

# DISCOVERY MODEL INTEGRATED WITH RELIGIOUS ASPECT IN BIOLOGY SUBJECT FOR IMPROVING SCIENTIFIC BEHAVIOUR

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## Abstract

The aim of this study described about the integration between discovery models with religious aspect in Biology subject to develop student's scientific behavior. Discovery is a systematic discovered learning model and each step of it gives an encouragement to do an investigation. Researcher combined each step of discovery syntax with religious aspect to give a simultaneously chance to the students, so they got scientific knowledge and religious aspect on Biology subject that they studied. There was no difference between science and religious aspect on learning method related to the concept mastery, 2) psychomotor; and 3) scientific aspect. Focus of this study was to develop scientific behavior such as curiosity, critical thinking, and honesty in Biology subject, because the teacher hadn't integrated religious and scientific aspect during learning process, meanwhile the pattern of the integration through scientific process of syntax discovery. This study developed discovery learning models integrated with religious aspect through class action room research and it implements in Senior High School/Islamic Senior High School. This instructional procedure concept discovery model integrated with religious aspect using Lee and Jang's procedure (2014). Need analysis, design, implement, and evaluate relate to discovery learning design integrated with religious aspect on Science (Biology) learning. The process by discussing, asking, answering, investigating, experimenting, interviewing, and the appropriate learning source based on science material to improve student's scientific behavior in Senior High School relate to curiosity, critical thinking and honesty.

**Keywords:** *Integrated discovery model; religious aspect; Biology learning; Discovery; Attitude*

## PENDAHULUAN

Empirically learning process still hadn't integrated and hadn't centered to the students, only tend to cognitive aspect without reaching cognitive, affective, and psychomotor (Wardoyo, 2013). Learning process hadn't integrated with the other subject or the other field. Learning process can't be separated from learning model. Learning model is one of way to build attitude, knowledge, and skill of the students systemically. Discovery learning model is an invention learning model (Bruner, 1966) based on science learning. Bruner's learning theory (1960) in his book "The Process of Education" (1960) explains that individual learning maintain process and transform the information gotten actively by the students during learning process. The students focus on the problem then

investigate the information to solve the problem so they get completely meaningful comprehension (Dahar, 1988). According to Bruner (1960) there are four important things 1) the importance of knowledge structure in curriculum to relate important facts as an information that must be connected each other 2) learning readiness by Bruner (1966) in Dahar (1988) teacher must prepare the students to learn from the simple skills to the complex skills.

3) Intuition; Intuitively needs intellectual techniques to reach tentative formulation without analytic step to know whether those formulations are valid or not 4) Motivation is the teacher's effort to encourage individual internally and externally to have willingness for learning (Dahar, 1988). The students must be active to find knowledge through experience that makes long term mental knowledge.

Dahar (1988) quotes Bruner's opinion (1966) confirm that; 1) Discovery model implements method and aim to train intellectual potency of the students and to grow curiosity hence the students get motivation to learn. This is the aim of invention learning by Bruner, 2) Therefore teacher's role as the problem planner must be solved by the students, prepares the incomplete material, and stimulates the students to do scientific investigation. The material presents to give experience actively (action), iconic (internal mind) and symbolic (word/language). If the learning is in the laboratory so the teacher becomes the facilitator and gives assessment objectively and formulates the form of essay test.

This relevant with Bruner's invention that discovery model is student centered learning where the teacher involves as director and creator of learning environment to support the knowledge construction relate to content and pedagogy based on the student's mental development (Albrucasto, 1996). Furthermore, discovery is presented in form of problem that must be solved by the student itself (Mettler, 1998) . Teacher in teaching activity organizes the students into small groups learning to find information, the needs data and to train the student's critical thinking by discussing (Frank et al., 2008). The conclusion of the explanation, discovery learning is pleasant for the students. The students encourage finding the knowledge empirically and contextually and train the students developing their skill and interest to fulfill their mental needs systematically, logically, and meaningfully. The students become independent from the teacher, but must be active to develop their skill in cognitive, affective and psychomotor empirically.

Religious aspect as needs value is a compulsory rule and bond to every believer as a media among the servant, his God and the environment around it (Dwikarya, 1987). The connection between the servant and his God is an internal process that happens inside the soul of the believer. The internalization of the religious aspect appears in spoken and behavior that can observe in daily life (Aviyah and Farid 2014). The actualization of religious aspect in society represents broadness, belief's strength, obedience and persistence worship in form of the implementation of his religion (Djamaluddin and Suroso, 2005). According to Ali (2004) religious aspect is consist of five dimensions, they are; belief, practice, feeling, religious knowledge and effect. Religious aspect influenced by; 1) Education level and social demands. Includes the effect of social

religion in society thoroughly 2) Experience, it forms the beauty of religion, morality, and emotional. 3) Life is about security and safety, love needed, and confession of self existence. 4) Intellectual is sequence of verbal or rational reasoning of the believer (Djamaluddin and Suroso, 2005). One of religious aspect on Biology is biodiversity value in Surah Al Fathir verse 27-28 explains the variety of form, color and characteristic about plant and animal can be observed by human and be a source of learning empirically or Kauniyah.

Learning Biology has taught since elementary school. Biology as science has science characteristic such as learn about concrete object can be observed empirically, systematically, logically, deductively, and generally. Learning Biology is as same as learning ourselves, the other creatures even the thing around it. Biology teaches the process of life, visible or invisible object, but it is so close with our life such as breathing as sign of life, to fulfill our physic needs. Growing process and development of living things the plant starts from the seed becoming a perfect organism, how the meal absorbed by the body. All of it is taught scientifically systematically, and logically. It is meaningful and encourage human to live a better life. Scientific process and natural process are meaningful kauniyah learning.

Religious aspect in this study will be given in form of literature facility as a religion aspect sources to guide, direct, motivate, strengthen, give chance and time. Religious aspect in Al Qur'an related to Biology material. For instance biodiversity in surah Al Fathir verse 27-28, Shad 27, Arra'du 4, and Arrum 41. .

The previous study concluded that discovery learning integrated with religious aspect needs a guidance book about relevant religious aspect and the syntagmatic implementation. There is no integration between discovery and religious aspect on Biology material. Besides it hasn't explained about the integration from the previous model.

Scientific behavior includes all of the experience and the social personal development (Ackerson, 1991/1992). Therefore scientific behavior can be taught as Gagne's opinion (2005) attitude is the result of teaching and related to emotional, action, and knowledge. Then Schunk (2012) attitude can be created, measurable, and affected by gen. Gie (1987) in Grahito and Jumanto (2017) has an opinion scientific behavior is a scientific skill in scientific work to solve and respond the scientific problem based on the scientific method on science subject. Scientific behavior generally contains attitude toward science and behavior related to science as the effect of learning science (Harlen, 1989). Scientific behavior in this study is curiosity, critical thinking, and honesty. Scientific behavior can be reached with philosophic approach, pedagogic approach, psychology approach, and religious approach. Hence scientific behavior influences an action and personality of the individual. It appears from knowledge, belief, and emotion.

Integrated learning model was introduced by Fogarty. Integrated learning process is based on topic, concept, skill, and unit of its integration. Integrated model by Fogarty (1991) classified into ten methods. The plan of those methods can be implemented and organized in integrated learning. Religious integrated learning model has studied by Kadir

(2016) by developing and combining the character of Ulul Albab, the way of thinking and making Math become the learning choice to connect Ulul Albab's value with Math.

Discovery learning model integrated with religious aspect on Biology subject with scientific approach. The teacher relates religious aspect in every syntax of it. Religious aspect can be integrated in Science and has a strong didactic and methodic connection.

Philosophically science is about the nature, the creature, and the interaction in microscopic environment, the latest, world needed, and humanity. Discovery epistemology related to sequence of the invention of scientific knowledge and scientific working. The used methods related to scientific working for observing the nature and the environment, the laboratory and the lesson/the text book. Meanwhile learning process that used in this study are lecturing, asking answering, natural experiment/laboratory, data analysis, verification, and taking conclusion. Axiological is the value of scientific behavior in scientific learning. Based on cognitive psychology theory, constructs, empirical, humanism, and positivism. Methodically and pedagogically use scientific approach (PBL, Inquiry, Discovery, etc).

Religious aspect in this study is based on Islam. This discovery learning model integrates with religious aspect and uses enculturation concept for science activities, that aspect gives empowerment and belief towards Biology concept, so that the students can improve the curiosity, critical thinking and honesty. Biology is one of subject that has been learnt from Elementary School. Biology consists of concept, theory, principle and procedure about how we interact with nature. Biology as a part of science gives experiences to understand the concepts and principle through skills, this part of science give a chance to observe, to ask question, to collect information, to associate, and to discuss finding, we called it as scientific approach. The materials in Biology subject are purposed to: 1) creates positive behaviour and realizes the greatness of God, 2) develop honesty, objectivity, critical thinking, and able to cooperate well, 3) Increase the experience in doing research through experiment and present the result in speaking and writing, 4) improve critical thinking analysis, inductive and deductive using Biology principle, 5) Develop Biology concept through knowledge, skills and having confidence, 6) Apply Biology concept to produce simple technology product, 7) take part in environment preservation.

Biology as science has three dimension: 1) science as a process, 2) science as a product, 3) science as scientific behaviour. Those components are crucial in Biology learning activity. Biology in learning process needs an approach that makes teacher explains the material easily and makes students comprehend knowledge. The approach in this study is Discovery Approach, discovery approach consists of systematic steps that can encourage students to learn actively using direct self-experiences. They collect data and information to solve the problem through reading, observing, and doing experiment systematically. Discovery approach is based on cognitive, constructivist, and behaviourism theory. In next level of discovery model, it can be analysed that this discovery model has same pattern that often used by scientist. Discovery learning (Bruner, 1961) in (Dahar, 1989) said that it was really important to build knowledge based on its former knowledge. The

former knowledge is supposed to stimulate student in exploring concept and answering questions through their learning experience. Students learn to think critically, manipulating information, analysing and connecting concept. This learning model is able to encourage students have long lasting memory through analysis and problem solving (Hosnan, 2014). The researcher purposes to describe the discovery learning model that integrated with religious aspect and how the integration process to develop students' scientific behaviour in learning Biology subject.

1. (Ruddel & Martha, 2007); Religious aspect influenced the education, politic, point of view, debate and social society in Europe: Teacher and students' motivation can be increased through teaching strategy, self-role and cooperation through Reading concept integration (CORI).
2. Sorli and Kinar (2010) Integration between science and religious in self-experience without differentiate religion, ethnic, nation and human as a population in universe.
3. Windrati (2012) Religious aspect education helped students in to understand, to respect, and to decide self-problem, family, community and country. It was also expected to remove the arrogance
4. Vicente et al. (2013) Religious aspect influenced the education, politic, point of view, debate and social society in Europe; significant with this assessment  
Research study that related to scientific behaviour in teaching:
  1. Sukaesih (2011) Students from university felt happy and told that learning can increase their motivation, understand the concept easily and then participate actively, so learning based practise can give positive influences to students' scientific behaviour.
  2. Nopiyanti, Nopiyanty (2020) Discovery teaching and learning model can increase the value of students scientific behaviour p-value  $0,042 < 0,05$  and there was positive significant affectivity through critical thinking in increasing the value of students' scientific behaviour p-value  $0,000 < 0,05$ .
  3. Solihin and Widayani (2016); learning accelerated as an approach to improve students' learning result in Physic subject "Besaran dan Satuan" in X-TKR-2 Class, Senior High School Muaro Jambi
  4. Guritno and friends (2015) ; learning model influences in scientific behaviour interaction and student's psychomotor in affective assessment not in cognitive assessment
  5. Widiadyana I W., Sadia I W., Suastra I W (2014) There was different significance between discovery model towards students' scientific behaviour who learned using direct learning ( $F=11,013;p<0,05$ ).
  6. Endang and friends (2017). There's different biology concept and scientific behaviour in using discovery learning model and direct learning ( $f=10,450$ ; Sig ( $0,000 < a$ ) to students

7. Khaerawati and friends (2018) The correlation of students' scientific behaviour at SMPN 13 Sungai Kakap in Science learning (0,92) showed very strong coefficient correlation.
8. Yani and friends (2017) The analysis of Biology students' scientific behaviour through PJBL Teaching model about fresh water increased well
9. Agnafia and friends (2019) about scientific behaviour measurement of prospective educator in Biology subject showed that their attitude increased very well.
10. Bass, Contant and Carin (2009) said, 1) Curiosity of natural word and artificial word, 2) Desire to find knowledge to understand world, 3) Objectivity based on fact and data, 4) Able to do modification to change the concept based on the proof, 5) Cooperative in investigating and solving the problem, 6) Having integrity in reporting the result.

Relevant research studies that related to religious aspects:

1. Hamdani (2016), Development of teaching that integrated with religious aspect could increase students' competency in cognitive skill and professionalism.
2. Darmawan (2004), Experiment result about internalization of religious aspect in Science subject was significant to develop students' characteristic.
3. Zarima and Friends (2017), the integration among technology, science and Islam had been applied at schools, especially in Physic, Science and Biology.
4. Nagahama (2014) said that integration learning had become a learning subject and national debate in Philipina, Besides that, religious aspects "Islam and Christian" became fundamental learning at school and society

From the description of those relevant studies, it can be concluded: 1) There is no discovery model study that integrated with religious aspect in Biology subject, 2) integration of religious models is not explained logically and systematically, 3) It is necessary to develop further research from previous studies to make the integration of religious aspect can run well and completed with guideline book and lesson plan.

## **METODE PENELITIAN**

The researcher used descriptive qualitative method to explain the continuity research process using ADDIE guideline with type 1 (F1-O1-S1-A1) analysis procedure from Lee and Jang (2014) to compile conceptual model ID with driven theory approach using literature review in connecting variables/ activities. e.g., Clifford (2009), Moallem (2003), you (2002) in (Lee and Jang 2014). Those detailed procedure can be seen in the table:

***Table of Synthesis Procedural Steps Type 1 (F1-O1-S1-A1) Lee and Jung (2014)***

<b>No</b>	<b>Steps</b>	<b>Synthesis Procedural Steps</b>
1	Determining sources	Determine conceptual supporting theory that suitable with development model from reliable sources such as books and scientific journal

2	Collecting data	Analyse and discuss suitable literature with learning model subject, religious and scientific behaviour
3	Analysing data	Identify and construct syntax components from various literature sources
4	Idealizing model	Connect the relation of syntax component model logically
5	Presenting model	Make the visualization of syntax component into schema/diagram as conceptual model

### HASIL DAN PEMBAHASAN

Discovery models that integrated with religious aspect are developed by following some analysis steps and procedure analysis from Lee and Jang 2014. Their procedure analyses are: 1) Determining fundamental sources as supported conceptual theory by analysing discovery learning model, religious aspect and scientific behaviour from reliable sources such as books and scientific journal.

Researcher collected the data, analyse and discuss suitable literature that fitted with learning model and religious aspect, so, the researcher can get some data that can support the model concept development based on the needs analysis.

Researcher identified and constructed syntax model components from various literature sources. So this syntax model component can be adapted and adopted become new syntax component that is needed to analysed based on purpose of development concept. From the result, the researcher will connect syntax component model logically to idealize learning model as conceptual model. At last, researcher made a visualization of syntax component into schema/diagram as conceptual model

For the next step, conceptual model would be checked by expert before it began to be implemented in the classroom, the implementation was applied by using enculturation process (Suastra, I.W 2006). Enculturation of religious aspect had already been applied in Islam, with similar ways (Schineller, SJ, 1990). The instructional design process used procedural analysis from Lee and Jang (2014) for analysing, designing, developing instrument, applying, and evaluating learning that related to discovery learning model with religious attitude in Biology subject. In Development step, discovery learning model are expanded in Biology subject, so it can be implemented and evaluated. Classroom Action Research was used in learning trials. After the needs of analysis were designed, then the researcher arranged discovery learning model that integrated with religious aspect in each syntax of discovery model such as ayat/hadist/bible in learning activity process, in this case, Biology subject in learning process are related to Alquran. Students were stimulated individually or in groups to participate actively in constructing knowledge and finding the essential meaning, it would be evaluated in classroom action research for product trials.

The result showed that it was students' first experiences that have great connection between learning biology subject and Alquran. The students felt grateful and got the strongest belief in knowledge and Islam. The students were able to gain more knowledge about Biology subject and the greatness of God. The researcher used questionnaire to get students competency of the applied model and used statistical analysis with Alpha Cronbach Reability:

K. 10

Si2: 8,49524

St:12, 9333

r11: 0,68081

High reability category

So, discovery learning model that integrated with religious aspect have great function and benefit for developing students scientific behaviour

### **KESIMPULAN**

The conclusions are: 1) Discovery learning model that integrated with religious aspect were developed by Lee and Jang 2014 using procedural analysis, 2) these model gave benefit for students in learning Biology, 3) Using scientific approach and that acculturate in learning activity, each discovery syntax can grow students' curiosity, integrity and critical thinking, 4) the steps of syntax can be implemented easily by teachers to develop students' scientific behaviour, 5) discovery learning model that integrated with religious aspect are useful for developing students' scientific behaviour as a sustainable process, so that the enculturation process become the culture and great habitual in students' life.

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