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Design of Chemo-entrepreneurship Oriented Teaching Materials to Analyze Students' Entrepreneurial Creativity

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Abstract

Studying Chemistry is not about the concept but how to train the students' creativity. The learning outcomes are influenced by several factors, including learning models and materials. Teachers still use the books provided by the school, so teachers should develop learning materials that suit learning objectives and students' conditions. Teachers should analyze the students' cognitive ability and also creativity. Chemo-entrepreneurship-oriented learning materials would help to analyze students' cognitive ability and entrepreneurial creativity. This research used research and development with ADDIE method. Results were the validity of material instrument from three experts gave very valid with the scores of 49, 50, and 48. The learning materials got a very good category from teachers' responses with a score of 34 out of 40 and got a good category from students' responses with a score of 38.53 out of 48. Results from the analysis of students' entrepreneurial creativity showed that students had high entrepreneurial creativity. Students also actively discussed and made creative products. There were aromatherapy candles, banana nuggets, apple donuts, and crispy balado potatoes.

Keywords: creativity; chemo-entrepreneurship; material book; nomenclature; redox

Abstrak

Belajar kimia bukan tentang konsep, tetapi bagaimana melatih kreativitas siswa. Hasil belajar dipengaruhi oleh beberapa faktor diantaranya model dan materi pembelajaran. Guru masih menggunakan buku-buku yang disediakan sekolah, sehingga guru harus mengembangkan bahan ajar yang sesuai dengan tujuan pembelajaran dan kondisi siswa. Guru harus menganalisis kognitif dan juga kreativitas siswa. Materi pembelajaran yang berorientasi kewirausahaan akan membantu untuk menganalisis kognitif dan kreativitas kewirausahaan siswa. Penelitian ini menggunakan penelitian dan pengembangan dengan metode ADDIE. Hasil uji validitas instrumen materi dari tiga ahli memberikan nilai sangat valid dengan skor 49, 50, dan 48. Materi pembelajaran mendapat kategori sangat baik dari respon guru dengan skor 34 dari 40, dan mendapat kategori baik dari respon siswa dengan skor 38 ,53 dari 48. Hasil analisis kreativitas kewirausahaan siswa menunjukkan bahwa siswa memiliki kreativitas kewirausahaan yang tinggi. Siswa juga aktif berdiskusi dan membuat produk kreatif, ada lilin aroma terapi, nugget pisang, donat apel, dan kentang balado renyah.

Kata kunci: kewirausahaan; kreativitas; buku materi; tata nama; redoks

Introduction

Increasingly fierce product competition, so there is a need for learning about entrepreneurship because educated people are more capable of finding various opportunities (Jiménez et al., 2015). Educated people also have competencies and creativity (Abdulrahamon et al., 2018). Entrepreneurship is a complex concept that needs the creation of ideas on the process, so academic institutions help build students' entrepreneurship skills (Sadraei et al., 2018). Because of the industry revolution, people must prepare their skills and communication (Hasanah & Ratumbuysang, 2017), and there are entrepreneurship programs for universities or schools that develop their entrepreneurship curriculum to prepare their students for the industry revolution (Awaysheh & Bonfiglio, 2017). Learning about entrepreneurship can be given to students as a debriefing in the form of entrepreneurial skills that provide a lot of experience and benefits for students started from a younger age because the younger they are, the more creative they would be (Agustina, 2017).

The orientation of chemistry education is now starting to develop students' thinking skills, namely by connecting chemistry with other materials or other disciplines where students hope that they will be able to help solve global problems (Nagarajan & Overton, 2019). Entrepreneurship-oriented chemistry learning or chemo-entrepreneurship is an alternative chemistry learning model that focuses on learning chemistry through project activities that train students' soft skills like creativity (Sumarti et al., 2018). The experimental method in a project can motivate students about how the knowledge they gain can be formed and synergized (Joyce et al., 2015).

Entrepreneurial activities in chemistry learning can develop students' creativity and cause active classroom conditions so that learning becomes more concerned (Wibowo & Ariyatun, 2018) while at the same time attracting students' interest in the world of entrepreneurship (Arieska & Kamaludin, 2018). Having both knowledge and entrepreneurship skills would make students experience more things and learn more about multidisciplinary and intercultural skills (Gannon et al., 2016). Also, chemistry can be found everywhere and every day in our life, so we can apply chemistry knowledge in our daily activities like entrepreneurship (Mashami et al., 2019).

The study by Paristiowati concluded that students' cooperation and communication increased through the implementation of chemo-entrepreneurship learning (Paristiowati et al., 2015) and also proved that chemo-entrepreneurship learning through project-based learning can improve students' creativity (Aisyah, 2021). Next, another study showed concluded that students' creativity was improved through the implementation of a chemo-entrepreneurship oriented inquiry module (Dewi & Mashami, 2019). Later, the previous study by Arfin also concluded that students and teachers gave positive responses to the developed chemo-entrepreneurship modules and could be used as teaching material (Arfin et al., 2018). Purnama also concluded that chemo-entrepreneurship learning increased science process skills through students' entrepreneurial creativity (Purnama et al., 2020).

STMCpE learning textbook based on Science Technology Engineering Mathematic and Contextual Problem developed by Sutarto showed that students' creative thinking skill was better than that learned from usual school textbook (Sutarto et al., 2021). From the above studies, we can conclude that the advantages of chemo-entrepreneurship learning are; that it can improve students' ability to study chemistry and their soft skills, especially their creativity.

Learning can run well if there are teachers (teachers) and the right learning components, one of which is the availability of appropriate books or teaching materials. Teaching materials are learning aids that contain the application of science, information, and examples of the application of science in everyday life that can be used in the classroom or at home (Arsyad, 2011).

The transfer of knowledge through teaching materials depends on how students can understand the material provided by teaching materials (Rizqiana et al., 2017) Thus, it is necessary to have appropriate teaching material so that students can easily accept learning material. Good teaching materials have several components, including cover pages, identity, introduction, table of contents, instructions for using books, basic competencies and indicators, concept maps, materials, assignments, summaries, evaluations, and closings (Arieska & Kamaludin, 2018). Chemo Entrepreneurship implementation can be integrated into the learning activities using teaching materials (Prayitno et al., 2017).

A field study in Madrasah Aliyah 1 Kota Semarang said that learning still needs to be studied because students have not reached the minimum standard. Only 9 students from 30 in the X MIPA 1 reached the minimum standard in the daily test. There should be a problem that made students not complete the minimum standard. Also, they did not have a creativity evaluation, so it should be a problem because students did not have enough creativity to develop the main material. They were not respectful of the material. Thus, the development of entrepreneurship oriented learning was needed to build students' creativity (Afwa et al., 2018). A field study in Madrasah Aliyah 1 Kota Semarang also showed that chemistry teachers had not developed their learning materials. The learning materials that teachers used were the learning materials provided by the school and the government. It would not fit the students' abilities because of generalization in the Semarang City. It would be better to develop their learning materials based on what teachers and curriculum want from students (Nurbaeti, 2019).

Because of the gaps in the field study that showed the need for creativity in this era, the low creativity from students that makes their score is below the minimum standard, and the teacher does not provide learning materials that fit the students, it is necessary to develop a lesson, manual, or reference that can be used to improve the quality of student's resources in entrepreneurship activities. Unmatched between students' skill and the purpose of learning can be reduced using material books developed by the teacher because the teacher knows the students' basic skills and the learning purpose, so it would be better to fit them (Alfiantara et al., 2016). The development of teaching materials can also be used as a basis for knowledge to start a business. It can even be used as a training and evaluation of students' entrepreneurial skills. So, this research focuses on developing a chemo-entrepreneurship oriented teaching materials to analyze the student's creativity. Then, this research aims to develop proper material books through expert validation, students, responses, and teachers' responses and to analyze students' creativity using chemo-entrepreneurship teaching materials.

Method

The research method was research and development by following the ADDIE model development research design with five stages (Dick, et al., 2008). The research stages included: (1) the analysis phase, (2) the design phase, (3) the development phase, (4) the implementation phase, and (5) the evaluation phase. The research location was carried out at Madrasah Aliyah Negeri 1 Semarang city from January to May 2021. The research subjects consisted of teachers, students of class X MIPA 1, and expert validators.

The ADDIE research procedure had been modified so that each stage had an evaluation session. Evaluation is used to correct deficiencies at each stage (Dick et al., 2008). The analysis phase began with field observations through interviews. The results of the interviews were used for the problem and need analysis. The design phase began with determining the research subject matter, making a research flow chart, and assessing the concept of teaching materials developed. Next, the topic of discussion was the topic of redox reactions and the nomenclature of chemical compounds for class X in even semesters. The research flow chart was designed according to the research

flow, starting from field observations, analysis of problems and needs, the process of designing teaching materials products, product validation and testing processes, product implementation, data analysis of research results, and drawing conclusions. The development phase began with designing the concept of teaching materials, syllabus, lesson plans, evaluation tools, validation processes, and the trial phase. Experts validated the design of teaching materials and other devices to assess the feasibility of the design of teaching materials before the trial.

TheASEAN Economy Community (AEC) created the free market that required skilled humans and high competence to compete other nations in the international marketplace (Agustina, 2017). The lack of employment because of peoples' lacked experiences make them open entrepreneurial activities (Windsor et al., 2014). Entrepreneurial activity is a form of innovation to make a product or service of economic value. The increase in entrepreneurial activities results in design of teaching materials that had been declared feasible to be tested to get input so that they could be improved before the implementation stage was carried out. The implementation stage was the stage of applying teaching materials to research subjects, namely students of class X MIPA 1.

Learning was carried out using the project method that produced products. Entrepreneurship projects were planned and designed by students whose output was in the form of value-added entrepreneurial products related to redox reactions. The results of the students' work were assessed to obtain data on the entrepreneurial creativity of students, which were then analyzed. The evaluation stage was used as an evaluation of each stage. Besides that, it is also a stage to find out the strengths and weaknesses of chemo-entrepreneurship-oriented teaching materials that were developed based on the responses of students and teachers as users through questionnaire responses.

The instruments used in the study included teacher and student interview guides, teaching materials instruments, syllabus, and lesson plans, instrument validation sheets, questionnaire responses, and entrepreneurial creativity observation sheets. The effectiveness of teaching materials was seen from the analysis of the entrepreneurial creativity of students. Teaching materials are declared effective if: (1) students have good creativity in doing projects in terms of design, manufacturing process, product assessment, and product presentation. Teaching materials are declared effective if the entrepreneurial creativity of students in groups obtains a minimum score of "high", and (2) users of teaching materials, including teachers and students, give positive responses with a percentage of more than equal to 80% (Aliyah et al., 2018).

Results and Discussion

The research data were obtained from students' answers to the HOTS-based test instrument on the Chemical Bonding materials at MAN Binjai. Three expert validators revised and validated the instrument before being used to determine students' higher-order thinking skills. It consisted of 30 multiple-choice questions, distributed into 6 C4 questions, 14 C5 questions, and 10 C6 questions. Afterward, based on the test conducted on students through small classes to determine the instrument's validity, 25 questions were declared valid.

Based on the results of research that has been carried out at the analysis stage, the teacher stated that the teaching materials used were still using textbooks provided by the school, but other learning media on the internet were also used by teachers in distance learning during the pandemic. The teacher stated that there were still some students who had not completed the daily test. The teacher also stated that effective learning applied during the pandemic was discussion learning through video calls due to the lack of activeness of students in discussions if only using WhatsApp message media. The teacher also stated that the abilities and skills expected of graduate

students were independent, competitive in the world of work, and creative in entrepreneurship. Meanwhile, students stated that the chemistry material could be understood easily, and the lesson was fun. Students also prefered to study in groups. Students did not know and were not interested in the world of entrepreneurship. However, they stated that entrepreneurial people are creative people, so the research was conducted as an introduction to entrepreneurship activities through chemistry learning.

The results of observations made in the field by reviewing the chemistry learning process directly found that students tend to be more passive in class when learning was only done with WhatsApp messages. However, students tended to be more active in class using teleconferencing media. Thus, the researcher concluded that the material could be maximized if it was delivered with the help of teleconferencing. The literature review results in the form of data on the test scores results of X MIPA 1 students in the previous material, which are shown in Table 1, also concluded that many students had not completed the KKM, namely those with scores below 70.

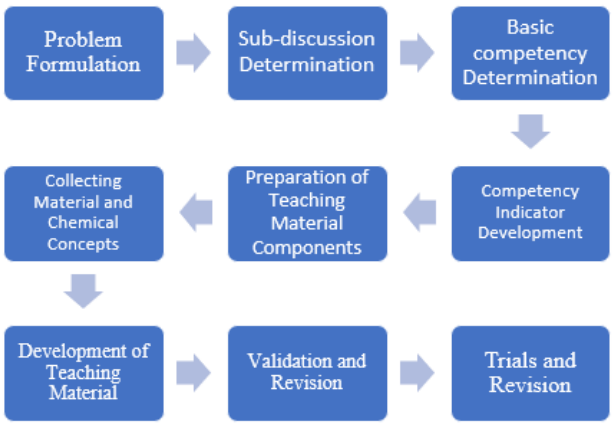
Table 1
Data Results of Daily Test X MIPA 1 in Previous Material

Subject	Results	Subject	Results
S-1	75	S-16	63
S-2	84	S-17	65
S-3	49	S-18	64
S-4	50	S-19	69
S-5	51	S-20	68
S-6	52	S-21	70
S-7	72	S-22	57
S-8	55	S-23	72
S-9	55	S-24	54
S-10	70	S-25	68
S-11	57	S-26	70
S-12	55	S-27	75
S-13	60	S-28	73
S-14	60	S-29	48
S-15	63	S-30	47

The data on the daily test scores of students in class X MIPA 1 was still low because only 9 out of 30 students completed the KKM. It shows that there was a lack of mastery of students' material, so there needs to be learning that has a positive effect on students' understanding, one of which is the development of CEP chemistry learning aids (Afwa et al., 2018).

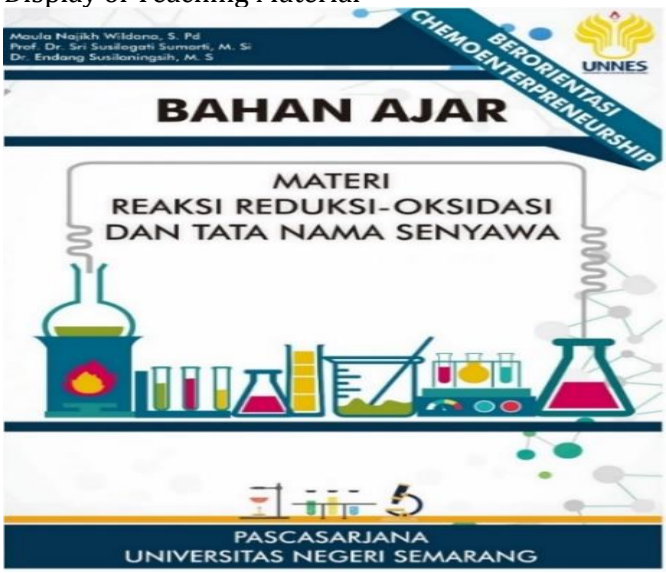
The design stage was carried out by determining the research subjects and making research flow diagrams. The subject matter used was Redox material and the Nomenclature of Chemical Compounds. Basic competencies were obtained from the high school chemistry syllabus by the 2016 Ministry of Education and Culture. Indicators of competency achievement were developed from basic competencies by taking some skills from entrepreneurial attitudes. The flow chart developed included the preparation of components of teaching materials, collection of materials and chemical concepts, collection of chemo-entrepreneurship materials, and development of teaching materials designs. The flow chart for the development of chemo-entrepreneurship-oriented teaching materials is shown in Figure 1.

Figure 1
Flowchart of Development



The development stage started with designing teaching materials, designing supporting instruments, making the instrument validation sheet, the instrument validation stage, and the trial stage. Making teaching material instruments started from the preparation of teaching materials. The components of teaching materials used referred to the development of teaching materials by Arieska & Kamaludin, including title pages, introductions, table of contents, instructions for use, competencies, concept maps, core materials and chemo-entrepreneurship materials, assignments, and closing pages (Arieska & Kamaludin, 2018). The creation of teaching material content used the Microsoft Word 2016 application, while the design used the 2018 Corel Draw application. The teaching materials were then converted into *.pdf extensions to make their compatibility wider because they could be accessed by more devices through laptop and smartphone browsers and could overcome distribution limitations of teaching materials. The application of electronic teaching materials in learning was one of the efforts to overcome the problem of limited printed teaching materials (Meek et al., Miller, 2016). The display of the developed teaching materials was presented in Figure 2.

Figure 2
Display of Teaching Material



The teaching materials that had been designed were then validated by three expert validators to assess the product before testing the product, because communicative module or books made it easy to understand (Lasmiyati & Harta, 2014). Aspects measured included material aspects, display aspects, and chemo-entrepreneurship aspects. The assessment was carried out through 13 statement items, including: the suitability of the material on the basic competencies and core competencies; the accuracy or suitability of the material with facts, concepts, and did not cause double interpretations; the latest material on the development of chemistry, actualization events presented, and the use of factual illustrations; presentation techniques includes coherence, introduction before the material, and a summary at the end of the material; in accordance with the rules of sentence structure accuracy, sentence effectiveness, sentence standardish, and clear delivery of information; straightforward and communicative covering the accuracy of the use of spelling, punctuation, and being able to encourage students to learn the material; the completeness of the components of teaching materials; display quality includes design and layout; the presentation system, namely the coherence of the material from easy to difficult, there are examples of questions, and placement of assignments; accuracy of graphics includes color accuracy in sample images, picture descriptions bars, and the placement of illustrations that do not interfere; the effectiveness of teaching materials in providing entrepreneurial motivation through chemo-entrepreneurship learning; components of teaching materials with a chemo-entrepreneurship orientation; contextualization of events presented in teaching materials. The results of the validation carried out by three experts are presented in Table 2.

Table 2
Results of Validation

Number	Validator Code	Total Score	Criteria
1	VT-1	49	Very Valid
2	VT-2	50	Very Valid
3	VT-3	48	Very Valid

The teaching material instrument was declared to meet the very valid criteria by validator 1, validator 2, and validator 3. The teaching material instrument could be used for testing with an average score of 49 out of 52, which was included in the very valid criteria. The revisions to the teaching material instruments developed based on suggestions from expert validators included changes in the title page design, changes in the contents of the instructions for using teaching materials which were changed to be more descriptive and contained instructions for teachers as well as instructions for students, giving boxes as a differentiator between content sections with assignments, and adding practice questions to hone students' abilities.

Teaching materials that had gone through the validation and revision stages based on expert advice were then tested before the implementation stage. The trial was carried out in class XI MIPA 4, and the results obtained were in the form of input that must be improved again before the implementation stage. The input given was obtained from a test questionnaire which included 10 statements, including how easy to understand teaching materials; clarity and legibility of texts; attractiveness of the design; attractiveness of delivering a material; attractiveness of existing entrepreneurial materials; attractiveness of making students creative; contextuality illustrations and entrepreneurial stories presented in teaching materials; attractiveness of project learning in making students confident and flexible in discussions; students' interest in developing creative ideas; the relationship between entrepreneurship material and chemistry.

The results of the test questionnaire responses analysis showed that students tended to answer agreeable statements, followed by strongly agree answers, and some answered disagreed with the statements given. The average response score for the trial phase was 31.36 from the maximum score of 40. The test got a percentage of 78.41% and was categorized in the "good" criteria. As for the input to the teaching materials developed at the trial stage, among others: pictures and examples were reproduced to make the teaching materials even more interesting, added cartoon or animated illustrations so that they were more interesting to read and made students understand the topics being taught more quickly, multiply inspirational stories about entrepreneurs to build students' creative ideas in entrepreneurship, added animation and entertainment to make learning more interesting. It is nearly the same results compared to research that said the chemo-entrepreneurship oriented module makes students interested and want to practice the material immediately (Urfa et al., 2019).

The implementation phase was carried out on 30 students of class X MIPA 1. The implementation phase was carried out face-to-face with the help of the Google Meet teleconferencing application because it was still in the Covid-19 pandemic. Students were allowed to use chemo-entrepreneurship-oriented teaching materials that were developed outside of learning. The research activity was carried out for four meetings. The first to fourth meetings were used for learning activities and the fourth meeting was used for presentations on entrepreneurial product projects. Analysis of entrepreneurial creativity was carried out through project activities that produced entrepreneurial products (Sumarti et al., 2014).

The first learning process was carried out by introducing teaching materials and ensuring that all students had received the teaching materials. Teaching materials were used during the learning process. Assignments were given at the end of the meeting. The assignments given were in the form of questions and project assignments for making entrepreneurial products. Learning was done with students studying in groups. Learning in groups could create interdisciplinary collaboration between students so that students could train collaboration such as scientists and product designers, to make an efficient product (Bouldin & Wagner, 2019).

The students in the implementation class were divided into 5 groups consisting of 6 students each group. The first assignment was the formulation of ideas and ideas about events related to redox reactions. Students were freed to arrange problems that arose from or as a result of redox reactions. Then students developed solutions. Assignments made by students generated ideas and ideas about events and problems related to redox and could be related to the manufacture of a product.

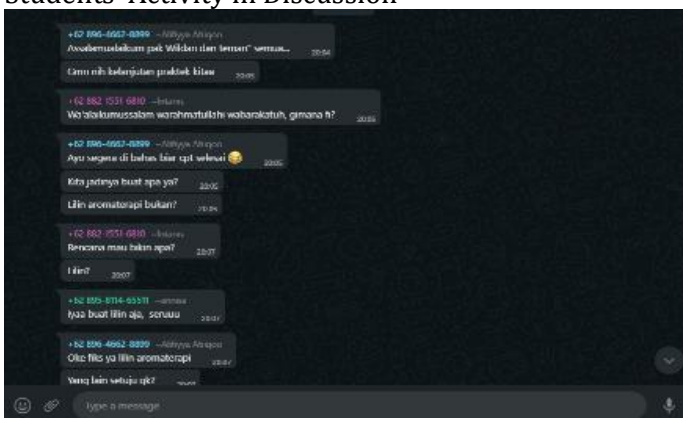
The second assignment was product manufacturing planning. Students were asked to discuss and produce solutions to problems that were raised at the previous meeting. Next, students were directed to compile tools and materials as well as work steps to make an entrepreneurial product. Students were free to look for references in books and on the internet. The result of this assignment was to produce an article containing the background of the problem, the emergence of ideas, tools and materials, as well as work steps to create entrepreneurial products that solved these problems.

The third assignment was to make a short video about making products from the projects being worked on. Students were also asked to promote and sell products to determine buyers' responses to the products made. Videos of product making made by students were then assessed to analyze the entrepreneurial creativity of students.

The learning that had been carried out had been run well and there was a lot of discussion. Students were active in learning in terms of activeness in answering questions and exercises given by the teacher. Also, students were not shy when asking about difficulties in learning. Students were confident in conveying their answers when

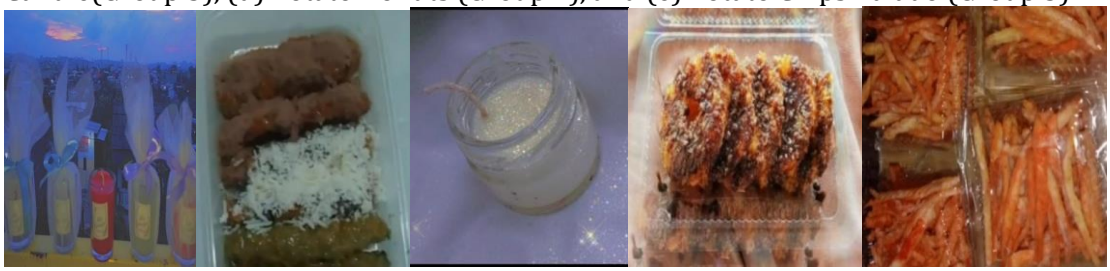
asked to answer by the teacher. Students were active in discussing through the whatsapp group discussing the tasks being carried out as shown in Figure 3. They were confident on communicate each other to discuss the best solution from ideas (Subasree & Nair, 2014; Triastuti, 2020).

Figure 3
Students' Activity in Discussion



Entrepreneurial products developed by students were diverse. Products made by students included aromatherapy candles, banana nuggets, crispy apple donuts, and potato chips balado. The creativity of students were challenged through the manufacture and promotion of the products. Students looked for materials and worked the steps for making products in groups through their respective references. Products made by students are presented in Figures 4.

Figure 4
(a) Aromatherapy Candle (Group 1), (b) Banana Nugget (Group 2), (c) Aromatherapy Candle(Group 3), (d) Potato Donuts (Group 4), and (e) Potato Chips Balado (Group 5)



(a) (b) (c) (d) (e)

The products that had been made were then assessed with an entrepreneurial creativity observation sheet. The assessment was carried out by three observers, and the total scores would be averaged to obtain the assessment results. Product assessment was based on five categories, including creative in choosing materials, creative in innovating, creative in making product displays, advantages over competitors, as well as product presentation and selling power. The results of the assessment by the three observers are presented in Table 3.

Table 3
The results of the Assessment by the Three Observers

Observer	Total Score (per group)				
	G-1	**G-2**	**G-3**	**G-4**	**G-5**
1	19	17	18	16	18
2	18	18	17	17	16
3	19	18	18	16	17

The results of the analysis of the entrepreneurial creativity of students were that students had about high to very high entrepreneurial creativity. Firstly, Group one got an average score of 19 out of 20, with a score of 95 and a very high category. Next, Group two got an average score of 18 out of 20, with a score of 90 and a very high category. Then, Group three got an average score of 18 out of 20, with a score of 90 and a very high category. Group four got an average score of 16 out of 20, with a score of 80 and the high category. The last, Group five, got an average score of 17 out of 20 with a score of 85, and the category was very high. The score data obtained were then analyzed to determine the category of students' entrepreneurial creativity criteria. The results were similar to a previous study by Sunarya that showed that students' evaluation was "very high" when taught by developed chemo-entrepreneurship learning materials (Sunarya et al., 2018). The results of the entrepreneurial creativity analysis are presented in Table 4.

Table 4
Results of Analysis

Groups	Criteria
Group 1	Very High
Group 2	Very High
Group 3	Very High
Group 4	High
Group 5	Very High

The average entrepreneurial creativity of students showed a very high category which meant that students had good skills and creativity in entrepreneurship. The evaluation stage aimed to determine the advantages and disadvantages of teaching materials developed based on the responses of teachers and students. Questionnaire responses were also used as a means of input to teaching materials developed for teachers and students. Questionnaire responses to teaching materials for teachers are presented in 10 indicators. While the questionnaire responses to teaching materials for students are presented in 12 indicators.

The indicators used in the teacher response questionnaire were: The coverage of teaching materials following the 2013 Curriculum Basic Competencies, indicators of the teaching materials in line with the 2013 Curriculum Basic Competencies, the language used in the teaching instruments was not easily accessible, causing misinterpretations or did not contain doubles, the time of learning implementation with sufficient CEP-oriented teaching materials in schools, teaching materials that were easy to apply in the learning process, CEP-oriented instruments could be applied as alternative teaching materials for teachers, CEP-oriented instruments could help teachers analyze students' entrepreneurial understanding and creativity, learning instruments that CEP-oriented could be imitated and used as learning material for other materials (besides Redox and Compound Nomenclature), and CEP learning could be used to hone students' entrepreneurial skills.

The results of the teacher's response questionnaire were that teaching materials were suitable for use in chemo-entrepreneurship-oriented chemistry learning on redox material and nomenclature of chemical compounds. Teaching materials also had the potential to be developed on other materials by considering the contextuality of the material. Teaching materials got a score of 34 out of a maximum score of 40 with a percentage of 85% and were included in the "very good" category. It was similar results to the previous study about chemo-entrepreneurship module with a "good" category (Andrean et al., 2019). The advice given was to provide more examples of entrepreneurial activities that could be carried out by students so that later they could provide a better picture and motivate students to be interested in trying the world of entrepreneurship.

The indicators used in the students' questionnaire responses were ease of understanding the material in the teaching materials, the contextuality of the material contained in the teaching materials (the materials could be found and linked to everyday life), the attractiveness of the book design presented, the delivery of the material in the book, the interest of the participants. Students learned chemistry through a variety of teaching materials and entrepreneurship-oriented learning, the attractiveness of project learning in generating creative entrepreneurial ideas, the attractiveness of chemistry learning with entrepreneurial projects, the timeliness of project assignments, the usefulness of books and entrepreneurial-oriented chemistry learning in training entrepreneurial creativity, gaining additional insight work on entrepreneurial chemistry projects, and the suitability of the test questions given with the material being taught.

The results of the students' questionnaire responses showed that the teaching materials developed were suitable for use in chemo-entrepreneurship-oriented chemistry learning on redox material and the nomenclature of chemical compounds. A recap of students' responses to the developed teaching materials is presented in Table 5.

Table 5
Recap of Students' Responses

Indicator	Total Score	Percentage	Conclusion
1	98	81,67	Very Good
2	97	80,83	Very Good
3	108	90,0	Very Good
4	97	80,83	Very Good
5	91	75,83	Good
6	103	85,83	Very Good
7	90	75,0	Good
8	89	74,17	Good
9	101	84,17	Very Good
10	101	84,17	Very Good
11	90	75,0	Good
12	91	75,83	Good

Developed teaching materials were considered more attractive to use in chemistry learning because students easily understood them. It is also in accordance with the findings by Ruliyanti and Urfa in previous research (Ruliyanti, Sudarmin, & Wijayati, 2020; Urfa et al., 2019). It was influenced by the contextuality of the material, making it easier for students to understand the material by finding redox events in everyday life. The design of the book that was presented was good, and the orientation of entrepreneurial learning made learning more interesting for students. Project learning helped students come up with creative ideas and challenged students' creativity in preparing entrepreneurship-based chemistry projects. It is accordance

with the previous research that chemo-entrepreneurship oriented materials increase the students' creativity (Dewi & Mashami, 2019; Hussain & Akhtar, 2013). The time to work on project assignments was considered sufficient, and the test questions given were also in accordance with the material that had been studied. Students claimed to get additional benefits and insights from books and learning chemistry with a developed chemo-entrepreneurship orientation. Teaching materials obtained an average total score of 38.53 from a maximum score of 48 with a percentage of 80.28%, and teaching materials were categorized in the "good" category.

The result of this study was that the developed teaching materials had met the first research objective, which was feasible according to expert validation stated by teaching materials' "very valid" category, teacher responses stated by "very good" category, and student responses stated by "good" category. The developed teaching materials also met the second research objective: to analyze students' entrepreneurial creativity shown by students who made creative products such as aromatic candles, banana nuggets, apple donuts, and potato chips balado. Average students' entrepreneurial creativity were in "very good" category, and students were active in discussion inside the class and also outside class when they were discussing the final chemo-entrepreneurship projects.

Conclusion

The teaching materials developed are suitable for use in chemistry learning in terms of the responses of teachers and students after the research. Expert validators gave "very valid" category. The teachers gave positive responses; teaching materials got a score of 35 out of a maximum score of 40 and a percentage of 85% and the "very good" category. Students also gave positive responses, and teaching materials obtained an average total score of 38.53 from a maximum score of 48 and a percentage of 80.28% in the "good" category. It states that developed teaching materials fit the first objective of this research. Developed chemo-entrepreneurship teaching materials fit students' basic knowledge and fit what teachers and schools want from students. Students also have good entrepreneurial creativity in making entrepreneurial projects in terms of the results of observations on the average entrepreneurial creativity of students showing a very high category. There are four groups with very high creativity category and one group with high creativity category. The results of the entrepreneurial creativity analysis show that students have high entrepreneurial creativity, students are active in discussing and making entrepreneurial products related to redox reactions, including aromatherapy candles, banana nuggets, apple donuts, and potato chips balado, which fits the second objective of this research. Students are active in learning, which means it fits what teachers want from students. It also builds the students' knowledge about entrepreneurship when learning chemistry and would be better if they practice it in the real world.

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