Analysis of Student Independence and Habits of Mind of Students in Biology Learning in Class X MIA through Portfolio Assessment

Rikizaputra[1*], Lufri[2], Andromeda[2], Fatni Mufit[2]

[1] University of Lancang Kuning, Pekanbaru, Riau, Indonesia
[2] Padang State University, Padang, West Sumatra, Indonesia

Abstract: Everyone is taught to live independently, independence is a pattern of life that is formed from the habits of various human habits. Habit of thinking is one of the causes. The habits of intelligent thinking of each individual are called habits of mind. Independence and habits of mind are the factors needed in the series of learning processes so that the problems faced by students are able to be resolved properly, becoming a problem in schools that students' learning independence is less honed because of the dominance of teachers in teaching. The purpose of this study was to determine the profile of students' learning independence and habits of mind. Conducted in 2020 in class X MIA SMAN 7 Pekanbaru. This research is a descriptive research type with a survey method. The instruments used were in the form of a questionnaire of learning independence and habits of mind with 30 items of positive and negative statements that have been validated on a 5-Likert scale ranging from strongly disagree (SD) to strongly agree (SA) With three questionnaire categories, there are 3, namely high (mean 4.41-5.00), moderate (mean 3.39-4.40), low (mean 1.00-3.38). The research data were processed by using descriptive percentages. The results showed that the independent learning in portfolio assessment learning was 3.60 in the medium category. The mean of students' habits of mind is 3.8 in the medium category.

Keywords: Learning independence; habits of mind; portofolio

Introduction

The government has made various efforts in order to improve the national education process, among others, making changes to the curriculum, changing textbooks, upgrading and training teachers. One effort that is no less important is learning and teaching, which is the core of the educational process (Sukmadinata, 2007).

The learning process is a major component that must be established in the teaching process which serves as an indicator of educational success. The success of a learning process is largely determined by teacher factors. The teacher occupies a key position in creating a conducive and enjoyable learning atmosphere in order to be able to lead students to achieve goals optimally to build positive attitudes in learning, arouse curiosity, encourage independence, and the accuracy of intellectual logic.

One of the components that greatly determines the successful implementation of a learning strategy is the teacher who teaches it. Teacher expertise in using learning models, methods, approaches and techniques can be the key to the success or failure of learning. The model is a learning stage characterized by syntax. The method is a practical way that is applied in learning. The approach is a learning point of view, while the learning technique is an implementation of the method (Rusman, 2011).

The teacher's ability to choose and sort out the right learning strategy, meaning that it is effective and efficient will greatly affect the meaning of learning. The way the teacher delivers the subject matter greatly influences the learning independence and thinking habits of students on the subject matter which is expected to increase student motivation and competence. In addition to considering the social conditions of students, the strategies used must also be in accordance with the teaching material (Paruha et al., 2016).

Apart from the teacher factor, there are many other factors that also affect the quality of learning activities, for example students, the availability of adequate educational facilities, existing teaching materials or materials, school administration and management as well as parents' attention. Quality students will be able to be born from a learning process that pays attention to the various sectors that influence it. The important role of the education process is how to give birth to young people who have quality and are able to answer challenges. Therefore, improving quality and creativity is a must in order to develop the potential that exists in students (Rusman, 2011).

Teachers can change the paradigm of the learning process, namely from the teaching thinking paradigm to the learning paradigm. If we pay attention to the standard of the educational process, the learning process that is carried out is emphasized on learning that can help facilitate the development of student potential. The learning process must be directed at emphasizing the activities of students and strengthening learning responsibilities for students so that student participants can develop their potential. Therefore, choosing learning activities that can foster students' level of understanding and creativity needs to be done by the teacher (Rustaman et al., 2005).

According to a survey conducted at SMAN 7 Pekanbaru, students' independence and ability to act intelligently in learning was still lacking. Students always wait for orders from the teacher to carry out activities such as looking for material, taking notes and so on. For that it is necessary to do learning that can increase the independence of students in learning and change the way they think. One of the efforts to improve this condition is by implementing portfolio-based learning (Saefullah et al., 2013).

Portfolio learning is seen as an alternative strategy that can be done in learning because it is considered capable of fostering student understanding in learning (Kusaeri, 2014). Portfolios as assessments and learning strategies can achieve several learning objectives such as teachers monitoring the progress experienced by students after going through the learning process. Documentation of the learning process that is taking place can be carried out, the success of learning achieved by students can be considered well, the increase in the effectiveness of learning can be carried out by the teacher, there is space to exchange information between teachers and parents of students, and the concept of accelerating positive development in students can be realized (Kusaeri, 2014).

It should also be noted that portfolio assessment should not negate the assessment by other means, meaning that the assessment can be enriched by other methods such as tests, performance and so on. The four pillars of education are the main foundation in implementing portfolio-based learning, namely learning to know, learning to be able to do, learning to form a complete individual, meaning that it is balanced between emotional, spiritual and intellectual, and learning to be able to live together in society (Sumadinata, 2007) . Based on the above background, it is considered important to conduct this research.

Learning portfolio will expose students to many tasks, to complete the task requires intelligence in thinking and acting as well as student active participation so that the completion of assignments can be effective and efficient. Cheung and Hew (2010) state that self regulation is open in habits of mind so that it can be explored through active participation. The formulation of the problem in this research is how are the students' learning independence and habits of mind through portfolio assessment learning?

Method

This research was conducted in the odd semester of 2020 in Class X MIA SMAN 7 Pekanbaru. The population is the entire research subject (Arikunto, 2002). The population in this study were students of class X MIA SMAN 7 Pekanbaru which consisted of 4 classes with a total of 144 students. As a sample, 25% of students were taken using the Simple Random Sampling technique. Simple rendom sampling is a sampling technique in which all individuals in the population either individually or collectively are given the same opportunity to be selected as members of the sample.

The descriptive approach with the survey method was chosen in this study without giving treatment, manipulation or altering the variables used, but rather how to give a natural picture as it is (Mc. Millan and Schumacher, 2001). Descriptive is an approach that provides a systematic and accurate description of the facts and characteristics of the population being studied. The collected research data that has been collected is analyzed and interpreted for

further description in order to illustrate the real conditions of the research subject.

The instruments to be used in this study are 30 items of learning independence questionnaire and habits of mind respectively developed based on the dimensions of habits of mind according to Costa and Kallick (2000) and independent learning according to Desmita (2009). The 30 questionnaire items consist of positive and negative statements on a 5 Likert scale which ranges from strongly disagree (SD) to strongly agree (SA).

Data were analyzed by descriptive percentage on each variable of learning independence and habits of mind in each class and in total. The mean of the questionnaire is converted into categories according to Cavas (2011), there are 3 questionnaire categories, namely high (mean 4.41-5.00), moderate (mean 3.39-4.40), low (mean 1.00-3.38).

Result and Discussion

Independent Learning

The data from the results of this study are presented based on indicators on each of the variables studied in biology learning in the MIA SMA class using portfolio assessment learning. Based on the analysis of the data obtained, it was found that detailed student learning independence can be seen as in Table 1.

Table 1. Average Student Learning Independence in Portfolio Assessment Learning

No	Independence Indicator	Score	Category
1	There is a strong desire or desire to learn	3.7	Medium
2	Able to take decisions and initiatives to deal with problems	3.5	Medium
3	Responsibility for what he did	3.6	Medium
4	Confident and carry out tasks independently	3.6	Medium
Average		3.6	Medium

In Table 1, we can see that the average student learning independence on each indicator shows a moderate category, even though it shows various numbers. In general, students' learning independence is still in the medium category. The medium category indicates that the learning process has not been maximized in the implementation of the portfolio as an assessment in learning. This figure shows that there is no dominant indicator of independence. Students' confidence in learning affects their ability to utilize the strategies used. Sa'diyah (2017) states that independence is practically an ability that a person has in thinking and acting independently to meet their needs so that they no longer depend on others but can become individuals who can stand on their own. In line

with Basry (2017), there is a significant positive relationship between self-confidence and independence, that someone who is confident will have a strong desire to learn so that he is responsible and able to make decisions independently.

The average student learning independence on each indicator after the portfolio assessment learning has shown a fairly good number, even though the high category has not been achieved. Overall, we can see that the average independent learning in learning is 3.60. This figure shows that the learning independence of students is starting to be honed by the portfolio assessment learning that is being carried out. This is due to the fact that students are trained in making assignments independently, because portfolio assessment is an assessment strategy based on assignments and works. Surapranata and Hatta (2004) state that portfolio assessment can be interpreted as an assessment based on a collection or collection of work, which contains information on the ability, achievement, progress and development of students through assignments determined by the teacher and displayed at a certain time.

Suryadana (2009) which states that portfolio-based assessment learning has a good impact on student learning independence. In line with that, Lubis et al (2016) found the application of portfolio learning to be effective in improving the learning independence of students. The effectiveness of student learning using a portfolio is due to the positive response of students to this learning. Lukitasari et. al (2020), strengthening the arguments of students who use portfolios in learning shows a positive response.

Independence is an important thing that must be developed in the learning process. The development of student independence is caused by high activity by implementing portfolios. Nuraeni (2019), explains that the application of portfolio-based assessments can improve student learning activities. In line with that, Wijaya (2015) found that independence has a significant relationship with learning activities.

Ratih's (2018) research results show that portfolio-based learning can increase student learning activity. This is in line with Estiastuti and Setyawati (2017), learning activeness has a positive and significant relationship with student learning independence. Learning independence certainly affects student achievement. Asmar (2018), writes that there is a significant direct effect of independent learning on student science learning achievement.

Table 2. Categories of Learning Independence Based on Number of Students

No	Independence Category	Total (%)
1	Low	25.0
2	Medium	66.7
3	High	8.30

The results of the research in Table 2. above indicate that there are differences in the number of students who experience an increase or improvement in independence in learning based on portfolio assessment. The number of students who have moderate independence is very dominant, namely 24 people (66.7%), who have high independence also experience an increase, from 1 to 3 people. 25% of students have low category learning independence. This means that there is still a need for a more effective and efficient portfolio utilization strategy in learning.

The independence of the majority of students in portfolio assessment learning is better due to the habit of students preparing assignments in learning. Sriyati (2011) states that students who learn with a fortopolio will be more independent and responsible, because portfolio-based formative assessment encourages someone to be disciplined in carrying out their assignments. In line with Suryadana (2019) that portfolio learning requires students to be more independent in learning because of the various collections of work and assignments they do.

Portfolio assessment is an important part of the learning process which is currently an alternative assessment option for teachers. The portfolio assessment process is critical to the success of the teaching program. Implementation of portfolio learning, students will be involved at each stage of learning portfolio assessment. According to Surapranata and Hatta (2004), the stages of portfolios that are implemented starting from setting goals, determining the contents of the portfolio will have an impact on students' learning independence.

In principle, the contents of the portfolio are student assignments and works. Assignments in learning will have an impact on improving learning independence. Nurmala and Mulyadi (2014) explain that assignments or recitations in learning have a positive effect on independence. In line with that, Yildirim (2013) found that the use of portfolios helps student-teachers to become more independent with regard to their personal and professional development in understanding the portfolio process in a positive way.

Habits Of Mind (HOM)

Research data on the HOM variable are presented based on indicators before and after the portfolio assessment learning is carried out, in detail can be seen in table 3.

Table 3. Average Habits of Mind of Students Before and After Portfolio Assessment Learning

No	Indicator Habits of mind	Score	Category
1	Persisting	3.9	Medium
2	Managing impulsivity	3.6	Medium
3	Listening with understanding and empathy	4.1	Medium
4	Thinking flexibly	3.7	Medium
5	Metacognition	3.7	Medium
6	Striving For Accuracy	3.9	Medium
7	Question and posing problem	3.9	Medium
8	Applying New Knowledge to New Situation	3.7	Medium
9	Thinking And Comunicating with Clarity and Precision	3.8	Medium
10	Gathering Data Through all Sense	3.8	Medium
11	Creating, Imagining and Innovating	3.9	Medium
12	Responding with wonderment and awe	3.9	Medium
13	Taking responsible risk	4.0	Medium
14	Finding humour	3.6	Medium
15	Thinking interdependently	3.9	Medium
16	Remaining open to continuous learning	4.1	Medium
Average		3.8	Medium

In Table 3, it can be seen that in general the students' HOM on each indicator is in the medium category. When viewed from the numbers, it shows the diversity of each student's HOM indicator than learning. HOM on learning is 3.8. This is because the portfolio assessment also contributes to improving students 'learning independence, even though it is not optimal, meaning that there are still opportunities to improve the learning process so that students' HOM can reach the maximum. Student habits and student compatibility with a strategy in learning affect their ability to receive learning messages.

In learning activities there is always a stimulus and response and between the two there is a process. Constructivism teaches that how a person responds after learning depends on the individual's ability to process stimuli in the learning process. HOM is one of the learning responses generated by a series of stimuli given, the stimulus can be in the form of motivation, materials and learning tasks. In accordance with the Classical Conditioning theory which states that learning activities teach new attitudes to students which encourage them to learn certain attitudes even though sometimes these attitudes are not realized by students.

A person's ability to act in solving problems depends on mental attitudes and habits in managing these stimuli. Costa and Kallick (2008) stated that HOM depends on mental habits. In line with that, Winkel (1996) also conveyed the link between Operant Conditioning theory with the learning pathway for attitudes in learning that someone who is diligent and learns well will provide self-reinforcement.

In Table 3, it is found that there are differences in the mean HOM for each indicator. These data differ only slightly but indicate an increase in HOM as portfolio learning is provided. This is because many of them are related to assignments, such as papers, environmental observation assignments and simple research as well as a variety of practicums that are given so that this has the opportunity to shape the character and experience of scientists. Nurmaulita (2014) found that students who learn through a work-oriented and assignment-oriented community-technology science approach will show very good Habit of Mind (HOM), it can be seen from self-regulated thinking, critical thinking and creative thinking.

HOMs can be formed through various types of assignments. Costa and Kallick (2008) explain that even though the tasks done by a person are different, all of these tasks can lead to the formation of HOM if the task is carried out consistently and continuously. Learning habits in the classroom also have a role in the formation of student HOMs. The same thing was also found by Sriyati (2011) that HOM will be formed through portfolio assessment in the form of an assignment strategy. Students who have been in college for a long time usually receive more and more workloads so that this is what contributes to forming their HOM.

The ability to think smart (HOM) really needs to be formed and developed at various levels of education including in tertiary institutions which are basically faced with various problems, so that they can solve these problems effectively and efficiently.

The results of this study found that the students' HOM was still in the medium category. This is caused by students' inconsistency in completing assignments and also due to their different mindset when completing assignments or problems. Isfiani (2016) found that thought patterns give rise to an emotional aspect that appears as a normal response, namely in the form of cognitive anxiety. The complexity of these components will indirectly affect the acquisition of learning outcomes and HOM.

The HOM condition of students in this study needs to be improved with various strategies and approaches so that from the medium category they can reach the high category. HOM is a very important dimension of learning. Costa and Kallick (2008) explain

that HOM is not only about mastering concepts, attitudes and skills. HOM is a combination of these three components which leads to the formation of personality maturity and intellectual enhancement.

Based on the data analysis conducted, it was found that the number of students who experienced moderate HOM was more dominant, namely 66.7%, the high category was 22.2% and there were still those who had a low HOM, namely as many as 11.1% of students. For more details, it can be seen in Table 4. The diversity of students' HOMs on each indicator is caused by student learning habits through portfolio assessment learning. With portfolio learning students are accustomed to independently doing assignments. The habit of doing this task gradually sharpens the habits of intelligent thinking of students so that the learning assignment given by the teacher can be completed as expected.

Habits like this train the habit of creative thinking and the ability to control work regularly. Rakhmawati (2013) found that students who learn by learning electronic-based portfolio assessment have a good effect on their HOM. The same thing was also stated by Idris et al (2014) that students who studied with portfolio assessment showed better HOM.

Table 4. Habits of Mind Categories Based on Number of Students

No	Habits of Mind category	Sum (%)
1	Low	11.1
2	Medium	66.7
3	High	22.2

HOM really determines the learning strategies that need to be used in learning so that educators need to know the HOM of the students they are teaching. Hidayati and Idris (2020) state that knowing the HOM profile can help lecturers or teachers in determining the design or learning strategy to be used.

Learning through portfolio research is able to develop the Habit of Mind (HOM) of students, because portfolio assessment is a class-based assessment of a group of student works that is arranged systematically and organized during the learning process within a certain period of time which is used to determine the development of students' knowledge and attitudes. Surapranata and Hatta, 2004). The most dominant component of portfolio assessment in this study is written feedback and self assessment. The self-assessment provided helps students evaluate how they work and think. The effects of giving written feedback and self-assessment such as being aware of mistakes in taking tests, being open, being able to work independently, getting used to assessing their strengths and weaknesses so that they can be corrected

immediately, continuously and continuously will become a habit (Habit of Mind).

Conclusion

Based on the data analysis carried out, it can be concluded that the student learning independence in portfolio assessment learning is 3.60 in the medium category. The average HOM of students is 3.80 in the medium category. The number of students who experience independent learning and HOM in the moderate category is more dominant.

Acknowledgments

References

Asmar, E. (2018). Pengaruh Kemandirian Belajar Dan Minat Belajar Terhadap Prestasi Belajar Ilmu Pengetahuan Alam. *Jurnal Pendidikan MIPA*. 1(1). [Indonesian]

Basry, A.A. (2017). Hubungan Antara Kompetensi Guru Dan Kepercayaan Diri Dengan Kemandirian Siswa SMP N 2 Pangkalan Susu. *Jurnal Psychomutiara Volume.* 1(1).

Cheung, W.S & Hew, K.F. (2010). E Examining facilitators' habits of mind in an asynchronousonline discussion environment: A two cases study. *Australasian Journal ofEducational Technology.* 26(1), 123-132

Costa , A.L. & Kalliks, B. (2000). *Describing 16 Habits of Mind. Habits of Mind:A Developmental Series*. Alexandria, VA.

Costa, A.L., & Kallick, B. (2008*). Learning and Leading with Habits of Mind 16 Essential Characteristics for Students. Washington DC*: Association for Supervision and Curriculum Development.

Cavas, P. (2011). Factors Affecting the Motivation of Turkish Primary Students for Science Learning. *Science Education International*, 22, 31-42.

Desmita. (2009). *Psikologi Perkembangan Peserta Didik.* Remaja Rosdakarya: Bandung. [Indonesian]

Estiastuti, A., & Setyawati, Y. (2017). Hubungan Kemandirian dan Keaktifan Belajar dengan Hasil Belajar PKn. *Joyful Learning Journal (JLJ).* 6(4). doi: https://doi.org/10.15294/jlj.v6i4.15022 [Indonesian]

Hidayati, N., & Idris, T. (2020). Students' habits of mind profiles of biology education department at public and private universities in Pekanbaru, Indonesia. *International Journal of Instruction*, *13*(2), 407–418. https://doi.org/10.29333/iji.2020.13228a

Idris, T., Sriyati, S., & Rahmat, A. (2014). Pengaruh Asesmen Portofolio Terhadap Habit of Mind dan Penguasaan Konsep Biologi Siswa Kelas XI. *Jurnal Pendidikan Biologi*. 6(10); 63-67. [Indonesian]

Isfiani, I.R. (2016). Profil Tingkatan Habits of Mind dan Kecemasan Kognitif dalam Mata Pelajaran Biologi Pada Siswa SMA. *Biodidaktika,* 11(2). doi: http://dx.doi.org/10.30870/biodidaktika.v11i2.1708 [Indonesian]

Kusaeri. (*2014*). *Acuan dan teknik penilaian proses dan hasil belajar dalam kurikulum 2013*. Ar Ruzz Media. Yogyakarta. [Indonesian]

Lubis, S., Hasruddin, & Mahmud. (2016). Efektivitas Penggunaan Portofolio pada Perkuliahan Mikrobiologi Terhadap Kemandirian dan Hasil Belajar Mahasiswa. *Jurnal Pendidikan Biologi,* 6(1), doi:https://doi.org/10.24114/jpb.v6i1.4323. [Indonesian]

Lukitasari, M., Hasan, R., & Sukri, A. (2020). The effect of e-portfolio on biological concepts understanding and responses of students with different academic achievement levels. *International Journal of Instruction*, *13*(1), 685–694. https://doi.org/10.29333/iji.2020.13144a

Mc. Millan, J.H. & Schumacher, S. (2001). *Research in Education. Fifth Edition*. New York: Longman.

Nuraeni, Z. (2019). Implementasi Penilaian Berbasis Portofolio Untuk Meningkatkan Aktivitas dan Hasil Belajar Mahasiswa Semester 1 Pendidikan Matematika STKIP Muhammadiyah Kuningan. *Jurnal Gantang*, 4(1), 79-85. doi:https://doi.org/10.31629/jg.v4i1.797 [Indonesian]

Nurmaulita (2014). Pembentukan Habits Of Mind Siswa Melalui Pembelajaran Salingtemas Pada Mata Pelajaran Fisika. *Jurnal Pendidikan Fisika* 3(1). doi:https://doi.org/10.22611/jpf.v3i1.3278 [Indonesian]

Nurmala, A., & Mulyadi, A. (2014). Pengaruh Metode Resitasi Terhadap Kemandirian Belajar Siswa Kelas Iv Di Sd Negeri Setia Darma 04 Tambun Selatan. *Jurnal PEDAGOGIK*.II(2). [Indonesian]

Paruha, B.E., Aswandi., & Yuniarni D. (2016). Peran Guru Dalam Melatih Kemandirian Anak 5-6 Tahun di TK Kristen II Sungai Raya. *Jurnal Pendidikan dan Pembelajaran Katulistiwa*. 5(6). [Indonesian]

Rakhmawati, I. (2013). *Penerapan Asesmen Portofolio Elektronik Untuk Meningkatkan Habits Of Mind dan Penguasaan Konsep Mahasiswa Pendidikan Biologi*.

Repository Upi.Edu. Universitas Pnedidikan Indonesia. [Indonesian]

Ratih, D. (2018). Penerapan Model Pembelajaran Berbasis Portofolio Untuk Meningkatkan Keaktifan Siswa Dalam Pembelajaran Pkn Kelas Vb Sd Bantul Timur. *Jurnal Pendidikan Guru*. 7(18). [Indonesian]

Rusman. (2011). *Model-Model Pembelajaran, Mengembangkan Profesionalisme Guru*. Raja Grafindo Persada: Jakarta. [Indonesian]

Rustaman., Dirdjosoemarto S., Yudianto, S.A., Achmad Y., Subekti, R., Rochintaniawati, D., & Nurjhani, M. (2005). *Strategi Pembelajaran Biologi. Malang*: UM Press. [Indonesian]

Sa'diyah R. (2017). Pentingnya Melatih Kemandirian Anak. *Jurnal Kordinat. XVI(1).* DOI: 10.15408/kordinat.v16i1.6453 [Indonesian]

Saefullah A., Siahaan P.,& Sari I M. (2013). Hubungan Antara Sikap Kemandirian Belajar Dan Prestasi Belajar Siswa Kelas X Pada Pembelajaran Fisika Berbasis Portofolio. *Jurnal Wahana Pendidikan Fisika* 1(1). doi: https://doi.org/10.17509/wapfi.v1i1.4891 [Indonesian]

Sriyati, S. (2011). Peran asesmen formatif dalam membentuk habits of mind mahasiswa biologi. *(Disertasi)*. Sekolah Pascasarjana, Universitas Pendidikan Indonesia, Bandung. [Indonesian]

Suryadana, M. (2019). Pengaruh Aasesmen Portofolio Terhadap Kemandirian dan Minat Belajar. E *Jurnal Pasca Undiksa*. 3(1). [Indonesian]

Sukmadinata, N.Y. (2007). *Landasan Psikologi Proses Pendidikan*. Remaja Rosdakarya: Bandung. [Indonesian]

Surapranata., Sumarna, & Hatta, M. (2004). *Penilaian Portofolio*. Remaja Rosdakarya: Bandung. [Indonesian]

Wijaya, R. (2015). Hubungan Kemandirian Dengan Aktivitas Belajar Siswa. *Jurnal Penelitian Tindakan Bimbingan & Konseling, 1*(3). Diambil dari https://i-rpp.com/index.php/jptbk/article/view/333. [Indonesian]

Yildirim, R. (2013). The Portfolio Effect: Enhancing Turkish ELT Student-Teachers' Autonomy. *Australian Journal of Teacher Education, 38*(8). http://dx.doi.org/10.14221/ajte.2013v38n8.8