

## Application of Quantum Learning Strategies to Improve Science Learning Outcomes for Class VI Elementary School Students

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### Abstract

*This study was structured with the aim of improving student achievement in learning outcomes using the quantum teaching learning strategy with the TANDUR concept in class VI students at SDN 31 Dompu in the 2023/2024 academic year. Achievement Learning Outcomes referred to in this study include three criteria, namely cognitive, affective, and psychomotor. This type of research is Classroom Action Research (CAR), in which the researcher is the implementer of learning while the classroom teacher is the observer. The design of this study uses the Kemmis and Mc. Taggart. Data collection techniques using observation and interviews. Data were analyzed descriptively and presented in the form of tables and graphs. The results showed an increase in student learning outcomes, namely in the first cycle the cognitive aspect obtained 53% (quite satisfactory), affective 70% (quite satisfactory), and the psychomotor aspect obtained 70% (quite satisfactory), then in the second cycle, all aspects experienced an increase, where the cognitive aspect got 65% (satisfactory), 80% (satisfactory) affective, and the psychomotor aspect got 70% (satisfactory). This means that all aspects have increased, for the cognitive aspect it has increased by 12%, the affective aspect has increased by 10%, while for the psychomotor aspect of the students it has remained in the satisfactory category*

### Abstrak

Penelitian ini disusun dengan tujuan untuk meningkatkan prestasi hasil belajar peserta didik menggunakan strategi belajar quantum learning dengan konsep TANDUR pada peserta didik kelas VI SDN 31 Dompu Tahun Ajaran 2023/2024. Prestasi Hasil Belajar yang dimaksud dalam penelitian ini mencakup tiga kriteria yaitu kognitif, afektif, dan psikomotorik. Jenis penelitian ini adalah Penelitian Tindakan Kelas (PTK), di mana peneliti sebagai pelaksana pembelajaran sedangkan guru kelas sebagai pengamat. Desain penelitian ini menggunakan model Kemmis dan Mc. Taggart. Teknik pengumpulan data menggunakan observasi dan wawancara. Data dianalisis secara deskriptif dan disajikan dalam bentuk tabel dan grafik. Hasil penelitian menunjukkan adanya peningkatan hasil belajar peserta didik, yaitu pada siklus I aspek kognitif memperoleh 53% (cukup memuaskan), afektif 70% (cukup memuaskan), dan aspek psikomotorik memperoleh 70% (cukup memuaskan), kemudian pada siklus II, semua aspek mengalami peningkatan, dimana aspek kognitif memperoleh 65% (memuaskan), afektif 80% (memuaskan), dan aspek psikomotorik memperoleh 70% (memuaskan). Hal ini berarti semua aspek mengalami peningkatan, untuk aspek kognitif meningkat sebesar 12%, aspek afektif meningkat sebesar 10%, sedangkan untuk aspek psikomotorik siswa bertahan pada kategori memuaskan.

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## 1. INTRODUCTION

Science is a natural learning concept and has a very broad relationship with human life. Science learning plays a very important role in the educational process and also in the development of technology, because science has an effort to arouse human interest in developing science. Understanding the universe, which has many facts that have not been revealed and are still secret, means that the results of its discoveries can be developed into new natural sciences that can be applied in everyday life. The learning objectives mentioned above can be achieved if science learning involves students directly through interaction with the environment. With appropriate learning, student motivation is more stimulated and student learning outcomes improve. An indicator of teacher success in learning is a change in learning outcomes (cognitive, affective and psychomotor) that are better after students experience the learning process (Sudjana, 1987: 23). To achieve these indicators, teachers need to create a conducive learning environment and learning that involves student activity.

According to Piaget in Sudjana (1987:26), high school elementary school children have several characteristics including, 1) Attention is focused on practical daily life, 2) Curious, wants to learn, and thinks about reality, 3) Arouses interest in special things, 4) Children view grades as an appropriate measure of their learning achievement at school. 5) Children like to form peer groups to play together. From this description it can be concluded that elementary school age children are at the concrete operational stage who think realistically, namely based on what is around them. Children at this stage still really need concrete objects to help develop their intellectual abilities.

Therefore, teachers should always link the concepts students learn with concrete objects in the surrounding environment.

Based on the results of these observations, the next focused discussion was directed at finding the root of the problem in class VI science learning at SDN 31 Dompu. It seems that students' low scores for essay questions that require deeper thinking stem from the lack of opportunities for students to take an active role in learning activities. The lack of appropriate methods and models applied by teachers in implementing learning results in reduced student attention in the learning process. According to Edgar Dale (2010), in his experience, the more concrete the learning carried out by students, the higher the percentage of achievement of learning outcomes. The opportunity for students to play an active role in learning can be achieved in quantum learning. In quantum learning, new methods will be introduced that facilitate the learning process through a combination of art and targeted achievements. Quantum learning focuses on dynamic relationships in the classroom environment, interactions that establish the foundation and framework for learning (Aqib, 2002: 129). In quantum learning, students will participate more and feel more proud of themselves. The application of quantum learning will make interactions that transform students' natural abilities and talents into light that will benefit them and others (Deporter, 2003: 5) Through the quantum learning method with the TANDUR framework (Grow, Experience, Name, Demonstrate, Repeat, and Celebrate), students are trained to be creative and active so that students' affective and psychomotor skills can develop. If students are in a conducive learning environment and a pleasant learning atmosphere, it is hoped that students will more easily understand the material being taught, so that students' cognitive learning outcomes can be optimal. Based on this analysis, researchers were encouraged to explore further by raising the research title "Application of Quantum Learning Strategies to Improve Science Learning Outcomes for Class VI Elementary School Students".

## **2. RESEARCH METHOD**

The type of research used in this research is Classroom Action Research (PTK). Classroom action research is an examination of learning activities in the form of actions, which are deliberately created and occur in a class together (Arikunto, 2006: 3). The place of research was carried out at SDN 31 Dompu. This research design was carried out in two cycles. The research was carried out in the odd semester of the 2023-2024 academic year. Each cycle includes planning, implementation, observation and reflection. Planning is the preparation of everything needed in classroom action research. The implementation of actions is carried out until the predetermined learning completion is achieved. Actions taken include: (1) Using the TANDUR concept in the learning process. This concept includes: (a) Grow: done by showing a globe related to the material to be taught, (b) Natural: in the form of giving assignments and group discussions about the process of rotation events. Discussion will make students think creatively, (c) Name: presentation of the results of the discussion, the teacher explains the learning material using the learning media that has been provided. (d) Demonstrate: direct practice of learning material, this also helps kinesthetic students understand the material, (e) Repeat: repetition of unclear material, giving test questions, (f) Celebrate: giving rewards in the form of applause and candy. The data collection technique is the result of the researcher's notes, both in the form of facts and figures (Arikunto, 2002). Data collection is a work method used in research, to obtain the data needed according to the related problem. The data collected was obtained through observations and evaluation results carried out from the beginning of the research to the end of the research. The data collected in this research covers three aspects of student learning achievement, namely cognitive, affective and psychomotor. Based on the formulation of the problem raised, the data collection method used is as follows:

**Table 2.1** Student Cognitive Test Criteria

Information:

B = Number of questions answered correctly

N = Number of question items

(Djemari Mardapi, 2008)

Observations can measure abilities or assess learning outcomes and processes, for example student behavior in learning, teacher behavior during teaching, student discussion activities, student participation in simulations and use of teaching aids during learning. Through observation, students' attitudes and behavior can be known, the activities carried out, their abilities and even the results obtained from their activities (Arikunto, 2006: 84-85). In this research, the observations made included observations of the implementation of TANDUR activities, affective and psychomotor aspects of students during the learning process. Observations were carried out to find out how enthusiastic the students were in participating in the learning process that implemented quantum teaching, as well as the teacher's success in implementing it. The results of observations that include students' TANDUR, affective and psychomotor concepts will be assessed using a Likert scale of 1 - 4 and calculated using the Arikunto (2009) formula. The following is the equation:

**Table 2.2** Observation Results Criteria

No	Score	Criteria
1	81 -100%	Very satisfactory
2	61 – 80 %	Satisfying
3	1 – 60 %	Good enough
4	0 – 40%	Not satisfactory

No	Score	Criteria
1	71 -100 %	Very satisfactory
2	61 – 70 %	Satisfying
3	51 – 60 %	Good enough
4	0 – 50 %	Not satisfactory

$$p = \frac{f}{N} \times 100\%$$

Information:

$f$  = Total score to be presented

N = N = Maximum score of all components

### 3. RESEARCH RESULTS AND DISCUSSION

This classroom action research was carried out twice. One cycle consists of one face-to-face meeting and one test question. The action carried out in this research is the application of the quantum learning model to improve the science learning outcomes of class VI students on the subject of the earth's rotation. In the initial stage, researchers made observations to find out how often various learning activities were carried out by class VI students. This observation was

carried out in order to see directly the learning activities through the attached observation guidelines. Based on the results of observations, we obtained several descriptions of students' activities in learning, including: a) Teachers teaching science subjects still use the lecture method and students are often asked to take notes, b) Teachers try to encourage activity through questions related to the learning material, but only a few students responded and most of them did not respond at all, this caused a lack of activity in the class which caused students to act passively, c) There was very little interaction between students because learning was only centered on the activities of the teacher (teacher center) so there was no triggers interaction between students, d) Students have difficulty understanding the material regarding the occurrence of day and night, so they need teaching aids that can make it easy for students to understand the material presented.

## **1. Cycle 1**

### **1. Planning**

At the planning stage, researchers have made initial observations to find problems regarding learning and the results to be achieved, by implementing quantum learning in accordance with the K13 Class VI Elementary School Curriculum for science subjects at each meeting. The components in this first cycle learning plan include: Core Competencies, Basic Competencies, time allocation, learning indicators, learning objectives, learning materials, learning media/resources.

### **2. Implementation/Action**

In cycle 1 the allocation for each meeting was 2x35. The implementation of learning includes initial activities, core activities and final activities. During the learning process, observations are made of teacher activities, student activities and learning outcomes. In cycle 1 the following results were obtained:

#### **a) Initial activity**

The researcher, who is also a teacher, enters the class to ensure students' readiness to start learning by instructing the class leader to prepare their friends and pray together. After that, the researcher checked the list of students present, then provided initial reinforcement as an introduction to the material and conveyed the material to be studied. The teaching media used are textbooks and globes. The attendance of 28 students. Researchers act as implementers of action. Mrs. Asfah, S.Pd. as the subject teacher, he acts as a collaborator because he understands the material of the earth's rotation. Researchers also tell students to pay close attention to the learning that is taking place, because at the end of the lesson, students will be given a question, which is a multiple choice test, and whoever gets a high score will get a prize.

#### **b) Core activities**

Next, the teacher directs the students to prepare stationery to record the main keywords of the material to be explained, after that the teacher begins to explain the material regarding the process of rotation and revolution of the earth and instructs the students to listen to the explanation of the material and note down the key words from the material being explained, after that the participants Students were told to form groups randomly and then discuss with their peers and the researcher gave each group the opportunity to re-express the material they had learned in front of the class. However, at this stage, only a small number of students seemed enthusiastic about listening to the material presented, the remaining students did not pay attention and were busy talking with other friends.

#### **c) Closing Activities**

At this stage the researcher conveys the conclusions of the material and gives 10 multiple choice test questions to measure the extent of students' understanding in receiving the material that has been presented, and students who get high scores from the test results

will receive a prize, this prize is in the form of candy. . There were 4 students who got scores above the KKM from the results of this test, namely Dian Safirah, Anggi, Rahmi Wulansari, and Suci Nur Takwa

### 3. Observation/Observation Stage

During implementation stage /action takes place, researchers assisted by collaborators make observations/observations of aspects of Quantum Learning and student activities through student observation sheets (attached) and documentation assisted by students. Here's the explanation:

#### a) Teacher Activity Results

From the data from observations of teacher activities during teaching and learning activities using quantum learning learning strategies with the TANDUR concept in cycle 1, 67% were quite satisfactory. The teacher and student activity scores have not reached the expected percentage, so there are several teacher actions that need to be improved, especially motivating students, providing reinforcement and using time so that the entire learning process can run well.

**Table 3.1** Observation Results of Quantum Learning Aspects of cycle I

Observed aspects	Percentage	Criteria
Knowledge	53%	Good enough
Attitude	70%	Good enough
Skills	70%	Good enough

#### b) Learning Outcomes Achievement

Student achievement is measured from knowledge, attitudes and skills. Knowledge is measured using multiple choice test questions. Meanwhile, for the affective and psychomotor aspects, the researcher used an observation sheet which was signed by the researcher and approved by the subject teacher. The students' scores can be seen in the following table:

**Table 3..2** Observation Results of Quantum Learning Aspects cycle 1

No	Observed aspects	Mark
Tandur Concept		
1	Grow it	4
2	Experience	2
3	Name it	2
4	Demonstrate	3
5	Repeat:	2
6	Celebrate:	3
<b>F</b>		<b>16</b>
<b>N</b>		<b>24</b>
<b>%</b>		<b>67%</b>

#### 4. Reflection

Based on data obtained from the implementation of learning, it shows that the learning process using quantum learning aspects with the tandur concept is in the quite satisfactory category with a percentage of 67%, so it is possible for this research to be continued in cycle II. The description of the data above shows that some students have met the satisfactory criteria in each aspect measured. Only a small number of students do not meet the unsatisfactory criteria. Cycle I learning has been carried out in accordance with the learning of the TANDUR concept. This cycle I learning plan is in accordance with TANDUR learning which uses the Quantum Learning method. The teacher's activities in this lesson are good, there are several aspects that have not reached 100%. After analysis, it can be concluded that during the learning process in cycle I, obstacles occurred, including: a) Learning strategies using the quantum learning method in influencing learning activities obtained 67%. This is because the arrangement of the benches does not focus students' attention on the information center (teacher and globe), b) There are some students whose knowledge scores are still low, lagging behind their friends, due to not understanding the material when the teacher is giving lessons in class. , such as some students joking to themselves, there are also students who are sleepy in class, c) The source of information is only obtained from the teacher so that the information obtained is limited (each student must have learning materials in the form of handouts), d) Cognitive, affective and psychomotor aspects of students Previously it was quite satisfactory. Providing sufficient examples and motivation needs to be improved further. Based on the results obtained in cycle I, the implementation of the action is in accordance with the specified quantum learning criteria. To strengthen the results obtained, cycle II was carried out.

## 2. CYCLE II

### 1. Planning

Based on the results obtained in cycle I, the action planning for cycle II was determined as follows: (a) Making quantum learning scenarios focused more on real examples, (b) selecting the position of the bench to form a U shape, (c) distributing handouts to each group.

### 2. Implementation/Action

In cycle 1 the allocation for each meeting was 2x35 minutes. Implementation of learning includes initial activities, core activities and final activities. During the learning process, observations are made of teacher activities, student activities and learning outcomes. In cycle 2 the following results were obtained:

#### a) Initial activity

Learning begins with apperception by opening the lesson and conveying the learning objectives and competencies related to the learning material. The researcher, who is also a teacher, enters the class to ensure students' readiness to start learning by instructing the class leader to prepare their friends and pray together. After that, the researcher checked the student attendance list, then provided initial reinforcement as an introduction to the material, then the students were asked to form a bench like the letter U. The researcher acted as the implementer of the action. Mrs. Asfah, S.Pd. as the subject teacher, he acts as a collaborator because he understands the material of the earth's rotation.

#### b) Core activities

Next, the teacher informs students to prepare writing tools to record the main keywords of the material to be explained. After that, students were asked to form groups randomly, where each group consisted of 4 students. Each group was given handouts (teaching materials) to support each information presented by the researcher. Next is the rotation of the globe which is related to the material of the earth's rotation.

Students seemed enthusiastic about the material presented. Then it continues with

discussion in class. In this discussion, students appeared more active because the source of information was more focused and with the handouts, the presentation of information by researchers was also more focused. The teaching media used are teaching materials, flashlights and globes. After conducting discussions with group friends, the researcher gave each group the opportunity to make their own conclusions regarding the material presented and explain it again in front of the class with the help of a globe and flashlight.

### c) Closing Activities

At this stage the researcher conveys the conclusions of the material and gives 10 multiple choice test questions to measure the extent of students' understanding in receiving the material that has been presented, and students who get high scores from the test results will receive a prize, this prize is in the form of candy. . There were 7 students who obtained scores above the KKM from the results of this test.

## 3. Observation/Observation Stage

The results of observations in cycle II show that the learning process is better than cycle I. Students' attitudes are also better than cycle I. Overall the learning process with the TANDUR concept has gone well with Satisfactory criteria and a percentage of 75%. The previous student attitude scores had shown better results than the first cycle, the student's attitude showed significant changes and obtained a percentage of 75% with satisfactory criteria. Providing such behavior influenced the attitude and skill aspects of the students in cycle II to obtain the respective score percentages. -80% and 75% respectively with satisfactory criteria.

### a) Teacher Activity Results

From data from observations of teacher activities during teaching and learning activities using the quantum teaching learning strategy with the TANDUR concept in cycle 1, 67% met the criteria of being quite satisfactory. The teacher and student activity scores have not reached the expected percentage, so there are several teacher actions that need to be improved, especially motivating students.

**Table 3..3** Observation Results of Quantum Learning Aspects, Cycle II Achievement Learning Results

No	Observed aspects	Mark
Tandur Concept		
1	Grow it	4
2	Experience	3
3	Name it	4
4	Demonstrate	2
5	Repeat:	2
6	Celebrate:	4
Learning Environment		
7	Bench arrangement: bench arrangement in a U shape	3
8	There are handouts	3

<b><i>F</i></b>	<b>25</b>
<b><i>N</i></b>	<b>32</b>
<b>%</b>	<b>78%</b>

b) Learning achievement

Student achievement is measured from knowledge, attitudes and skills. Knowledge is measured using multiple choice test questions. Meanwhile, for the affective and psychomotor aspects, the researcher used an observation sheet which was signed by the researcher and approved by the subject teacher. The students' scores can be seen in the following table:

**Table 3..4**Results of Observation of Aspects of Student Learning Outcomes

<b>Observed aspects</b>	<b>Percentage</b>	<b>Criteria</b>
Knowledge	65%	Satisfying
Attitude	80%	Satisfying
Skills	75%	Satisfying

From the table above, it can be concluded that student learning outcomes in the cognitive aspect obtained a score of 65% with quite satisfactory criteria. Meanwhile, the attitude aspect received a score of 80% as well as the skills aspect which received a percentage of 75%.

#### 4. Reflection

Based on data obtained from the second cycle stage, the implementation of learning using the TANDUR concept has gone very well with a score of 78%. The position of the student's bench which forms the letter U helps focus the student's focus on the information presented by the researcher. The presentation of material supported by teaching aids, flashlights and handouts makes students quickly understand the material presented. All class members, including teachers, researchers and students. Everyone understands each other's responsibilities so that learning goes well. Knowledge absorption becomes better. Based on the results obtained in cycle II, the research cycle was stopped.

#### 4. CONCLUSIONS AND SUGGESTIONS

##### 4.1. Conclusion

From the results of the researchers' findings regarding the application of quantum learning strategies at SDN 31 Dompu, it can be concluded that the quantum learning method applied in the learning process can improve student learning achievement. Improvement can be seen in 3 aspects of assessment, namely the knowledge aspect, attitude aspect and skills aspect. In order to analyze further, researchers conducted pre-PTK observations using student activity observation sheets in three aspects, namely cognitive, affective and psychomotor. The knowledge, attitude and skills values each received a score percentage of 55% (unsatisfactory), 60% (unsatisfactory) and 65% (quite satisfactory). Based on observations and interviews conducted by researchers in the pre-cycle, in cycle I the researchers will apply a quantum learning learning strategy using the TANDUR concept (Grow, Experience, Name, Demonstrate, Repeat and Celebrate). The use of this learning strategy regularly increases activity and motivation in students. The assessment aspect in cycle I is seen in three aspects,



namely cognitive, where the knowledge value is obtained from test questions that have been answered by students, while the attitude and skills aspects are observed through observation sheets. . The increase in cognitive aspects was 53% (quite satisfactory), affective aspects were 75% (satisfactory), and psychomotoric aspects were 70% (quite satisfactory). Based on the results obtained in cycle I, the results obtained do not meet the criteria for activeness, so the learning process using the quantum learning learning strategy needs to be continued to cycle II by adding several points such as, the arrangement of the benches must form the letter U so that information is channeled directly to each students, each group was given a handout as support for the material the researcher presented in front of the class, increasing good cooperation between researchers and students, encouraging students through providing motivation, etc. Through the implementation of cycle II, the increase in student learning activities is in accordance with the specified quantum learning learning criteria and meets the cognitive criteria of 65% (satisfactory), affective 80% (satisfactory), and psychomotor 75% (satisfactory). Quantum learning is an innovative method that can help students in the teaching and learning process.

#### 4.2. Suggestion

Based on the conclusions above, it is recommended:

- 1) Teachers in teaching should actively involve students so that students feel more appreciated and cared for, which will increase good learning behavior.
- 2) Teachers should apply innovative learning methods that help students absorb learning material
- 3) Teachers in teaching should act as facilitators and motivators who are able to provide learning experiences that enable students to be responsible in carrying out the learning process.

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