information or opinion (Facione, 2015). A claim is any statement of controversy put forward for argument. Both sides of the argument, the pro and con side of a debate, must argue the same claim (Marteny, 2020).

Components in assessing claims according to (Martene, 2020) consists of:

- 1) Claims of Fact. Claims of fact asserts that something measurable has existed, does exist, or will exist. In other words, fact claims argue whether the claim statement is true or false, valid or invalid, true or false. Fact claims also focus on cause-and-effect relationships. Fact claims can be statements about the past, present, or future. Factual claims can be measured. This means that establishing the truth of factual claims relies heavily on empirical verification. Such verification, or evidence, usually consists of using some combination of sensory data (sight, smell, touch, sound, and taste) (Martene, 2020).
 - 2) Claims of Value. Claims of value assert qualitative judgments along a continuum relating to people, events, and things in one's environment. The center of the argument in value claims lies in the criteria used in making judgments (Martene, 2020).
 - 3) Claims of Policy. Claims of policy asserts that something should or should not be done by someone about something. It proposes that some particular action should, but not necessarily, be taken. Policy claims are analyzed by locating sub-claims of fact (the need for a policy change in the status quo), or value claims (the desirability of making such a change) attached to the policy claim (Martene, 2020).
- b. Assess Arguments. Assess Arguments is concerned with assessing whether a conclusion is correct based on the premises and assessing the logical strength of an argument and assessing whether an argument is relevant, applicable or has implications for a situation (Gelerstein et al., 2016). Components in assessing arguments according to Toulmin Argument Pattern (TAP) in (Erduran et al., 2004) consists of:
- 1) Claim. A claim is the main argument which is an answer, idea, hypothesis or opinion on an event (Ebadi et al., 2020).
 - 2) Ground. Ground is the proof of claim provided (Erduran et al., 2004). Ground can be in the form of facts, data or reasons for making a claim (Ebadi et al., 2020).
 - 3) Warrant. A warrant is a statement that connects a claim to a ground (Erduran et al., 2004). This plays a role in convincing how the ground relates to support a given claim (Ebadi et al., 2020).

Improving Evaluation Skills Through Flipped-Problem-Based Learning With Digital Storytelling Task

Flipped-Problem Based Learning is an innovation in learning that combines the Problem-Based Learning model and the Flipped Learning method (Alten et al., 2019). With Flipped Learning integrated into the Problem-Based Learning model, it can reduce the model's weaknesses. This is because Flipped Learning provides opportunities for students to learn according to their respective learning styles and does not burden students in learning. As described in Table 2, it can be seen that the application of Flipped-Problem Based Learning is by the syntax. Learning with Flipped-Problem Based Learning can improve evaluation skills (Facione, 2015)

Evaluation Skills are skills to assess the credibility of statements or other representations that can describe perceptions, experiences, situations, judgments, beliefs, or opinions and to evaluate the logic of actual or intended inferential forces of relationships between statements, descriptions, questions, or other forms (Facione, 2015). These skills can be improved in the fifth syntax of Flipped-Problem Based Learning, namely Overview, Integration, and Evaluation, which is carried out in the classroom. This syntax allows students to evaluate how they do it as learners: being problem solvers, independent learners, and team members.

In addition to the Flipped-Problem Based Learning model, it is also necessary to give assignments in digital storytelling to improve students' evaluation skills. Integrating the Flipped-Problem Based Learning model in the Digital storytelling preparation activity will build students' evaluation skills at each stage consisting of evaluating statements and arguments.

CONCLUSION

Based on a literature review with the PRISMA method to determine whether the Flipped-Problem Based Learning model with Digital Storytelling Task can improve evaluation skills, it can be concluded that the Flipped-Problem Based Learning model with Digital Storytelling Task can improve evaluation skills. This is because the syntax of Flipped-Problem Based Learning model and the step to create a Digital Storytelling are integrated to the indicators of evaluation skills. For further results, research is needed to test learning effectiveness with the Flipped-Problem Based Learning model with Digital Storytelling Task to enhance students' evaluation skills.

ACKNOWLEDGMENT

Thanks to previous researchers who have discussed flipped learning, Problem-Based Learning models, digital storytelling, evaluation skills, researchers can find out how flipped-problem-based learning models with Digital Storytelling Task improve evaluation skills.

REFERENCES

- Ahmed, H.O.K. (2016). Flipped Learning As A New Educational Paradigm: An Analytical Critical Study. *European Scientific Journal, ESJ*, 12(10), 417. <https://doi.org/10.19044/esj.2016.v12n10p417>
- Akib, E., Erwinto Imran, M., Mahtari, S., Mahmud, M.R., Prawiyogy, A.G., Supriatna, I., & Hartono Ikhsan, M.T. (2020). Study on the Implementation of Integrated Curriculum in Indonesia. *IJORER: International Journal of Recent Educational Education Study on Implementation of Integrated Curriculum in Indonesia*, 1(1), 39–57.
- Alten, D.C.D., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. In *Educational Research Review* (Vol. 28). Elsevier Ltd. <https://doi.org/10.1016/j.edurev.2019.05.003>
- Boateng, A.A., Essel, H.B., Vlachopoulos, D., Johnson, E.E., & Okpattah, V. (2022). Flipping the Classroom in Senior High School Textile Education to Enhance Students' Learning Achievement and Self-Efficacy. *Education Sciences*, 12(2). <https://doi.org/10.3390/educsci12020131>
- Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. *Computers and Education*, 151. <https://doi.org/10.1016/j.compedu.2020.103819>
- Cai, L., Li, Y.L., Hu, X.Y., Li, R., & Khoshnood, A. (2022). Implementation of flipped classroom combined with case-based learning: A promising and effective teaching modality in undergraduate pathology education. *Medicine (United States)*, 101(5), 28782. <https://doi.org/10.1097/MD.00000000000028782>
- Çevikbaş, M., & Argün, Z. (2017). An Innovative Learning Model in Digital Age: Flipped Classroom. *Journal of Education and Training Studies*, 5(11), 189. <https://doi.org/10.11114/jets.v5i11.2322>
- Daud, S., Eladwiah, R., Rahim, A., & Alimun, R. (2008). Knowledge Creation and Innovation in Classroom. *World Academy of Science*, 39, 241–245.
- Deruisseau, L.R. (2016). How We Teach: Generalizable Education Research The flipped classroom allows for more class time devoted to critical thinking. *Adv Physiol Educ*, 40, 522–528. <https://doi.org/10.1152/advan.00033.2016.-The>
- Din, M. (2020). Evaluating university students' critical thinking ability as reflected in their critical reading skill: A study at bachelor level in Pakistan. *Thinking Skills and Creativity*, 35. <https://doi.org/10.1016/j.tsc.2020.100627>
- el Soufi, N., & See, B.H. (2019). Does explicit teaching of critical thinking improve critical thinking skills of English language learners in higher education? A critical review of causal evidence. *Studies in Educational Evaluation*, 60, 140–162. <https://doi.org/10.1016/j.stueduc.2018.12.006>
- Facione, P.A. (2015). *Critical Thinking: What It Is and Why It Counts*.

- Fidan, M., & Tuncel, M. (2019). Integrating augmented reality into problem based learning: The effects on learning achievement and attitude in physics education. *Computers and Education*, 142. <https://doi.org/10.1016/j.compedu.2019.103635>
- Frankl, S., Newman, L., Burgin, S., Atasoylu, A., Fishman, L., Gooding, H., . . . Schwartzstein, R. (2017). *The Case-Based Collaborative Learning Peer Observation Worksheet and Compendium: An Evaluation Tool for Flipped Classroom Facilitators*. https://doi.org/10.15766/mep_2374
- Handayani, P.W., Hidayanto, A.N., & Budi, I. (2018). User acceptance factors of hospital information systems and related technologies: Systematic review. In *Informatics for Health and Social Care* (Vol. 43, Issue 4, pp. 401–426). Taylor and Francis Ltd. <https://doi.org/10.1080/17538157.2017.1353999>
- Jeong, J.S., & González-Gómez, D. (2021). Flipped-ocn method in mathematics learning to analyze the attitudes of pre-service teachers. *Mathematics*, 9(6). <https://doi.org/10.3390/math9060607>
- Karapetian, A.O. (2020). Creating ESP-based language learning environment to foster critical thinking capabilities in students' papers. *European Journal of Educational Research*, 9(2), 717–728. <https://doi.org/10.12973/eu-jer.9.2.717>
- Khonamri, F., Azizi, M., & Kralik, R. (2020). Using interactive e-based flipped learning to enhance EFL literature students' critical reading. *Science for Education Today*, 10(1), 25–42. <https://doi.org/10.15293/2658-6762.2001.02>
- Klegeris, A. (2021). Mixed-mode instruction using active learning in small teams improves generic problem-solving skills of university students. *Journal of Further and Higher Education*, 45(7), 871–885. <https://doi.org/10.1080/0309877X.2020.1826036>
- Lakhtakia, R., Otaki, F., Alsuwaidi, L., & Zary, N. (2022). Assessment as Learning in Medical Education: Feasibility and Perceived Impact of Student-Generated Formative Assessments. *JMIR Medical Education*, 8(3). <https://doi.org/10.2196/35820>
- Latorre-Coscolluela, C., Suárez, C., Quiroga, S., Sobradriel-Sierra, N., Lozano-Blasco, R., & Rodríguez-Martínez, A. (2021). Flipped Classroom model before and during COVID-19: Using technology to develop 21st century skills. *Interactive Technology and Smart Education*, 18(2), 189–204. <https://doi.org/10.1108/ITSE-08-2020-0137>
- Li, B.Z., Cao, N.W., Ren, C.X., Chu, X.J., Zhou, H.Y., & Guo, B. (2020, August). Flipped classroom improves nursing students' theoretical learning in China: A meta-analysis. *PLoS ONE*, 15(8). <https://doi.org/10.1371/journal.pone.0237926>
- Mahanal, S., Zubaidah, S., Sumiati, I.D., Sari, T.M., & Ismirawati, N. (2019). RICOSRE: A learning model to develop critical thinking skills for students with different academic abilities. *International Journal of Instruction*, 12(2), 417–434. <https://doi.org/10.29333/iji.2019.12227a>
- Moraros, J., Islam, A., Yu, S., Banow, R., & Schindelka, B. (2015). Flipping for success: Evaluating the effectiveness of a novel teaching approach in a graduate level setting. *BMC Medical Education*, 15(1). <https://doi.org/10.1186/s12909-015-0317-2>
- Munson, A., & Pierce, R. (2015). *INSTRUCTIONAL DESIGN AND ASSESSMENT Flipping Content to Improve Student Examination Performance in a Pharmacogenomics Course*. Retrieved from <http://www.ajpe.org>
- Oliván-Blázquez, B., Aguilar-Latorre, A., Gascón-Santos, S., Gómez-Poyato, M.J., Valero-Errazu, D., Magallón-Botaya, R., . . . Porroche-Escudero, A. (2022). Comparing the use of flipped classroom in combination with problem-based learning or with case-based learning for improving academic performance and satisfaction. *Active Learning in Higher Education*. <https://doi.org/10.1177/14697874221081550>
- Paristiowati, M., Cahyana, U., & Bulan, B.I.S. (2019). Implementation of Problem-based Learning – Flipped Classroom Model in Chemistry and Its Effect on Scientific Literacy. *Universal Journal of Educational Research*, 7(9A), 56–60. <https://doi.org/10.13189/ujer.2019.071607>
- Patkar, K.U., Patkar, U.S., & Kolte, V.S. (2021). Efficacy of flipped classroom method in teaching-learning physiology. *Indian Journal of Physiology and Pharmacology*, 65(3), 204–209. https://doi.org/10.25259/IJPP_350_2020

- Polat, Ö., & Aydın, E. (2020). The effect of mind mapping on young children's critical thinking skills. *Thinking Skills and Creativity*, 38. <https://doi.org/10.1016/j.tsc.2020.100743>
- Ramadhani, R., Umam, R., Abdurrahman, A., & Syazali, M. (2019). The effect of flipped-problem based learning model integrated with LMS-google classroom for senior high school students. *Journal for the Education of Gifted Young Scientists*, 7(2), 137–158. <https://doi.org/10.17478/jegys.548350>
- Røe, Y., Rowe, M., Ødegaard, N.B., Sylliaas, H., & Dahl-Michelsen, T. (2019). Learning with technology in physiotherapy education: Design, implementation and evaluation of a flipped classroom teaching approach. *BMC Medical Education*, 19(1). <https://doi.org/10.1186/s12909-019-1728-2>
- Sajid, M.R., Laheji, A.F., Abothenain, F., Salam, Y., AlJayar, D., & Obeidat, A. (2016). Can blended learning and the flipped classroom improve student learning and satisfaction in Saudi Arabia? *International Journal of Medical Education*, 7, 281–285. <https://doi.org/10.5116/ijme.57a7.83d4>
- Saputra, M.D., Joyoatmojo, S., Wardani, D.K., & Sangka, K.B. (2019). Developing Critical-Thinking Skills through the Collaboration of Jigsaw Model with Problem-Based Learning Model. In *International Journal of Instruction* (Vol. 12, Issue 1). Retrieved from www.e-iji.net
- Styers, M.L., van Zandt, P.A., & Hayden, K.L. (2018). Active learning in flipped life science courses promotes development of critical thinking skills. *CBE Life Sciences Education*, 17(3). <https://doi.org/10.1187/cbe.16-11-0332>
- Tadesse, S.G., Tadesse, D.G., & Dagnaw, E.H. (2022). Problem based learning approach increases the academic satisfaction of health science students in Ethiopian universities: A comparative cross sectional study. *BMC Medical Education*, 22(1). <https://doi.org/10.1186/s12909-022-03397-5>
- Tan, O. (2003). *Problem-based Learning Innovation*. Cengage Learning.
- Tomesko, J., Cohen, D., & Bridenbaugh, J. (2022). Using a virtual flipped classroom model to promote critical thinking in online graduate courses in the United States: A case presentation. *Journal of Educational Evaluation for Health Professions*, 19. <https://doi.org/10.3352/jeehp.2022.19.5>
- Wale, B. D., & Bishaw, K. S. (2020). Effects of using inquiry-based learning on EFL students' critical thinking skills. *Asian-Pacific Journal of Second and Foreign Language Education*, 5(1). <https://doi.org/10.1186/s40862-020-00090-2>
- Wu, S., Pan, S., Ren, Y., Yu, H., Chen, Q., Liu, Z., & Guo, Q. (2020). Existing contradictions and suggestions: Flipped classroom in radiology courses of musculoskeletal disease under Chinese medical educational mode from medical imaging student perspective. *BMC Medical Education*, 20(1). <https://doi.org/10.1186/s12909-020-1991-2>
- Wyness, L., & Dalton, F. (2018). The value of problem-based learning in learning for sustainability: Undergraduate accounting student perspectives. *Journal of Accounting Education*, 45, 1–19. <https://doi.org/10.1016/j.jaccedu.2018.09.001>
- Yang, F., Lin, W., & Wang, Y. (2021). Flipped classroom combined with case-based learning is an effective teaching modality in nephrology clerkship. *BMC Medical Education*, 21(1). <https://doi.org/10.1186/s12909-021-02723-7>