



Teacher Strategies in Managing Chemistry Learning Time to Improve Student Learning Achievement

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Abstract: The purpose of this research is to find out the teacher's strategy in managing ideal and effective chemistry learning time to improve students' learning achievement. The method used is literature research using secondary data reviewed from books, articles, and journals. The results show that chemistry learning conducted during the day has an ineffective impact on students in participating in learning, such as students not focusing, tired, sleepy, hungry, thus disrupting students' learning concentration. The hot classroom conditions during the day also make it difficult for students to accept the material taught by the teacher. Thus, morning time is considered an effective time or a good time to absorb chemistry learning materials. Students can also repeat or study the material again so that they understand better in the afternoon or evening. Thus, teachers can prepare teaching materials that have been adjusted to the time allocation so that learning is expected to run well and effectively.

Keywords: Chemistry Learning Time; Literature Research; Learning Achievement

Introduction

The chemistry learning process must have a goal that becomes the direction of a learning process, while the purpose of chemistry learning is to provide opportunities for students to learn theories and facts and develop scientific habits and attitudes so that students can find practical and logistical skills to build knowledge and understanding (Juwitasari & Suyono, 2023).

Chemistry learning becomes fun and can encourage students to be active in the learning process, inseparable from the role of the teacher in it (Sitorus, 2022). The ability and role of teachers in providing learning to students according to Sitorus (2022), can be oriented towards increasing the intensity of students' involvement in the learning process and can bring many benefits to students. One of them, can have an impact on the success of students in improving their learning achievement. Learning achievement is the ultimate goal of learning activities in schools that are successfully

achieved by students expressed in numbers or letters (Wijaya, 2021). Learning achievement according to Wijaya (2021), can also be interpreted that if someone has learned, there will be a change in behaviour in that person, for example from not knowing to knowing and not understanding to understanding. The learning achievement achieved by students is closely related to the formulations and objectives that have been planned by the teacher beforehand, into three categories, namely cognitive, affective, and psychomotor (Wijaya, 2021).

A person's success in learning depends on the factors that influence it (Wijaya, 2021). Factors that affect learning achievement can be classified into two parts, namely internal factors and external factors. External factors according to Wijaya (2021) are factors that affect learning achievement that come from outside students, including parents' educational background, parents' social economic status, availability of facilities and infrastructure at home and school, media used by teachers, and teacher competence. Internal factors

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according to Wijaya (2021) are factors that affect learning achievement that come from within students, including students' intelligence or intelligence, learning methods, talents, interests, and motivation.

Schools play an important role in every learning activity of students and teachers. At school a student can receive knowledge, develop the talents and interests of students, and the skills they have. Not a few of the learners who find it difficult to accept the knowledge conveyed by the teacher, as a result of the reduced concentration level of the learners (Hartanti & Hidayah, 2019). According to Slameto (2013), school is one of the external factors that include teaching methods, curriculum, learning process discipline, learning time, learning standards, classrooms, and the quality of teachers in teaching (Slameto, 2013). School time is a factor that greatly affects the learning process of students and teachers. In general, learning time at school is carried out in the morning until noon. The implementation of learning during the day has a lower level of concentration of students, due to the condition of students who are getting tired in learning activities. Moreover, chemistry subjects are less attractive to students, because students tend to think that chemistry will focus more on difficult formulas and chemistry that is abstract and complex (Slameto, 2013).

Learning difficulties are where students cannot learn as they should. This learning difficulty is often caused by external factors from students, especially in the chemistry learning time used. Thus, chemistry subjects should not be given in the last hours or hours after sports lessons, which results in students' concentration levels according to or low (Hartanti & Hidayah, 2019). Good learning is learning that is tailored to the characteristics of the material, the condition of the students, the facilities and infrastructure available, and the objectives of the learning process (Morgan, 2012). One of the things that can improve the success of students' learning is effective learning time.

Learning effectiveness is a measure of success in the learning process related to the relationship between students and teachers in learning in order to achieve learning objectives (Rohmawati, 2015). The effectiveness of learning can be seen from the activities of students during learning activities. In order to achieve an effective and efficient learning, a reciprocal relationship between students and teachers is needed in order to achieve the expected learning objectives (Fathurrahman et al., 2019). Indicators to determine the level of learning effectiveness include: time, personnel, and learning resources (Yulianto & Nugraheni, 2021).

Effective learning time can affect student learning achievement (Hartanti & Hidayah, 2019). Learning time according to Hartanti & Hidayah (2019), is the time when the teaching and learning process occurs at school,

school learning time can be done in the morning, afternoon or evening. Learning that is carried out in the morning is the time from sunrise to 09.00 or 10.00. This shows that, choosing the right and effective learning time will have a positive influence on learning. Students when studying in the morning, have a fresh mind, the air is still cool, the body is in good condition, and students will find it easier to concentrate on learning (Hartanti & Hidayah, 2019).

Learning is carried out during the day according to Hartanti & Hidayah (2019), which is the time between morning and evening from 11.00 to 14.00. During the day is a time when students should rest, but on the one hand, students still have to go to school, so they listen to lessons while sleepy and so on. So that learning is carried out during the day, causing a lot of problems, namely students have difficulty in receiving lessons, because students find it difficult to concentrate and think in a weak body condition. Thus, learning time at school also affects students' learning achievement (Hartanti & Hidayah, 2019). Thus, morning time is considered an effective time to absorb learning material. In addition, students can resume learning in the afternoon or evening. Thus, the purpose of this research is to find out the teacher's strategy in managing ideal and effective chemistry learning time to improve students' learning achievement.

Method

Type of Research

The type of research used in this research is literature research or library research. Literature research is a study that studies various reference books and the results of similar previous research which is useful for obtaining a theoretical basis for the problem to be studied (Sari & Asmendri, 2020). This definition is reinforced by Mendes (2020), which explains that the literature research process is carried out by reviewing the literature and analyzing relevant topics that are combined. Literature searches can utilize sources such as journals, books, dictionaries, documents, magazines and other sources without conducting field research (Mendes et al., 2020).

Thus, it can be concluded that library research is a research activity carried out by collecting information and data with the help of various kinds of materials in the library such as reference books, similar previous research results, articles, notes, and various journals related to the problem to be solved. Activities are carried out systematically to collect, process, and summarize data using certain methods to find answers to the problems at hand.

Data source

The data source used in this research is secondary data. Secondary data sources are data obtained from previous researchers' primary data or in other words data obtained not based on direct observation by related researchers. This study obtained data sources from books or scientific reports in the form of articles or journals. The data in this study were obtained by collecting data by literature review. The data collection method is carried out by searching and tracing data from the literature related to the formulation of problems in the study.

Procedure

Data collection procedures related to ideal chemistry learning time on improving students' learning achievement, followed by analyzing data using descriptive qualitative data through literature studies, the results of descriptive data analysis presented in written sentences (Pringgar & Sujatniko, 2020). The following are the details of the steps taken:

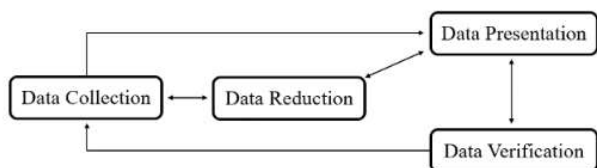


Figure 1. Detailed flow of the literature study research stages

The following is a description of the literature study research flow (Pringgar & Sujatniko, 2020), Among others: *Data collection*, is the process of collecting existing data in the field from the process of reviewing articles or journals regarding the ideal chemistry learning time to improve student learning achievement. *Data reduction*, is a data analysis technique that explores, classifies, directs, separates unnecessary data, and organizes data in such a way as to obtain a final conclusion. *Presentation of data*, providing conclusions and taking action from possible data. Recording secondary data in the form of articles and journals, so as to obtain some general conclusions from these articles and journals. *Drawing conclusions/verification*, is an act of analyzing general conclusions that lead to specific conclusions so as to find new findings about the ideal chemistry learning time to improve students' learning achievement.

Result and Discussion

Chemistry is a subject that is considered difficult for students. So that students are reluctant to learn chemistry (Sari et al., 2013). In fact, during learning there are many obstacles faced by a teacher, so the teacher is

required to think of ways so that learning objectives can be achieved properly (Rikawati & Sitinjak, 2020). When the teacher chooses the wrong learning strategy, it will have fatal consequences on the achievement of learning objectives (Shoimin, 2013).

Teachers are required to be able to choose the right learning strategy to make it easier for students to understand and master the subject matter taught by the teacher. The learning strategy in this case according to Kusumawardani et al. (2018), is the teacher's mastery of learning models, methods, and media. Thus, teachers are required to be more creative and innovative in delivering subject matter to students so that learning becomes effective and not boring. One way that a teacher can make learning not boring is by using interesting learning media and learning models so that students feel enthusiastic, active, understand, and master the subject matter (Kusumawardani et al., 2018).

The active state of learners is where learners are continuously engaged mentally and physically (Hollingsworth & Lewis, 2006). Active learning is learner-centred learning (Indrawati & Setiawan, 2009). Where active learning is learning that seeks to optimise all the potential possessed by students based on characteristics, so that students are able to achieve the expected learning objectives. This means that active learning is learning that requires students to have an active role in understanding the material taught both physically and mentally using their potential (Helmia, 2016). So that learning can be considered effective in improving student learning outcomes.

Indicators of effective learning can be seen in the factors and aspects that support effective learning. Factors that influence effective learning according to Tarihoran & Cendana (2020), namely: internal support, learner characteristics, teacher behavior, learner expectations, learning time, varied learning strategies, learner assessment and feedback. With regard to this, the aspects of effective learning include preparation of materials and time during the teaching-learning process, learning process, high motivation of teachers to teach, high motivation of learners to learn, and good interaction between learners and teachers (Tarihoran & Cendana, 2020). Thus, one of the indicators that make learning effective is the allocation of time to the right material as a form of support in the learning process.

Time allocation is an indicator that greatly influences learning to be effective which will have an impact on student achievement (Hartanti & Hidayah, 2019). In general, learning time in schools is carried out in the morning until noon. The implementation of different learning times, of course, has different implications for the success of students in absorbing the lessons presented. Especially in learning certain subjects that are less attractive to students, such as chemistry.

Chemistry subjects are less attractive to students, this is because, according to Hartanti & Hidayah (2019) students tend to think that chemistry subjects focus on difficult formulas and have no effect on everyday life. Thus, a teacher strategy is needed in managing learning time so that chemistry learning becomes more effective and students become more enthusiastic in learning chemistry subjects.

Learner enthusiasm is one of the success factors for students in achieving maximum learning goals. Learners who have high enthusiasm will be better at receiving lessons or knowledge, and the attitudes that arise in students will be positive in learning (Sardiman, 2014). It is very important to form a spirit of learning in learners so that learning changes in a more positive direction (Budiariawan, 2019). Learner enthusiasm can be influenced by several factors, one of which is learning time. Difficult chemistry learning requires the right time to learn, and requires a high level of concentration in learning it. The condition of students in the morning who are still fresh because they have not done much activity helps students have high concentration in learning chemistry. Because a learner will achieve success in learning, if they have the right time to learn and can manage that time to be more effective and efficient (Hakim, 2005).

Learning time at school can also affect students' learning achievement at school, especially in chemistry subjects (Hartanti & Hidayah, 2019). The intensity of learning during the day will have an impact on students to be less excited, physical and psychological conditions are already in a state of fatigue, and cause students to be less focused and maximized in learning a material, so this will have an impact on difficulty in receiving lessons. Meanwhile, the intensity of learning in the morning will have an impact on students to be more excited, fresher mind, and body in good condition (Slameto, 2013).

Some learners generally have high concentration and focus when learning in the morning, on the grounds that they are still fresh, so students have interest and enthusiasm for learning. Whereas during the day, many learners feel tired because they have done school activities or activities all day, from morning to noon, there are even learners who tend to be sleepy when studying during the day (Lestari, 2015).

Learning is carried out during the day according to Hartanti & Hidayah (2019), namely the time between morning and evening from 11:00 to 14:00. During the day is a time when students should rest, but on the one hand, students still have to go to school, so they listen to lessons while sleepy and so on. So that learning is carried out during the day, causing a lot of problems, namely students have difficulty in receiving lessons, because students find it difficult to concentrate and think in a

weak body condition earlier. Thus, learning time at school also affects students' learning achievement. Learning difficulties are where students cannot learn as they should. This learning difficulty is not always caused by low intelligence factors (mental abnormalities), but can also be caused by non-intelligence factors. With this, it is advisable for subjects that require thinking skills such as arithmetic, especially in chemistry, not to be given at the last hour or hour after sports lessons (Hartanti & Hidayah, 2019). This explanation is reinforced by several studies as follows:

Based on research conducted by Sanjiwani et al. (2018), explaining that chemistry learning time in the afternoon with hot class conditions, and conducted at the last hour can be the cause of learning difficulties in students. Students admitted that it was difficult to focus on learning chemistry because they were tired of attending lessons from the morning. In addition to being tired, in the last hours of the lesson students are also sleepy and hungry which disrupts their learning concentration. The hot classroom conditions during the day also cause students to become increasingly unfocused on learning. Chemistry teachers who teach in the classroom also agree with the results of student interviews, teachers also have difficulty maintaining the concentration of students in learning because it is already in critical hours (Sanjiwani et al., 2018).

Based on research conducted by Hartanti & Hidayah (2019), it explains that there are changes in the level of ineffectiveness of students per 15 minutes of learning from the beginning to the end. The following is a description of each change in the ineffectiveness of students in learning subjects at school, namely: In the first 15 minutes, one male learner was seen sleepy with a position at the back of the class on the left side of the class. Learners have lowered their heads when the teacher is explaining the lesson in front of the class, then at minute seven two female learners are seen with the front who are talking to their classmates, and at minute ten one female learner sitting in the middle of the class looks unfocused staring at the front while playing with her stationery, at minute fifteen one male learner who is at the back of the class to the right of the class looks sleepy by lowering his head to the table.

In the second 15 minutes, one female learner was seen sleepy by putting her head down on the table on the left side of the class, and in the middle of the class one male learner was seen not looking at the teacher who was explaining and looking at his other friends. In the third 15 minutes or 1 lesson hour, there were no students who felt sleepy, unfocused or talking to their classmates. Because the teacher who teaches is held a quiz to answer chemistry questions and the answer will be randomly selected by the teacher so that it looks like students focus on paying attention to the teacher, besides that the

teacher who teaches brings a little joke to refresh the state of students who already look tired.

In the fourth 15 minutes after the transition of the lesson, three learners were seen chatting in one place because the situation after the transition of the hour the teacher gave questions to the learners to answer, the learners chosen by the teacher came forward to write the answers to the questions given, then seen one learner who bowed his head to the table not paying attention to his friend who was answering the question in front, and seen one male learner who was not focused facing the class window not paying attention to his friend being in front.

In the fifth 15 minutes, it was seen that the activeness of the learners had begun to decline, namely three learners at the back of the class put their heads down on the table not paying attention to the teacher who was correcting the answers of their friends who had answered to the front. One learner chatted with his classmate on the right side of the class, and two female learners were not focused by playing with their hair and not paying attention to the teacher who was in front.

In the sixth 15 minutes or the last lesson, there were four students who did not pay attention to the teacher and chatted with their classmates with the position of the students sitting front and back, and one male student at the front left of the class put his head down on the table after coming forward to answer questions. These learners are often asked by chemistry teachers to come forward to answer questions so that they are not sleepy.

The description of the time allocation above, it can be concluded that daytime learning tends to be boring, and students who feel tired when it is above 12 noon or sleepy so that the absorption of information received is slightly hampered. This is reinforced by other research. Based on other research conducted by Cross & Polk (2018) in their research explained that time management in the learning process has an impact on the learning process that supports students' understanding and activeness. Thus, the teacher in learning acts as an instruction giver. Teachers as instructors will prepare teaching materials that have been adjusted to the time allocation so that learning is expected to run well and effectively. Teachers also ensure learners' learning styles and learners' ability to absorb information in determining time allocation. Therefore, teachers must use time efficiently so that learning can run effectively (Cross & Polk, 2018).

Based on research conducted by Setyaningsih et al. (2020), in their research, they explained that the subjects that must be taken by students in each day are 4 hours with an allocation of time for each subject of 35 minutes. The subjects that students must take include: Indonesian language, English, Mathematics, Elective Subjects (including sociology, economics, geography for social

studies classes, and for science classes including chemistry, biology, and physics), Additional subjects (including Islamic Religious Education, Civic Education, Physical Education, Skills, Arts, Information and Communication Technology). The five subjects above are taken by students by having to focus and relate to their chosen interests to make a guide in continuing their higher education (Setyaningsih, et al., 2020).

Reflection at the end of the learning process is a must for learners and teachers. Learners can reflect by making daily notes as a response to the learning process. For teachers, reflection aims to evaluate the level of success in the learning process and to design efforts to optimize the learning process and the results of the learning process. As for students, reflection aims to achieve students' self-satisfaction with the learning process and to establish communication between students and teachers in the classroom (Setyaningsih et al., 2020).

The innovation design made by researchers is to use a time allocation of 35 minutes per subject starting at 08.00 until 12.00. At the end of the learning time, a reflection is held by students, by reviewing the material that has been received regarding the benchmark of the extent to which learning can be received and can be understood by students (Setyaningsih et al., 2020).

Another study conducted by Yunitasari (2017) explained that classroom management in the learning process by implementing a project-based learning model as an effort to improve students' readiness and learning outcomes. Changes in student learning outcomes by applying project-based learning models can be done with the following procedure (Yunitasari, 2017): Before the learning activities are carried out, a teacher first prepares the instruments to be used, forms a discussion group of students by taking into account the ability of each student. A teacher conveys the material taught to students before assigning tasks or projects, determines the time limit needed to complete the tasks or projects that are the responsibility of students. Each group drafts the activities of a project that will be produced at the end of the learning process, and continues with investigation activities to produce or obtain the data and information needed. Organizing data, namely data and information that has been obtained previously with a group of friends, then the data and information are collected, grouped, and arranged into a complete project or work product. The project or work product is presented or presented in a class discussion to obtain input, improvement, and evaluation. Collecting projects or work results as assessment material which will later be carried out by a teacher to assess each student (Yunitasari, 2017).

Table 1. Lesson schedule innovated by the researcher

Hours	Times	Teaching and Learning Process				
		Monday	Tuesday	Wednesday	Thursday	Friday
1	08.00 - 08.35	Indonesian Language	Mathematics	English	Mathematics	Elective Subjects
2	08.35 - 09.10	Mathematics	English	Indonesian Language	Indonesian Language	English
3	09.10 - 09.45	Elective Subjects	Additional subject	Mathematics	Elective Subjects	Additional subject
4	09.45 - 10.05					Rest
5	10.05 - 10.40	English	Indonesian Language	Elective Subjects	English	Mathematics
6	10.40 - 11.25	Additional subject	Elective Subjects	Additional subject	Additional subject	Indonesian Language
7	11.25 - 12.00					Reflection

Another study conducted by Marliani & Gazali (2020) who conducted research by applying the REACT learning model which consists of five main steps, namely (Marliani & Gazali, 2020): Relating is the first step taken by the teacher to link students' prior knowledge with new concepts that students will learn. Experiencing is learning in the context of exploration, discovery, and creation which is the core of contextual learning. Applying is learning by using concepts that have been obtained in the previous stage, namely the experiencing stage. Cooperating is the stage where the teacher asks the learners to work together, communicate, share with their classmates. Transferring is learning by applying the new contexts that have been received to the exercise questions given by the teacher to deepen the learners' concepts.

In this study, researchers used the type of Quasi Experiment research using the Random Control-Group Posttest Only Design. The results of this study indicate that the REACT learning model has a significant effect by comparing the experimental class and control class on acid-base material on student learning outcomes. One of the factors in this study is the different learning time for the experimental and control classes, where the experimental class is conducted in the morning and the control class is conducted in the afternoon. It can be seen that the enthusiasm and interest of students are different in the morning and afternoon, in this case showing the results that the experimental class is higher than the control class (Marliani & Gazali, 2020).

Another research conducted by Rosidi (2022) which explains that the learning process by applying Flipped Classroom is a learning process that requires students to search for knowledge materials independently which can be done from home. The steps for implementing Flipped Classroom suggested by researchers include the following: The first step is to divide into 2 large groups. Group A conducts face-to-face learning in the first period and online learning in the next period. Group B conducts online learning at the beginning of the first

period and face-to-face learning in the next period. And the material is categorized into 2 types, category 1 can be learned by students independently by participating in learning activities through e-learning, zoom meeting, google meet, google classroom so that the material can be maximally understood and category 2 needs to be guided by the teacher in class. Group A in the first period, studying material 2 which requires guided learning from the teacher and discussion activities in the classroom. For the next period, group A can do online learning that emphasizes material 1. Group B in the first period, studied material 1 which emphasized assignment activities that students could do from home. After the next period, group B focuses on material 2 by conducting teacher-guided learning and discussion activities in the classroom. A teacher can organize learning hours well, so that group A and group B do not collide in their learning hours. For example, face-to-face learning can be done in the morning and independent online learning is done in the afternoon. Reflecting at the end of each learning material to determine the understanding of students and feedback or difficulties experienced by students during blended learning (Rosidi, 2022).

Conclusion

Learning can be developed by using teacher strategies in managing class time. Effective management of learning hours can support the improvement of students' learning achievement. Chemistry learning that is carried out during the day has an ineffective impact on students in participating in learning, such as students not focusing, tired, sleepy, hungry, thus disrupting students' learning concentration. The hot classroom conditions during the day also make it difficult for students to accept the material taught by the teacher. Thus, morning time is considered an effective time or a good time to absorb chemistry learning materials. Learners can also repeat or study the material again so

that they understand better in the afternoon or evening. Thus, teachers can prepare teaching materials that have been adjusted to the time allocation, so that learning is expected to run well and effectively.

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Author Contributions

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Conflicts of Interest

The authors declare no conflict of interest

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