

Validity of Flipped Classroom on Guided Inquiry in Acid and Base Solution

Zildiya Guswita¹, Mawardi Mawardi*¹

Departement of Chemistry, Faculty of Math and Science, Universitas Negeri Padang

Padang, Indonesia



Abstract— The COVID-19 pandemic has shifted the face-to-face learning process to online. According to the demands of the 2013 curriculum, students play an active role in learning. Guided inquiry is a learner-centered learning model and can find a concept. A Flipped classroom is a learning system that can cope with online learning. This study uses R&D with a ploomp model, obtaining data from media experts with an average of 0.87 categorized with high validity, and the average obtained from material experts in chemistry is 0.84 categorized with high validity. While the average value of practicality obtained from students is 92% categorized as very practical and data obtained from high school teachers is 89% categorized as very practical.

Keywords— guided inquiry, flipped classroom, acid and base solution

I. INTRODUCTION

The World Health Organization reports a new case in Wuhan City, China. This case is known to be etiologically a new type of disease, namely the coronavirus (1). Coronavirus known as COVID-19, WHO has declared COVID-19 as a public health emergency with a fairly rapid spread. The transmission of this virus can be through coughing or sneezing from people who are detected or COVID-19 patients (2). Based on data from the beginning of March to May 12, 2020, there were 17,514 positive victims of this virus. As the number of positive victims and deaths in Indonesia increases, it influences changes to existing policies in Indonesia. One of them is a new policy in the field of education, namely learning which is usually done face-to-face and is done online (3).

With the implementation of online learning, there is some dissatisfaction with the learning outcomes obtained, such as the quality of the learning, the quality of the learning, and the time and how the students receive the learning provided. One of the main factors that play a role in online learning is the readiness of educators and students. It is not easy for educators to carry out online learning, so a learning model is needed that is by accordance with current conditions and can increase student motivation (4). For online learning to be maintained, schools can innovate and adapt to technology, one of which is being able to use media so that learning can take place (5). One of the learning models that utilize technology and online learning is blended learning. Blended learning is a combination of face-to-face and online learning [6]. In blended learning, there are learning methods that need to be considered. The appropriate method is the synchronous and asynchronous learning system, this learning system is found in one part of blended learning, namely the flipped classroom. Flipped classroom is a reverse learning. That is by reversing the activities of students who usually work in class by understanding the material from the teacher and at home doing the given task and solving a problem [7]. A learning method can run well, a learning strategy is needed. one that supports active learning with the 2013 curriculum is guided inquiry. Guided inquiry learning emphasizes students' thinking processes to get answers to a questionable problem and is effective in learning, by encouraging students to study groups by looking for their own sources to improve conceptual understanding [8].

There are five cycles of guided inquiry stages, namely orientation, exploration, concept formation, application, and closing [9]. The learning process is student-centered by forming small groups to collaborate with each other to ensure students can play a role in the learning process in an activity that has been designed to guide students in building an understanding, with this understanding students can solve a problem [10]. Students can also interact with each other, work in teams through structured group work [11]. Therefore, so that the learning process can take place, learning media is used.

However, in the current condition, not all teachers understand using technology media, while the teacher's role in online learning has a significant influence on students' understanding. In addition, online learning using media also has limitations in face-to-face meetings between students and teachers, resulting in unpreparedness in learning [11]. The unpreparedness of learning between educators and students, can affect learning under the demands of the 2013 curriculum, namely student-centered learning who plays an active role in learning with the help of a platform in the form of a Learning Management System that can support the learning process.

Based on these circumstances, so that online learning can be carried out with learning that is not far from student active learning, the development of a guided inquiry-based flipped classroom learning system is carried out on acid-base solution material for class XI SMA with limits on validity and practicality tests.

II. METHODOLOGY

The study uses Research and Development with a plom model, which consists of three stages, namely the preliminary research, the prototype phase and the assessment phase [12]. The research subjects consisted of lecturers from the Department of Chemistry, FMIPA UNP, lecturers in Electronic Engineering at UNP, teachers in Chemistry at SMA, and students in class XI MIPA at SMA Negeri 8 Padang. The object of research is a guided inquiry-based flipped classroom learning system on Acid-Base Solution material for class XI SMA by using instruments in the form of a material expert validation questionnaire, media expert validation questionnaire, and practicality questionnaire for teachers and students. The research was conducted at SMA Negeri 8 Padang.

III. RESULT AND DISCUSSION

Result

The study used R&D with the plom model [12]. In the preliminary stage, needs and context analysis, literature study, and conceptual framework were carried out. Needs analysis is carried out by analyzing a problem at school based on current conditions according to government regulations by shifting face-to-face learning to online learning to minimize the transmission of COVID-19. Next, look for sources or references that can solve a problem regarding the impact of learning during COVID-19. So that a guided inquiry-based flipped classroom learning system is produced on the acid-base solution material. Acid-base solution material is a material that has a broad concept. Previously this material has been compiled and validated by material experts.

At the prototyping phase there is a formative evaluation of each prototype produced. The making of a guided inquiry-based flipped classroom learning system has been prepared by the teacher to produce prototype I, then evaluate by filling out the self-evaluation sheet to see that the components in the learning system are appropriate, so that prototype II is produced. Prototype II validates with material experts, namely lecturers and teachers in the field of chemistry, and is carried out one-to-one with 3 students. The media used were also validated by 3 media experts, lecturers of information technology.

The value of the validation results using the aikens v scale, as follows:

$$v = \frac{\sum s}{n(c-1)}$$

The results of the media expert data processing with an average of 0.87 categorized with valid categories, and the average obtained from material experts in the field of chemistry is 0.84 with valid category. The results of the one-to-one interviews showed that a learning system can help students in learning. The validation results were revised to get a valid prototype III. Next, test small group with 15 students and 3 high school teachers in Chemistry to gain practicality from the resulting learning system, the data obtained from students that is 92% categorized as very practical and data that obtained from high school teachers that is 89% categorized as very practical. System practicality learning is obtained from table 1:

$$NP = \frac{R}{SM} \times 100 \%$$

Table 1. Practicality Category

Skor	Kepraktisan
86%-100%	Sangat praktis
76%- 85%	Praktis
60%-75%	medium
55%-59%	rendah
54%	Tidak praktis

Discussion

The data obtained from the research results of the flipped classroom learning system based on guided inquiry on the material of acid and base solutions seen from the results of validity and practicality. The validity of the media is assessed by the ease of use, in research the media used is Edmodo. Edmodo has features that are easy for students to use and it looks like Facebook. Furthermore, the validity of the material expert was carried out with two lecturers and three high school teachers in the field of chemistry who had high validity values seen from the model and key questions according to the learning objectives so that the competency achievement index (GPA) was achieved. Guided inquiry learning with the flipped classroom method is carried out through two stages of learning, namely asynchronous and synchronous. The two stages used a guided inquiry learning model, namely the orientation stage, the exploration stage, and concept formation, and the application stage was carried out asynchronously using Edmodo. at the exploration and concept, formation stage students are asked to observe the model or information to answer key questions, students answer by working in teams and the teacher organizes and guides the discussion, at this time which is student-centered learning [13]. While the closing stage is carried out synchronously using a zoom meeting.

In the practicality test, students carry out learning activities at home by discussing with their friends or groups through Edmodo, while the teacher acts as a facilitator. During learning hours, students are asked to convey the results of the discussion and at the end of learning students can conclude. From the data obtained, the practicality of 92% of students and 89% of high school teachers are very practical. So that the guided inquiry-based flipped classroom learning system can be used because it is valid and practical.

IV. CONCLUSION

Learning using the guided inquiry model can be used by students during online learning using the flipped classroom method. From the results obtained, the flipped classroom learning system based on guided inquiry on acid and base solutions can be used because it has been tested for validity and practicality. The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g." Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

ACKNOWLEDGMENT

The researcher would like to thank the Head of the Department of Chemistry, Ms. Asra, and all parties who have helped researchers in completing this research.

REFERENCES

- [1] Moudy, J., Syakurah, R. A., & Artikel, I. (2020). *Higeia Journal Of Public Health*. 4(3), 333-346.
- [2] Satgas Penanganan COVID-19. (n.d). Data Sebaran. Retrieved from <https://covid19.go.id>
- [3] Ratu, D., Pramudibyanto, H., & Uswatun, A. (2020). *Pendidikan Dalam Masa Pandemi Covid-19 Pendahuluan*. 10(1), 41–48.
- [4] Mujib, I. H. Al. (2020). *Jurnal Nomosleca*. *Jurnal Nomosleca*, 6(April), 68–76.
- [5] Herliandry, L. D., & Suban, M. E. (2020). *Jurnal Teknologi Pendidikan Pembelajaran Pada Masa Pandemi Covid-19*. 22(1), 65–70.

- [6] Chaeruman, U. A. (2013). Merancang Blended Learning Yang Membelajarkan. *Meningkatkan Kualitas Pembelajaran Melalui Penggunaan Sumber-Sumber Dan Teknologi Yang Tepat*, 1(1), 384–394. [Http://Ci.Nii.Ac.Jp/Naid/40016053415/En/](http://Ci.Nii.Ac.Jp/Naid/40016053415/En/)
- [7] Penerapan, E., Pembelajaran, M., Peningkatan, P., & Berpikir, K. (2017). *Efektivitas Penerapan Model Pembelajaran Flipped*. 3(2), 160–170.
- [8] Mawardi, M., Aini, F. Q., Gazali, F., Fitriza, Z., & Priscylio, G. (2019). Perkembangan Model Mental Mahasiswa pada Penggunaan Bahan Ajar Kesetimbangan Kimia berbasis Inkuiri Terbimbing. *Jurnal Eksakta Pendidikan (Jep)*, 3(1), 40. <https://doi.org/10.24036/jep/vol3-iss1/323>
- [9] Mawardi & Andromeda. (2015). *Pengembangan Bahan Ajar Hidrolisis Garam Berbasis Guided-Inquiry Dengan Representasi Chemistry-Triangle Untuk Siswa SMA/MA*. Prosiding SEMIRATA 2015 bidang MIPA BKS-PTN Barat Universitas Tanjungpura, Pontianak Hal. 356 – 365
- [10] Asra & Mawardi. (2013). *Inkuiri Terbimbing Merupakan Salah Satu Strategi Pembelajaran Kimia Untuk Memenuhi Tuntutan Kurikulum 2013*. Prosiding Seminar Nasional Pembelajaran Fisika. Padang 2 November 2013
- [11] Mawardi, M., & Yani, F. H., Aisyah Fitri Rusiani, J.(2020). Effectiveness of student worksheets based guided inquiry on acid base material to improve students higher order thinking skill (HOTS). *Journal of Physics: Conference Series*, 1481(1). <https://doi.org/10.1088/1742-6596/1481/1/012083>
- [12] Fitri, R. (2017). Pengembangan Perangkat Pembelajaran Berbasis Pendekatan Konstruktivisme Untuk Meningkatkan Kemampuan Pemahaman Konsep Pada Materi Persamaan Lingkaran. *Jnpm (Jurnal Nasional Pendidikan Matematika)*, 1(2), 241. <https://doi.org/10.33603/Jnpm.V1i2.562>
- [13] Iryani, Mawardi & Andromeda. (2016). *Pengaruh Menggunakan LKS Inkuiri Terbiimbing pada Materi Koloid*. Eksakta Vol. 1 Tahun XVII Februari 2016.