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LEARNING SCIENCE WITH THE CHARACTER BY DISCOVERY LEARNING TO IMPROVE CRITICAL THINKING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS

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Abstract

Students learn to integrate the concepts of subject matter, namely physics, chemistry, and biology. This integration in the curriculum is called integrated science. Integrated science can help students to connect different concepts, topics, and ties between subject matter. The purpose of this research is to create a learning model in the form of syllabus, lesson plans, LKPD, modules that integrate physics, chemistry, and biology with character with discovery learning models to improve the skills critical thinking of SMP/MTs students. Then the process of developing the learning component on the product by combining (overlaying) the stages of the Dick and Carey model by integrating physics, chemistry, character biology with discovery learning models, critical thinking skills. Student responses about the device (LKPD and module) were very interested in filling out the questionnaire by choosing weights of 4 (very good) and 3 (good) respectively: LKPD (52%, 47%), module (57%, 40%). The teacher's responses about the tools (syllabus, lesson plans, LKPD, modules) were very interested in filling out the questionnaire by choosing the weights of 4 (very good) and 3 (good) respectively: syllabus (58%; 42%); lesson plans (73%, 25%), LKPD (59%, 41%), and modules (66%, 33%). The results of the test of critical thinking skills obtained data that students can interpret, analyze, evaluate, infer, explain, and self-regulate.

Keywords: Integrated Science, Character, Discovery Learning, Critical Thinking Skills

INTRODUCTION

The Ministry of National Education has compiled guidelines for the development of integrated science learning since 2005, but the reality on the ground is that many science teachers in SMP/MTs still do not practice integrated science learning for various reasons. The results of interviews with science teachers in Jambi City found some reasons for not implementing integrated science learning, including the fear of teachers about the content of the curriculum material not being conveyed, the absence of examples of integrated science learning in some reading books, and the lack of development steps. Integrated science learning for SMP/MTs teachers.

Mustikasari & Wiyanto (2020), Sudjito et al. (2018) and Pulungan et al. (2021) in his paper reports that the trigger for only a small number of teachers who carry out integrated science learning is that there are not many concrete examples of integrated science learning tools that can be applied and a complete description of integrated science learning and the steps for developing learning has not been obtained. This lecturer also explained that through science learning, students can think to solve problems and literacy skill in everyday life (Rahmiwati, 2020), critical thinking and cooperation skill (Habibah & Maryanto, 2019). In a preliminary study (Delismar, 2019) which was tried on 45 science teachers at SMP City Jambi using a

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questionnaire, it appears that the working period of 0-5 years is 2 people (4, 4%), 6-10 years is 18 people (40%), 11-20 years old, 6 people (13%), 21-30 years old, 19 people (42%), junior high school science teachers in Jambi City listed as experienced teachers. A fairly long experience but has not done integrated science even though integrated science is a subject contained in the 2013 curriculum that is currently in effect. Education in a combined form has more advantages than when taught separately (stand-alone), so it is important for science teachers with backgrounds that are not integrated science to always try to prepare for education well.

Based on initial observations through interviews with some junior high school science teachers in Jambi City as well as Jambi City Science teachers who are members of the Natural Sciences Teacher Conference (MGMP) of Jambi City Region 1, it is obtained data that science teacher descriptions are still low on scientific approaches and models. Learning model. This is what makes science teachers less creative in practicing learning models in the classroom. They are reluctant to apply the Discovery Learning (DL) model for various reasons. The teachers assume that the implementation of the DL model can only be implemented if the equipment and materials in the laboratory are complete, lack of mastery of how to implement it, the lack of supporting facilities and infrastructure in the science laboratory, the unavailability of adequate ICT facilities for science learning, and the lack of integrated science learning resource books. in the library, they do not understand how to make learning tools (syllabus, lesson plans, LKPD, and modules) and an inadequate school environment for science learning.

To apply to learn, teachers need learning resources. Learning resources are not only limited to main sources (packaged books, reference books, reading books, enrichment books), other learning resources can also be used as alternatives to support the achievement of the expected competencies. Alternative learning resources can be obtained from libraries, the internet, laboratories, communities, and industry (Suryadhianto & Mujianto, 2020), social media (Zufar et al., 2020) and other online learning resources (Kofo et al., 2022). Learning resources have a positive impact on student learning outcomes (Ananda & Maksum, 2021). From the results of interviews with Jambi City Science teachers, they tend to use only some learning resources.

Integrated science learning can be used as a forum for improving literacy and cooperation skill (Rahmiwati, 2020), character building, increasing attention and motivation (Cholisoh et al., 2015), increasing cooperation, mutual respect and creative thinking skill (Jauhar, 2021). Moreover, the implementation model of Discovery Learning (DL) (Amalia, 2022) by integrated science with character and learning tools developed can be used as an alternative example for science teachers in SMP/MTs. In this regard, it is necessary to design several models of implementing character-based integrated science discovery learning into educational activities in the classroom that are by the implementation of Permendiknas No. 41 of 2007, namely the development of learning tools and the selection of active, innovative, creative, efficient, and effective educational models. As well as exciting. Systematic educational planning can be brought in layers of integrated learning tools between discovery learning in integrated science learning by creating characters in different learning sources to improve critical thinking skills.

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THEORY STUDY

1. Learning Design

Before learning is carried out, there are several things that the teacher must pay attention to, including the learning design (Ritonga et al., 2022). Learning design is also known as instructional design and is part of the curriculum (Lim, 2022). The curriculum which concerns what must be learned, the content of learning, includes higher-order thinking skills and metacognitive skills, in contrast to instructional theory, which concerns how it should be learned (W. P. Putra et al., 2023).

Design is an interactive process involving students in teaching and learning (Isola Rajagopalan, 2019). This assumption explains that instructional design adheres to the principle of learned-centered or student-oriented so that students participate in the instructional design process (Aldosari et al., 2022). Trif-boia (2022), (Mohammed & Al, 2022) and (Libata et al., 2023), introduced seven designs that they believe are meaningful in designing learning, namely content, strategy, message, control, representation, media, and information processing. On content, a designer ensures the learning material. This section is more towards content, for example, teaching theory related to design content. The educational process is expected to be able to link students from planning to assessment so that student-centered or student-centered learning is established. Design can improve students' critical thinking skills.

One of the learning design models is the Dick, W, and Carey, L (1985) model. This model is included in the procedural model. The steps of instructional design according to Dick and Carey are: a. Identify general learning objectives; b. Carry out learning analysis; c. Identify the input behavior and characteristics of students; d. Formulate performance objectives; e. Develop benchmark reference test items; f. Develop learning strategies; g. Develop and select learning materials; h. Design and carry out formative evaluations; i. Revise learning materials; j. Design and carry out summative evaluations. In addition to the Dick and Carey model, this study also uses steps in the ADDIE model. The ADDIE model (Libata et al., 2023) uses 5 stages of development, namely: a. Analysis; b. Design; c. Development; d. Implementation; e. Evaluation.

2. Learning Theory

Learning theory is a pragmatic and eclectic theory. The center of attention of a theory is always there, which is more concerned with the learning process, information systems that are processed in the learning process, and others. According to Nelwatri & Neviyarni (2022) and (Maj, 2022) learning theory can be grouped into four groups or schools, namely: behavioral, cognitive, humanistic, and cybernetic. The flow of behavior emphasizes the results of the learning process. The cognitive theory group emphasizes the learning process (Pakpahan & Saragih, 2022). The humanistic theory flow emphasizes the content or what is learned (Mustofa, 2022). The cybernetic flow theory emphasizes the information system being studied (Susanto et al., 2022) and (Tilak et al., 2022). Based on different human concepts according to Sri Haryanto, (2022) in explaining the occurrence of the behavior, there are two schools of learning theory, namely the behaviouristic-elementary school and the holistic cognitive flow.

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3. Discovery Learning Model

There are many kinds of learning models that teachers can use in learning, including discovery learning. Discovery learning originally appeared in Bruner's theory (Lullulangi, 2022) to develop aspects of exploration and experimentation towards knowledge and the teacher's main role is to help and encourage students to find concepts and ideas from learning (Yerimadesi et al., 2023). According to Jannah & Supardi (2020) learning inquiry/discovery is defined as "an approach to learning that involves the process of exploring nature or materials and it leads to asking questions, making discoveries, and by testing those discoveries in search of new understandings". This research combines scientific inquiry and integrated science learning (physics, chemistry, integrated biology) as a pathway to create a learner-centered learning design.

In this study, combining scientific investigations and integrated science learning (physics, chemistry, and integrated biology) is characterized as a pathway to create a learner-centered learning design. Discovery learning emphasizes the discovery of previously unknown concepts or principles. In applying the discovery learning model, the teacher acts as a mentor by providing opportunities for students to learn actively, the teacher must be able to guide and direct students' learning activities according to the objectives. Conditions like this want to change teaching and learning activities that are teacher-oriented to become student-oriented.

The advantage of discovery learning according to Anisa et al. (2017), Wati (2019), Handita & Prasetyo, (2022), Roheni et al. (2020), is to provide opportunities for students to experience the process of how knowledge is obtained; encourage optimal student learning participation to make the academic atmosphere more developed and increase memorization; encourage higher-order thinking processes that include critical, creative thinking, and problem-solving so that the knowledge gained lasts longer and is easier to remember; learning outcomes have a better transfer effect because they are easy to apply; and improve students' reasoning and ability to think freely, train students' cognitive skills to find and solve problems without the help of others. In the end, students can act as a problem solver, a scientist, historian, or expert.

Through discovery learning, students are invited to observe, classify, measure, predict, determine and formulate conclusions so that they get something, especially the concepts of physics, chemistry, and biology. In the implementation of learning using discovery learning models apply various learning strategies. The learning strategy shows a variety of teaching and learning activities, such as group discussions, independent reading, case studies, lectures, computer simulations, worksheets, and cooperative group projects. By applying the discovery learning model, the teacher applies this strategy, so students are directed to be active from the beginning of learning to the end of learning. The activeness of students can be seen in the steps of the discovery learning model, which was put forward by experts with explanations on each step by Lullulangi (2022), Nugrahaeni et al. (2017), and Roheni et al. (2020) namely stimulation (stimulation/providing stimulation), problem statement (statement/problem identification), data collection (data collection), data processing (data processing), verification, and generalization (draw conclusions/generalizations).

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The discovery learning model can be used in all subjects in SMP/MTs including science. Learning between physics, biology, and chemistry are taught in an integrated manner called integrated science (Irhasyuarna et al., 2022), meaning that science is no longer taught separately (Aswirna et al., 2023). Based on research conducted by Breslyn and McGinnis (2012), there is a comparison between the disciplines of biology, chemistry, earth science, and physics. Science/science teachers in secondary schools teach more than one discipline. From the results of the investigation of the teacher's conception of science, it is influenced by the context of the teaching discipline, it is hoped that this will happen if teachers can have inquiries/investigations with many concepts. For example, teachers can carry out investigations in different biological sciences or study chemistry or physics. Based on the term, chemistry according to Atkins (2015) is learning that delivers accurately about substances: their structures and properties, and the responses that turn them into other substances.

4. Character

Competencies that must be possessed by students consist of several aspects, namely knowledge, understanding, skills, values, attitudes, and interests (Nainggolan, 2022). All aspects of these competencies will be carried out properly if balanced with the cultivation of character values (Nisa, 2021). Character education is a system of inculcating character values to school members which include components of knowledge, awareness or willingness, and actions to implement these values (Zeni & Panggabean, 2022), (Adams, 2011) and (Agboola & Tsai, 2012), with the aim that the individual can increasingly live his freedom, so that he can increasingly responsible for their growth as a person and the development of others in their lives (Marsakha, 2021). The method used for character application according to Firmansyah et al., (2021), namely assignment, habituation, training, education, direction, and example. Character education must be carried out in tandem with theory and practice in everyday life, including in the classroom (Agboola & Tsai, 2012) as set out in learning tools ranging from the syllabus, lesson plans, LKPD, and modules. In this study, the device was integrated with character values, and a discovery learning model to improve critical thinking skills.

METHOD

This research is development research, development of learning tools. Development of an integrated learning model of physics, chemistry, biology with character discovery learning to improve critical thinking skills of SMP/MTs students, following the stages of Dick and Carey's instructional design model integrated with physics, chemistry, and biology with a character from discovery learning. The procedure for coating the learning design model follows the stages of the ADDIE (Analysis-Design-Develop-Implement-Evaluate) model. This model uses 5 stages of development, namely: a. Analysis; b. Design; c. Development; d. Implementation; e. Evaluation.

At the pre-development stage, information is collected about learning tools for physics, chemistry, and biology with the characteristics of discovery learning to improve critical thinking skills. At the development stage of making a design for the development of learning device products. The stages of implementing this product include trial activities followed by

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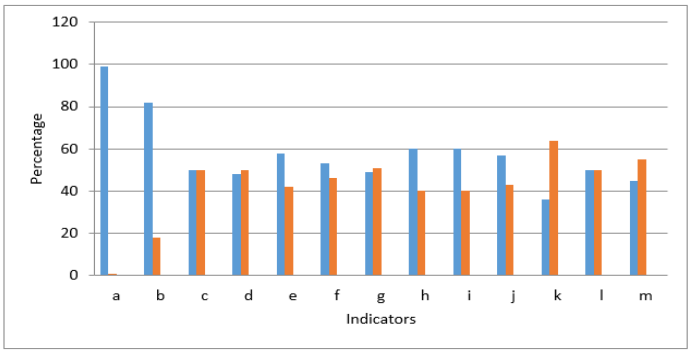
evaluation and revision. The test instrument for students' critical thinking skills that had been made was tested on the class that was used as the research sample. After the test results were obtained, then they were analyzed using quantitative descriptive. Quantitative analysis is assisted by the SPSS 20 program, while descriptive analysis states the results of quantitative calculations which then describe critical thinking skills on vibration and wave materials.

RESULTS AND DISCUSSION

The results of the calculation of the teacher's questionnaire on the integrated syllabus of physics, chemistry, biology with discovery learning to improve the critical thinking skills of SMP/MTs students, can be seen in the indicators of subject identity writing, namely the name of the subject, school/madrasah level, class, and semester, of 14 people answered 4 (91%), 3 (0.8%), 2 (0%), and 1 (0%). On indicators of determining Competency Standards (SK)/KI. The determination of this SK/KI should be done carefully and carefully and still pay attention to national standards, as seen from 14 people who answered 4 (82%), 3 (18%), 2 (0%), and 1 (0 %). In the indicator of determining Basic Competence (KD). KD is formulated using operational words, it can be seen from 14 people who answered 4 (50%), 3 (50%), 2 (0%), and 1 (0%). In the indicator of determining the subject matter, it can be seen that 14 people answered 4 (48%), 3 (50%), 2 (0.24%), and 1 (0%). In the indicator of determining the learning experience of students, it can be seen from 14 people who answered 4 (58%), 3 (42%), 2 (0%), and 1 (0%). In the indicator of the description of basic competencies as indicators, it can be seen from 14 people who answered 4 (53%), 3 (46%), 2 (0.1%), and 1 (0%). In the assessment indicators, it can be seen that 14 people answered 4 (49%), 3 (51%), 2 (0%), and 1 (0%). In the time allocation indicator, it can be seen that 14 people answered 4 (60%), 3 (40%), 2 (0.1%), and 1 (0%). On the indicator of learning resources, it can be seen that 14 people answered 4 (60%), 3 (40%), 2 (0%), and 1 (0%). In the character indicator, it can be seen that 14 people answered 4 (60%), 3 (40%), 2 (0%), and 1 (0%). On the indicators of practicality and ease of use, it can be seen that 14 people answered 4 (36%), 3 (64%), 2 (0%), and 1 (0%). In the indicator of the suitability of learning with the needs of students, it can be seen from 14 people who answered 4 (50%), 3 (50%), 2 (0%), and 1 (0%). In indicators of achievement of targets, it can be seen from 14 people who answered 4 (45%), 3 (55%), 2 (0%), and 1 (0%). For full details can be seen in graph 1 below:



Graph 1: Recap of the teacher's questionnaire on the syllabus

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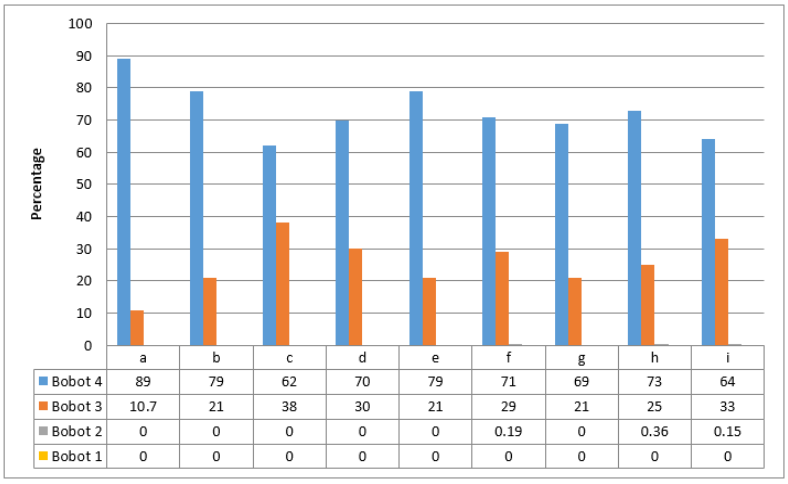
The results of the calculation of the teacher's questionnaire on RPP integrated physics, chemistry, biology with discovery learning to improve the critical thinking skills of SMP/MTs students, can be seen in indicator a. identity, from 14 people answered 4 89%), 3 (11%), 2 (0%), and 1 (0%). On indicator b. Core competencies (KI), Basic Competencies (KD), and indicators, as seen from 14 people answered 4 (79%), 3 (21%), 2 (0%), and 1 (0%). On indicator c. learning objectives, as seen from 14 people answered 4 (62%), 3 (38%), 2 (0%), and 1 (0%). On indicator d. subject matter, as seen from 14 people answered 4 (70%), 3 (30%), 2 (0%), and 1 (0%). On indicator e. learning methods, as seen from 14 people answered 4 (79%), 3 (21%), 2 (0%), and 1 (0%). On indicator f. learning activities, as seen from 14 people answered 4 (71%), 3 (46%), 2 (29%), and 1 (0.19%). On the indicator g. g. learning media, as seen from 14 people answered 4 (68%), 3 (32%), 2 (0%), and 1 (0%). On indicator h. learning resources, as seen from 14 people answered 4 (69%), 3 (31%), 2 (0.1%), and 1 (0%). On indicator i. assessment of learning outcomes, as seen from 14 people answered 4 (64%), 3 (34%), 2 (0.2%), and 1 (0%). The complete results of the teacher's questionnaire on the lesson plan can be seen in graph 2 below:



	a	b	c	d	e	f	g	h	i
Bobot 4	89	79	62	70	79	71	69	73	64
Bobot 3	10.7	21	38	30	21	29	21	25	33
Bobot 2	0	0	0	0	0	0.19	0	0.36	0.15
Bobot 1	0	0	0	0	0	0	0	0	0

Graph 2: RPP questionnaire results

The results of the calculation of the teacher's questionnaire on the integrated physics, chemistry, biology character LKPD with discovery learning to improve the critical thinking skills of SMP/MTs students, can be seen in indicator a. The suitability of the material with the science learning syllabus, from 14 people answered 4 66%), 3 (34%), 2 (0%), and 1 (0%). On indicator b. The suitability of the task with the material and condition of the students, and indicators, as seen from 14 people answered 4 (62%), 3 (38%), 2 (0%), and 1 (0%). On indicator c. Determining material that stimulates students' concern for the environment, as seen from 14 people answered 4 (64%), 3 (36%), 2 (0%), and 1 (0%). On indicator d. The accuracy of using language, as seen from 14 people answered 4 (61%), 3 (39%), 2 (0%), and 1 (0%). On indicator e. The suitability of the material with real life, as seen from 14 people answered 4 (50%), 3 (50%), 2 (0%), and 1 (0%). On indicator f. Developing independence, talents and interests, as seen from 14 people answered 4 (50%), 3 (50%), 2 (0%), and 1 (0%). On the indicator g.

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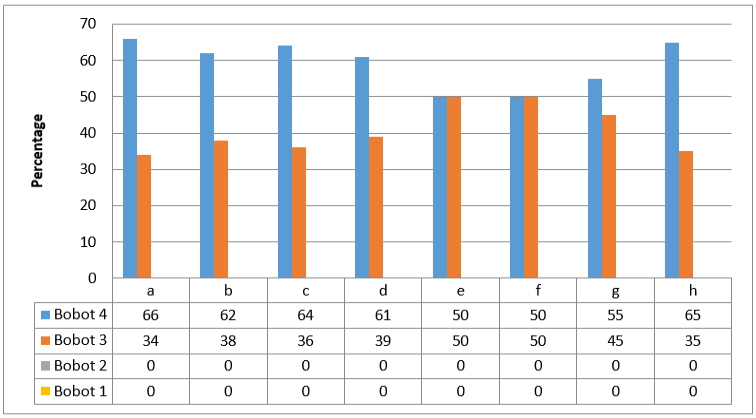
didactic requirements, as seen from 14 people answered 4 (68%), 3 (55%), 2 (45%), and 1 (0%). On indicator h. learning resources, as seen from 14 people answered 4 (65%), 3 (35%), 2 (0.1%), and 1 (0%). The complete results of the teacher's questionnaire on LKPD can be seen in graph 3 below:



	a	b	c	d	e	f	g	h
Bobot 4	66	62	64	61	50	50	55	65
Bobot 3	34	38	36	39	50	50	45	35
Bobot 2	0	0	0	0	0	0	0	0
Bobot 1	0	0	0	0	0	0	0	0

Graph 3: Graph of LKPD questionnaire results

The results of the calculation of the teacher's questionnaire about the integrated module of physics, chemistry, biology with discovery learning to improve the critical thinking skills of SMP/MTs students, can be seen in indicator a. According to the characteristics of students, out of 14 people answered 4 (57%), 3 (43%), 2 (0%), and 1 (0%). On indicator b. The suitability of the learning module with the environment and the prevailing education system, as seen from 14 people answered 4 (63%), 3 (37%), 2 (0%), and 1 (0%). On indicator c. In writing the form and size of the module letters, it can be seen from 14 people who answered 4 (59%), 3 (39%), 2 (0.2%), and 1 (0%). On indicator d. The accuracy and attractiveness of the module can be seen from 14 people who answered 4 (59%), 3 (41%), 2 (0%), and 1 (0%). On indicator e. Utilization of space (empty space) in the module, as seen from 14 people answered 4 (64%), 3 (36%), 2 (0%), and 1 (0%). On indicator f. Consistency, as seen from 14 people answered 4 (57%), 3 (43%), 2 (0%), and 1 (0%). On the indicator g. Determination of the organization of writing materials, as seen from 14 people answered 4 (86%), 3 (14%), 2 (0%), and 1 (0%). On indicator h. Determining learning strategies to achieve goals, as seen from 14 people answered 4 (86%), 3 (14%), 2 (0%), and 1 (0%). The complete results of the teacher's questionnaire on the module can be seen in graph 4 below:

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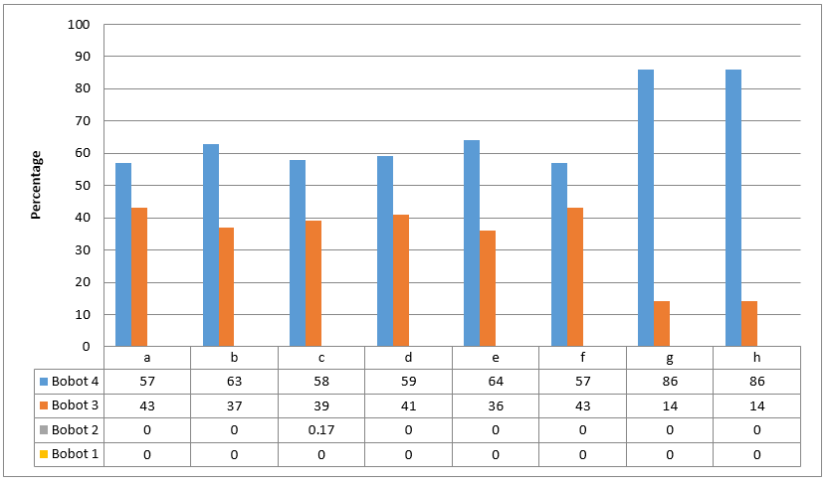
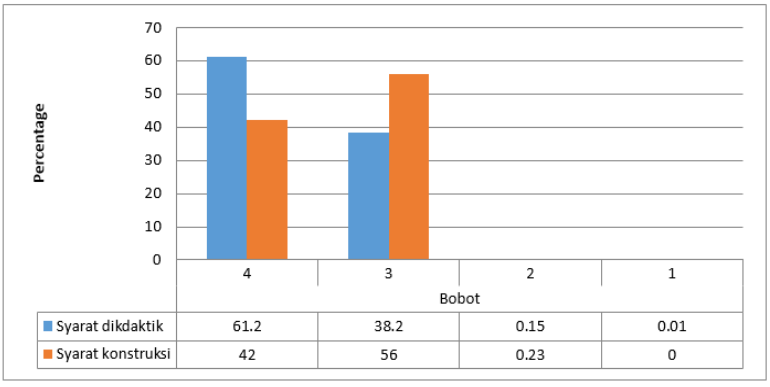


	a	b	c	d	e	f	g	h
Bobot 4	57	63	58	59	64	57	86	86
Bobot 3	43	37	39	41	36	43	14	14
Bobot 2	0	0	0.17	0	0	0	0	0
Bobot 1	0	0	0	0	0	0	0	0

Graph 4: Module questionnaire results

The results of calculating student questionnaires on LKPD integrated physics, chemistry, biology characterized by discovery learning to improve critical thinking skills of SMP/MTs students, can be seen in indicator a. For the didactic requirements, out of 98 people answered 4 (61.2%), 3 (38.2%), 2 (0.15%), and 1 (0.01%). On indicator b. Construction requirements, as seen from 98 people answered 4 (42%), 3 (56%), 2 (0.23%), and 1 (0%). The complete results of student questionnaires on LKPD can be seen in graph 5 below:



	4	3	2	1
Syarat dikdaktik	61.2	38.2	0.15	0.01
Syarat konstruksi	42	56	0.23	0

Graph 5: Graph of LKPD questionnaire results

The results of calculating student questionnaires on integrated modules of physics, chemistry, biology with discovery learning to improve the critical thinking skills of SMP/MTs students, can be seen in indicator a. For the didactic requirements, out of 98 people answered 4 (64%), 3 (35%), 2 (0.1%), and 1 (0.01%). On indicator b. Construction requirements, seen from 98 people answered 4 (50%), 3 (45%), 2 (0.5%), and 1 (0%). The complete results of student questionnaires about the module can be seen in graph 6 below:

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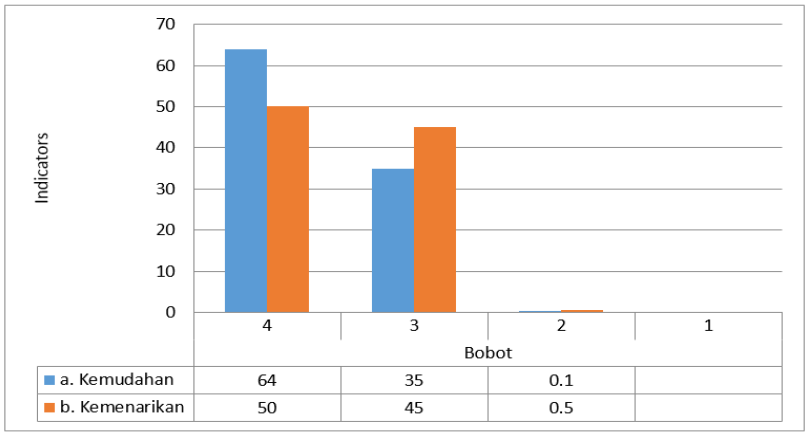

Graph 6: Graph of module questionnaire results

Apart from the results of the recapitulation of the questionnaire calculations from teachers and students about the syllabus, lesson plans, LKPD, and the modules mentioned above, comments from teachers and students regarding learning products. The comments from the teachers of SMP Negeri 9 Jambi City about the syllabus, in general, stated that the integrated syllabus of physics, chemistry, biology with discovery learning to improve critical thinking skills of SMP/MTs students was by the indicators as the correct syllabus starting from the indicators of writing subject identity, namely the name of the subject, the level of the school/madrasah, class, and semester to the indicator of achievement of the target so that it can be said overall, this syllabus is very good, it can be used as a guide for teachers because it is very helpful for science teachers, especially in learning and in preparing lesson plans. Another comment, the syllabus has applied discovery learning to improve critical thinking skills and is very well used in the learning process.

To see students' critical thinking skills after participating in the learning process following the discovery learning syntax using the syllabus, lesson plans, LKPD, and modules at 3 schools, SMP Negeri 9 Jambi City (26 people), SMP Negeri 10 Jambi City (28 people), MTs Negeri 3 Jambi City (27 people) with a total of 81 people, the results of the higher-order thinking skills test were obtained as shown in table 1 below:

Table 1: Critical thinking skills test results

No	Information	Question Items											
		1a	1b	1c	1d	1e	2	3	4	5a	5b	5c	5d
1	Maximum score	6	1	4	6	3	2	2	2	2	2	2	4
2	Earnings score	437	69	204	309	102	140	149	149	132	124	137	227
3	Information	80	85	63	64	21	86	92	92	82	77	85	70

From Table 1 it can be seen that the highest average of students' answers is in question number 3 and number 4 with the level/type of critical thinking skills, determining information relevant to the problem with examples of critical thinking skills; distinguish between facts, opinions,

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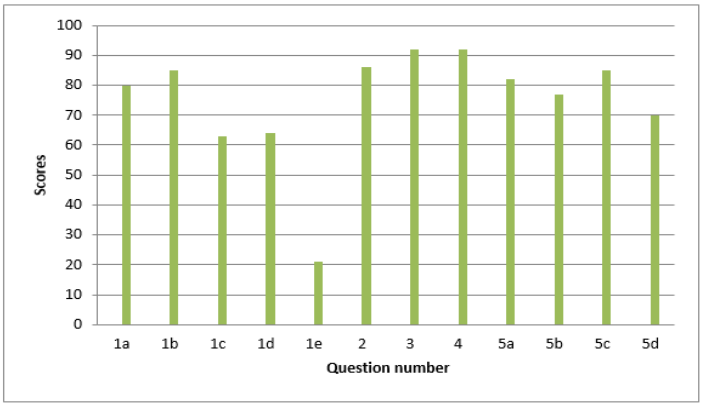
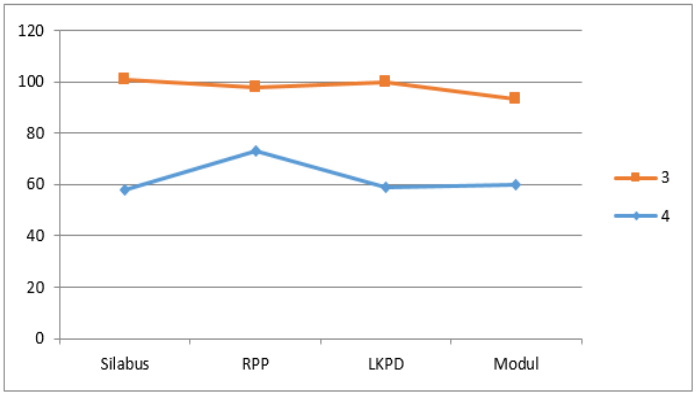
and logical decisions; checking for consistency, and recognizing the accuracy of the data, which is 92. Meanwhile, the lowest score is obtained from question number 1e with an average of 21. The lowest score is in the thinking skill of checking consistency, where students cannot understand the meaning of the question and cannot determine information related to the answer to the previous question. In concluding in general, it appears that students cannot summarize what has been analyzed/answered statements that are related to one another. The value of students' critical thinking skills can be illustrated in the following graph 7:



Graph 7: The value of students' critical thinking skills

From the results of the recap of the teacher's responses to the syllabus, lesson plans, LKPD, and modules, it can be seen that of the 14 teachers, in the syllabus, 58% said they were very good (4), in the RPP 73%, in the LKPD 59%, and the module 60%. This can be seen in Figure 8.



Graph 8: Responses to the syllabus, lesson plans, LKPD, and module questionnaires by teachers

The recap of students' responses to the LKPD, and the module shows that out of 81 students, who chose 4 (very good) on the LKPD 52%, and in the module 57%, this can be seen in Graph 9 below:

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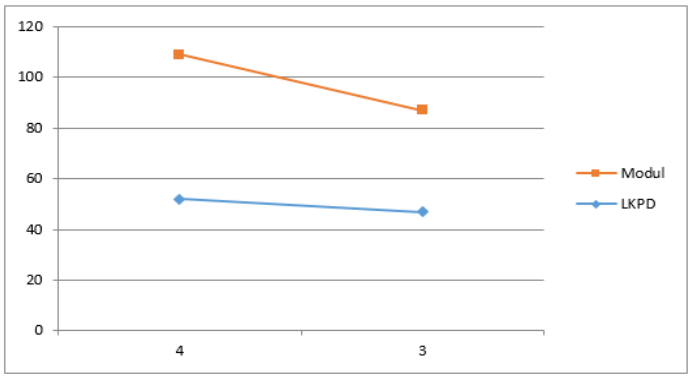

Graph 9: Responses to LKPD questionnaires, and modules by students

Interest has a great influence on learning because with interest someone will do something that interests him and relatively permanent (Lena et al., 2022). On the other hand, without interest, it is impossible to do something. This is by the results of research conducted by Kahu et al. (2017) namely the interest of students in learning can be seen from lessons that are easy to understand, good teachers teach, lessons are not boring, not a lot of theory, interesting and useful, and can eliminate boredom. Fitrilinda et al. (2022) and Fajaria & Nurhasanah (2022) explained that interest refers to the preferred and desired self-involvement in an activity. Where 2 types of interest affect learning and performance, namely personal interest and situational interest. Personal interest is a personality variable or individual difference that is more stable while situational interest is a contextual view of interest, namely, interest is generated by environmental features that are close or directly related to the individual. Situational interest can be increased through the use of interesting texts, media, presentations, etc., and is generally considered to be relatively consistent across all individuals. Thus, personal interest and situational interest were positively related to future activity choices, memory, deeper cognitive processing, and actual achievement and performance.

Thus, students' interest in science lessons and using the syllabus, lesson plans, LKPD, integrated modules of physics, chemistry, and biology are characterized by discovery learning to improve critical thinking skills equipped with contextual, colorful explanations of material, supporting pictures, and provide information or examples of creativity and innovation that can be done by students to foster critical thinking skills. This is reinforced by the opinion of Toli & Kallery (2021) that effective teachers are teachers who can establish good relationships with students and who can create nurturing and caring classes. Environment. Effective teachers are people who love learning, have an excellent command of certain academic subjects, and can transmit their lessons effectively to students. An effective teacher is to activate the energy of his students to work towards a more just and humane social order. The principle of character can be disseminated and implemented in all levels of society (Lickona, 2017), including at the SMP/MTs level. This happens, among which subject teachers have limited ability to describe, actualize, and ground the implementation of character values so that the counselor's role is needed as a transmitter of "heart" education (character education) which needs to be provided with hours of classical guidance services. It is necessary to find an alternative model framework

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for character education that is oriented towards the establishment of professional collaborative partnerships between counselors teachers and subject teachers in the implementation of character education in schools. According to Kristjánsson (2016), Aningsih et al. (2022), and Yanti (2021), character education will be carried out well if parents and teachers work together to help students read, understand, and provide concrete examples of attitudes and behaviors so that the internalization process takes place. By providing nuanced learning, it is hoped that the teacher can first set an example in everyday life, especially during the learning process. Education will not be realized without cooperation between students, parents, and schools to create independent students in developing their competencies with the ability to manage time well in the learning process.

Nida (2019) state that the points out that one of the causes of the weak learning process in the implementation of character education stems from the teacher's inability to create a supportive learning process. Based on observations in the field, he emphasized that the implementation of character education has not touched the dimensions of effective appreciation and is still far from the level of real value practice in the behavior of everyday educated life. The basic concept that is used as the orientation of character education in Indonesia is also unclear. Where did it start and where did character education go, its philosophical foundation is not easy to find. Mochammad Ircham (2022) observes that this character education movement does not have a theoretical perspective and a common practice basis.

By applying to learn using integrated learning tools of physics, chemistry, biology with character discovery learning, they can carry out a scientific approach (Keliat et al., 2022) including discovery learning. By discovery learning, students can carry out activities ranging from observing, asking, try, reason, and communicate to improve teacher performance in implementing (Roheni et al., 2020). As explained by Lullulangi (2022) and E. D. Putra & Amalia (2020) the use of the model can increase interest and learning outcomes in science. Students who have an interest in learning science show a real form of student-centered learning that eliminates the assumption of students as learning objects. Then added by Handita & Prasetyo (2022) that by using discovery learning students' interest is seen during science learning by showing high attention to teacher explanations to increase individual cognitive, affective, and psychomotor competencies. Mastery of these competencies is related to teacher activities, student activities, interaction patterns during the learning process. One of the positive impacts of the discovery learning model is the emergence of interest with an increased inactiveness and enthusiasm in learning with direct experience both individually and in groups which can ultimately improve student learning outcomes (Wahyudi, 2015 and Anisa, 2017). This is in line with this research that integrated learning of physics, chemistry, biology has character, the teacher will prepare students to accept learning and be connected with the daily experiences of students. The teacher acts as a facilitator in creating learning that allows students to develop exploitation activities starting from providing a stimulus to concluding.

The ultimate goal of this learning is to provide opportunities for students to improve critical thinking skills towards natural phenomena in the form of physics, chemistry, and biology so that learning is more meaningful. As researched by Mawaddah et al., (2015), Rudibyani (2018),

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E. D. Putra & Amalia, (2020a) and Roheni et al. (2020) by applying the discovery learning model has a high and effective effect on improving critical thinking skills and other student competency.

CONCLUSIONS AND SUGGESTIONS

The integrated learning model of physics, chemistry, and biology is characterized by discovery learning in the form of syllabus, lesson plans, LKPD, the modules developed can improve the critical thinking skills of students in class VIII SMP/MTs. The teacher is very interested in the tools (syllabus, lesson plans, LKPD, modules). Students are very interested in LKPD and integrated modules of physics, chemistry, and biology with discovery learning. The results of the critical thinking skills test show that students can interpret, analyze, evaluate, infer, explain, and self-regulate. Syllabus, lesson plans, LKPD, this module can be used in the learning process individual (self-study) both for teachers and for even semester VIII students. Subject teachers are suggested to be able to develop students' critical thinking skills by integrating physics, chemistry, and biology material with character discovery learning models. This is because in this way learning will be more meaningful.

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