



## FLIPPED CLASSROOM TO FIND AND RESEARCH JOURNALS AS WELL AS IMPROVING SCIENTIFIC LITERACY OF JUNIOR HIGH SCHOOL

Yohana Saraswati<sup>1,\*</sup>, Sifak Indana<sup>2</sup>, and Elok Sudibyo<sup>3</sup>

<sup>1</sup> State Junior High School of 32 Surabaya, Surabaya, Indonesia

<sup>1,2,3</sup> State University of Surabaya, Surabaya, Indonesia

\*Email: [yohana.19003@mhs.unesa.ac.id](mailto:yohana.19003@mhs.unesa.ac.id)

### Abstract

*The foundation of attitudes, knowledge, and skills for students is the foundation of scientific literacy. The benefit of the flipped classroom model is that students can learn outside the classroom so that learning in the classroom is effective with literary discussions. Students were given the task of watching videos about how to find and research journals about student digestion health. In the classroom, students work in groups to practice their knowledge and skills based on the videos they have learned. Furthermore, students were given a survey on the effectiveness of the video to deepen their knowledge and skills. One hundred and twenty students completed the survey and the results showed that the students found the video very helpful in searching and researching journals. The result was that students terbanti in 86% searched and 77% studied journals. Students claim that learning outside the classroom through video helps them with assignments (90%), the information obtained can be applied at other levels (87%) and they prefer to learn via video outside of the classroom to learn in class (63%). Students can acquire scientific literacy knowledge and skills through the flipped classroom methodology, especially watching videos.*

**Keywords:** *flipped classroom, junior high school, scientific literacy*

### Abstrak

*Landasan sikap, pengetahuan, dan keterampilan bagi siswa merupakan landasan literasi sains. Manfaat model flipped classroom adalah siswa dapat belajar di luar kelas sehingga pembelajaran di kelas efektif dengan diskusi sastra. Siswa diberi tugas untuk menonton video tentang cara mencari dan mempelajari jurnal tentang kesehatan pencernaan siswa. Di kelas, siswa bekerja dalam kelompok untuk mempraktikkan pengetahuan dan keterampilan mereka berdasarkan video yang telah mereka pelajari. Selanjutnya, siswa diberikan survei tentang efektivitas video untuk memperdalam pengetahuan dan keterampilan mereka. Seratus dua puluh siswa menyelesaikan survei dan hasilnya menunjukkan bahwa siswa merasa video sangat membantu dalam mencari dan mempelajari jurnal. Hasilnya adalah siswa terbanti dalam 86% mencari dan 77% mempelajari jurnal. Siswa mengaku belajar di luar kelas melalui video membantu mereka dalam mengerjakan tugas (90%), informasi yang diperoleh dapat diterapkan di tingkat lain (87%) dan mereka lebih suka belajar melalui video di luar kelas daripada belajar di kelas (63%). Siswa dapat memperoleh pengetahuan dan keterampilan literasi sains melalui metodologi kelas terbalik, terutama menonton video.*

**Kata kunci:** *Flipped classroom, sekolah menengah pertama, literasi sains*

### Article History

Received: 25-01-2021

Final Revision: 02-06-2021

Accepted: 26-06-2021

Published: 30-06-2021

## INTRODUCTION

Scientific literacy is defined in a complex manner, starting from knowledge of scientific issues to solving problems due to the impact of the XXI century. Scientific literacy is individual scientific knowledge to identify phenomena, explain phenomena and draw conclusions about scientific problems; understand science as a research science; prove that science shapes nature; and explain knowledge in solving scientific knowledge and natural sciences. This is the basis for scientific knowledge to determine, phenomena and inferences about those related to science; understand science as a research science; prove that science shapes nature; and participate actively in solving scientific problems (Archer, 2014).

Scientific literacy is very important to be applied and improved in the educational curriculum (Smith et al, 2012). Science literacy combines educational knowledge, especially the flipped classroom experience, which uses learning in the form of videos to discuss some of the components above. The Ministry of Education and Culture (Kemendikbud) developed the main strategy of the School Science Literacy Movement in the form of Cross-Curriculum Science Literacy, which is an application approach that focuses on the scope of scientific literacy and provides strategies for implementing it for every student in the educational curriculum (Kementerian Pendidikan dan Kebudayaan, 2017). The aim of students with scientific literacy is to create citizens who can make informed, effective, and rational decisions for personal, national, and global levels. Literate citizens can solve scientific issues using appropriate techniques based on valid information (Park et al, 2017).

Students with scientific literacy can understand and analyze natural phenomena, evaluate the conclusions expressed by researchers, and validate claims (Holbrook & Rannikmae, 2014). Individuals with scientific literacy use attitudes, knowledge and skills by referring to scientific data to participate in local, national policies, and global (Yocoubian, 2018). Education at Kindergarten to Senior High School level needs to develop a strategy developed by the Ministry of Education and Culture and develop it in a challenging manner for the university level. The MoEC clearly outlines the process for creating scientifically literate students in the 2013 education curriculum. It is important to create opportunities for teachers to face internal challenges building knowledge and skills and evaluation of scientific knowledge (Stark et al, 2018).

Science literacy can be taught through several methods, one of which is the flipped classroom. The syntax of a flipped classroom consists of before class, in class, and after class. Outside the class (before class) students can watch videos and read e-books outside the effective schedule of lessons and then they enter the classroom with the knowledge they already have to complete class assignments (Nouri, 2016). If in a traditional classroom, students complete homework on their own without assistance, students can discuss directly with teachers and peers in the "flipped classroom" (Martin, 2015). Flipped classrooms make students the drivers of the learning experience. Learning can be defined as the acquisition of knowledge and / or skills through observation, experience, or by way of teaching (Figurska & sokol, 2016). Therefore, to create an effective learning environment for students, teachers can apply the flipped classroom method. The advantage of a flipped classroom is that students can learn material with their own control but are still under teacher supervision (Abeysekera & Dawson, 2015). For example, through video learning, students can repeat or set back and forth videos that they feel they understand or need to be repeated, so students can adjust their learning experience.

The material that is packaged through flipped classroom helps teachers measure students' understanding of concepts and skills in real time outside the classroom (Chen & Summer, 2015). So that when in the classroom it is effective to enrich the material taught outside the classroom through video, and students can focus and be responsible for being more actively involved in the classroom. Flipped classroom is an interactive method so that students are no longer passive learners and teachers no longer doubt whether students understand the material presented (Delialioğlu, 2012). Another advantage of flipped classrooms from feedback is that teachers can

overcome student difficulties through additional instructions so that they are guided in understanding assignments. Follow-up, teachers can see competent students by providing additional challenging work to further explore the potential of students. The goal is that students can control the learning experience, minimize the boredom that occurs in the classroom, educators do not need to worry about the profile of students who are easily bored, have competent skills, or who need to be invited to fight together. This is based on Flipped Classroom making learning adjustments student-centered (Roach, 2014).

In general, the Flipped Classroom technique used by researchers uses video before class starts (Bishop & Verlenger, 2013). The video in question is made and can be downloaded via an embedded access link. Through Flipped Classroom, videos can be made and taught to classes with general skills or to specifically (Butt, 2014). In the research analysis of the Flipped Classroom video, students can conclude understand and approve of videos as increasing motivation and learning outcomes for experiences learn them and use video as an additional learning medium to add strategy research.

Based on the aim of increasing the efficiency of scientific literacy in the school environment, pedagogical methodological research is carried out in a way that creates and provides videos to discuss some of the components outlined above. Students were asked to respond whether they rated the video and flipped classroom assignments as useful in obtaining, applying, and improving scientific literacy. A common Flipped Classroom method is to combine videos watched at home and discuss literacy about assignments in class. In this research, assignments in class are discussed and completed through group work where several students can work together to solve the questions in the assignment. Educators can guide and monitor discussions and enrich video material when students work together in the classroom.

## METHOD

This research takes the formulation of the research problem, "Do students assess videos through the flipped classroom method as a useful instrument to improve skills in searching and analyzing journals?" Through the formulation of the problem, this researcher hopes to find out whether students benefit from the flipped classroom model to acquire scientific literacy skills.

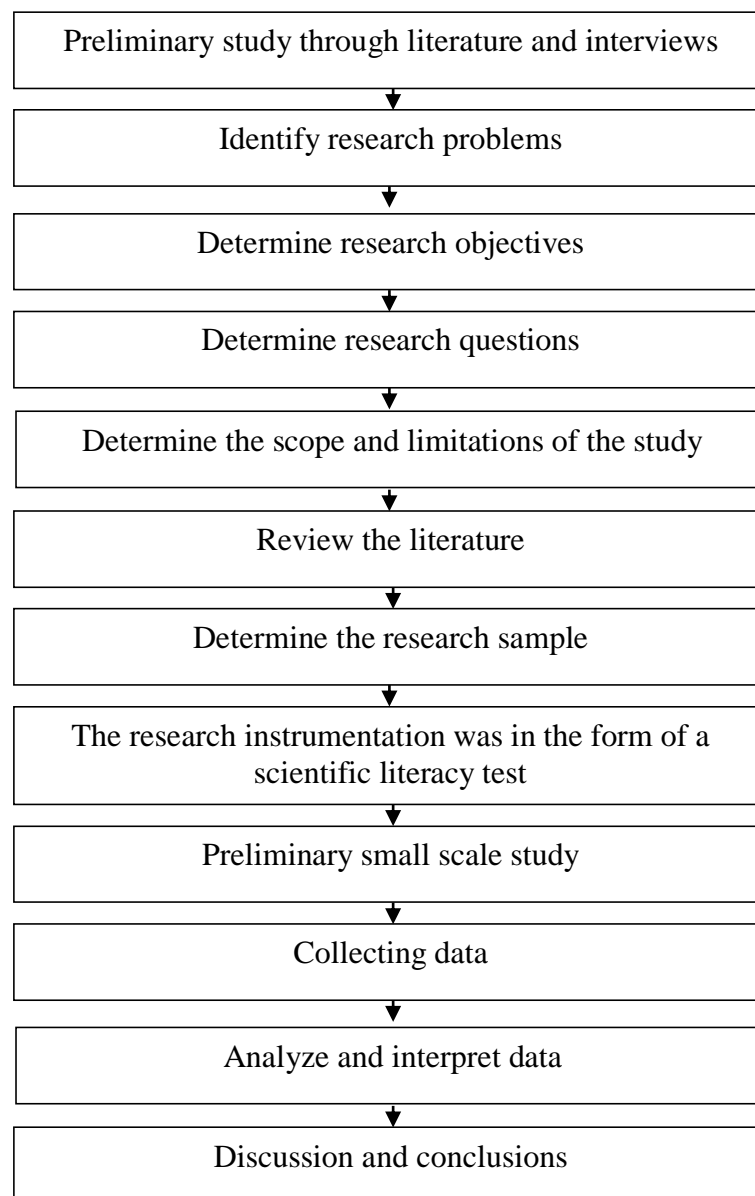
The subjects used in this research are Natural Sciences subjects in the health material of the Environmental digestive system in one of the State Junior High Schools in South Surabaya. The material is taught in grade 8 and is taught in 10 hours of lessons or four meetings in one semester. Data were collected from four meetings in December 2020. Lessons for all students totaled 111 students.

Students must complete four group discussions in class as part of the learning requirements in one semester. The concept of material is deepened by carrying out and completing learning activities in the classroom with the aim of strengthening the concept of learning. This research is based on the control class and the experimental class. Experiment class is different from the control class that does not use the flipped classroom methodology where the control class method is not given video media. Group members range from five students per group.

Before entering class for literacy discussion, students watch videos made by researchers to help search and research journals. Each video is about 30 minutes long. After watching the video the students worked in groups to complete the Student Worksheet (LPKD) questions. The questions presented in the LKPD :

1. Explain according to your argument, what is the purpose of the research?
2. What research questions did the author wish to answer?
3. Why is the writer sure that the title / topic is important to discuss?
4. Summarize the studies listed in the introduction. Why do researchers use these studies?
5. What evidence can the researchers find that supports their research questions?
6. What conclusions did the researcher reach?

7. What do researchers suggest as a limitation of the research? If not explained by the researcher. can you suggest that the researcher does better to answer the research question?



**Figure 1.** Flowchart of Research Procedure

The Screencast-O-Matic application supports video creation because it has features including video creation, editing, and sharing. Videos can be played back. Paused, and in quick settings during broadcast. Videos for how to search for journals are 6 minutes and 40 seconds long, and videos for how to review journals are 6 minutes 10 seconds long. Videos were posted to the Google Classroom learning management system as a focus for students in conducting literature searches. The Google Classroom LMS is the student's main access to download and upload assignments, bank exams, download teaching materials, review assessment rubrics, and access grades.

Students review videos and complete survey instruments under the teacher's direction. Survey uploaded by LMS Google Classroom. Students upload the LKPD and survey answers according to the teacher's instructions. The instructions read:

*Please complete the following survey honestly after watching the video. The results are used to review the effectiveness of the video as an instrument for searching and analyzing journals. Your responses are used to evaluate the flipped classroom learning model and are not included in the list your value.*

The survey consisted of 30 questions using a Likert scale. The Likert scale is a scale that is often used in research in the form of a point survey from a Likert scale from disagree to strongly agree. Survey questions that focus on previous, current, and future knowledge and skills. For example, previous knowledge "I already know how to search a journal", current knowledge (after watching the video. I'm sure I can complete the assignment"), and future knowledge ("the information I get I can pass on to other classmates"), Survey attached

## **RESULT AND DISCUSSION**

### **Search Journals**

The survey was answered by 111 students in three classes and all students answered all survey questions. All questions are answered by all students. The pass rates per class range from 75% to 82%. The purpose of this research is to improve scientific literacy by teaching how to search and review journals through videos. As much as 70% (N = 78) indicated that students knew how to search journals. 19% of students strongly agreed or agreed that they didn't know how to search for articles, and 11% (N = 12) is neutral.

86% of students agreed or strongly agreed (N = 96) that video was useful for students looking for journals. Students strongly agree / agree (90%. N = 100) that after watching the video they are sure they can complete the journal literacy task. Students disagreed (3.6%, N = 2) that they believed they could complete the assignment. Besides that, students stated that video is useful to be applied at other levels. Students strongly agree and disagree (87%. N = 97) that video is useful to be applied at other levels. Students strongly agree 54% (N = 60) and 37% agree (N = 41) that video is helpful information.

The concept of the flipped classroom model is that students learn material obtained outside and then enter the classroom to prepare the material that has been studied and are ready to actively discuss about literacy. The class format and assignments for flipped classroom are different from the class formats and assignments traditional class. Students who are passive in traditional classrooms are required to be active in the flipped classroom. Student responses address survey questions regarding whether they would prefer to watch videos outside of class based on their own free time. Students strongly agree or agree only 11% (N-12). and students 47% (N = 50) strongly disagreed or disagreed with watching videos in their spare time. Students 26% (N = 29) wanted the teacher to deepen the material in class and 2796 (N-30) did not want it.

Based on this analysis, it was concluded that after watching the video, students felt that they had acquired knowledge and scientific literacy skills. Students strongly agree or agree (93) N = 103) that they know how to search journals via web search engines and as much as 91% (N-101) indicate that students only focus on looking for journals according to their wishes and can mort single ranges according to their wishes

### **Reviewing Journals**

The survey was answered by 111 students in 3 classes and all students answered all survey questions. All grade 7 students answered the survey and there were no students who did not answer. Level graduation per class is 75% to 82%. All data shows that students strongly agree or agree (77%, N = 85) that all videos are useful for examining journals in accordance with the search for material themes. Only 33% (N = 37) of students strongly agreed or agreed that students did not know how to analyze jumplies with 68% (N = 76) of students stating that they had these skills. As many as 16% (N = 18) of students stated that to have skills students had to repeatedly watch and research videos

Students as much as 63% (N = 70) stated that they like watching videos in their time. However, students strongly agree or agree 47% (N = 52) that students want the teacher to evaluate the material together. Based on the analysis, students gained science literacy skills through video and most students understood and could research each section of the journal (89%, N = 99) and students understood how to find additional journals using the right keywords (86%, DAN 95), and they also found additional journals using the references section (929, N = 102). In addition, students believed that they could understand the research hypothesis (86%, N = 95) in the boundaries of the research (899, N = 99) and most students strongly agreed or agreed. (82%, N = 9) that they are increasingly skilled at writing citation sources using the APA format.

### **Video and Flipped Classroom**

In class, students work on assignments and are given the opportunity to discuss. However, in traditional methods, teacher explanations take up most of the discussion time (Bergmann et al, 2015). There are many advantages if the teacher applies the flipped classroom model for the teaching and learning process during the syntax in the classroom (Fulton, 2012). These advantages include; students can set their own learning time anywhere, students can set their own learning pace. The flipped classroom model educates students to be literate, active (Kellinger, 2012), and is very profitable in learning (Bishop & Verleger, 2013). In addition, the flipped classroom model gives students plenty of time to do innovative research (Freeman et al, 2012).

The flipped classroom model has a syntax that aims to make students play a more active role in the classroom and make learning effective in the classroom. In order for students to play a more active role in the class, students need to complete several requirements before class or before learning in class begins. Often times videos are given as homework that students need to complete. Through videos, students who previously had difficulty gaining learning experiences stated that videos are useful in helping students find and research journals. A small proportion of students (16%) use the opportunity to watch videos over and over again so that they are more competent in the knowledge and skills to complete class assignments.

Homework is given in the form of videos to support the effectiveness of learning in class, then it is followed by various student comments. 26% of students prefer the teacher to review with students the material about finding journals, and more than a third (47%) prefer it if the teacher reviews with students the material of researching journals in the class. Activating the role of students by searching, reading and deepening material outside of class or before class. Then students are actively involved with the knowledge gained in the classroom which is a relatively new method compared to traditional learning methods where students are passive. Therefore, this research reveals that there are some students who have doubts about playing an active role without the teacher in reviewing the material without students.

### **Acquisition of Scientific Literacy Skills**

The results of the research stated that almost all new students knew how to find journals (94%) and studied journals (58%). The survey states that students have knowledge and skills in using web search engines, limiting the date range to find the desired quantity, selecting search keywords. Meanwhile in general, students believe that they can analyze the journal and understand the hypotheses and limitations of the research that are read. Some students asked the teacher how to search journals on web search engines because they were struggling with this skill. They asked if they could search the journal from Wikipedia or Google.

In the classroom when they work in groups on assignments, they discuss how to identify hypotheses and what references are appropriate. The focus of the discussion is identifying research hypotheses from journals, identifying research variables, and making conclusions. The teacher facilitates students in answering assignment questions. There are several limitations or drawbacks to this research. First, students have initial knowledge about the skills taught in the video, so the researcher uses a pretest which aims to provide basic information on student skills.

Second, there is a short time to do research so that groups are formed to complete the task. Therefore it lacks in assessing individual skills. Third, the research class that is taken is only 1 level, namely grade 8.

The recommended recommendation for continuing research is the effectiveness of the video in the flipped classroom method which must include an individual assessment. Adding more variables, such as education level were included in the data and analysis. In general, scientific literacy is only taught in the field of Natural Sciences (IPA). Other fields of research for example PJOK, Craft, Indonesian Language and others often ignore the integration of science literacy. Scientific literacy can be integrated and applied to other fields of research, for example, the subject of stress in the field of science studies with the concept of lung and heart endurance in the field of CHD. In order for students' insights to be critical, creative, innovative, collaborative and able to communicate, knowledge and skills are needed in searching, reading, and researching journals seriously and critically. This subject is very important for all students and all levels of education, regardless of scientific or non-scientific fields of research. All fields of research should teach knowledge and skills in literacy and ensure that students are thirsty to have them for provisions in life. Therefore, literacy data must be collected by all field teachers so that schools are assisted in understanding the extent to which students' knowledge and skills can be overcome

## CONCLUSION

Most of the 111 students agreed that the flipped classroom is better than the traditional classroom because it improves their reading and writing skills. Flipped classrooms are more popular than traditional classrooms because they use videos to grab attention and allow students to share. The next day students have a basic understanding of the class material. . For further research, the researcher suggests to dig deeper into students' perceptions of the flipped classroom such as student attitudes and investigate other variables that can cause students' reading comprehension that have not been found in the research. Then, it is suggested for other researchers to use the control class and the experimental class to find out the difference. Further research should be extended to other variables that have not been measured in this research, for example the collaboration of the flipped classroom with the learning management system. In the application of reverse class, further research should be given extra attention with the video will be used. Make sure the video can make all students or respondents interested and easy to understand.

## REFERENCE

- Abeysekera, L & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher Education Research and Development*, **34**(1), 1–14.
- Bishop, J & Verleger, M. (2013). Testing the flipped classroom with model-eliciting activities and video lectures in a mid-level undergraduate engineering course. *Proceedings - Frontiers in Education Conference, FIE*, 161–163.
- Bishop, J & Verlenger, M. (2013). The flipped classroom: A survey of the research. *In 120th American Society of Engineering Education National Conference Proceedings, Atlanta, Georgia June*, **30**(9), 23–26.
- Butt, A. (2014). Classroom approach: Evidence from. *Business Education*, **6**(1), 33–44.
- Chen, H.L & Summers, K.L.S. (2015). Developing, using, and interacting in the flipped learning movement: Gaps among subject areas. *International Review of Research in Open and Distance Learning*, **16**(3), 41–64.
- Delialioğlu, Ö. (2012). Student engagement in blended learning environments with lecture-based and problem-based instructional approaches. *Educational Technology and Society*, **15**(3), 310–322.

- Figurska, I & Sokół, A. (2016). The process of knowledge acquisition with the use of various teaching methods and its effect on the creativity of employees of the creative sector. *Mediterranean Journal of Social Sciences*, **7**(6), 143-153.
- Fulton, K. (2012). Upside down and inside out: Flip your classroom to improve student learning. *Learning & Leading with Technology*, **39**(8), 12–17.
- Freeman, C., & Herreid, N.A.S. (2013). Case studies and the flipped classroom. *Journal of College Science Teaching*, **42**(5), 62–66.
- Holbrook, J. (2014). A context-based approach to science teaching. *Journal of Baltic Science Education*, **13**(2), 152–154.
- Nouri, J. (2016). The flipped classroom: for active, effective and increased learning – especially for low achievers. *International Journal of Educational Technology in Higher Education*, **13**(1), 33-40.
- Kellinger, J.J. (2012). The flipside: Concerns about the “New literacies” paths educators might take. *The Educational Forum*, **76**(4), 524–536.
- Archer-Bradshaw, R. (2014). Demystifying scientific literacy: Charting the path for the 21st century. *Journal of Educational and Social Research*, **4**(3), 165–172.
- Park, T., Pearson, D., & Richardson, G.B. (2017). Curriculum integration: Helping career and technical education students truly develop college and career readiness. *Peabody Journal of Education*, **92**(2), 192–208.
- Roach, T. (2014). Student perceptions toward flipped learning: New methods to increase interaction and active learning in economics. *International Review of Economics Education*, **17**(1), 74-84.
- Smith, K.V., Loughran, J., Berry, A., & Dimitrakopoulos, C. (2012). Developing scientific literacy in a primary school. *International Journal of Science Education*, **34**(1), 127–152.
- Kementerian Pendidikan dan Kebudayaan. (2017). *Materi pendukung gerakan literasi nasional*. Jakarta.
- Stark, E., Kintz, S., Pectorious, C., & Teriba, A. (2018). Assessment for learning: Using programmatic assessment requirements as an opportunity to develop information literacy and data skills in undergraduate students. *Assessment & Evaluation in Higher Education*, **43**(7), 1061–1068.
- Martin, M. (2015). Review of flipped learning. *British Journal of Educational Technology*, **46**(6), 1–22.
- Yocoubian, H.A. (2018). Scientific literacy for democratic decision-making. *International Journal of Science Education*, **40**(3), 308–327.