ICESST 2018

PROCEEDING | ICESST 2018
International Conferences on Education, Social Sciences and Technology
DOI: https://doi.org/10.29210/2018137
Website: http://icesst.fipunp.ac.id
Padang, February 14th - 15th 2018

Development of chemistry laboratory guides based on chemoentrepreneurship (Cep) for odd semester in science class second grade

Sakdimah[1], Latisma Dj[2], Indang Dewata[3]
[123]Universitas Negeri Padang, Padang – Indonesia, (sakdimah2016@gmail.com)

Abstract
Unemployment in Indonesia is dominated by high school graduates, this is due to limited job vacancy available, and generally high school graduates do not have the skills qualifications expected by the world of work. CEP is a chemical approach that links the material being studied with a real object. This research aims to develop a chemistry guide of chemistry high school chemoentrepreneurship (CEP) for the odd semester of class XI IPA. This research was conducted using 4D Models. The result of the development got the product validity level is 0.84 and the test of teacher practicity and student of SMA N 5 with value 0,83, teacher of MGMP with value 0,88. Based on the validation and practicality that has been implemented, Chemoentrepreneursip (CEP) Chemical Work Practice Guides (CEP) can be used as a learning resource and can improve life skill (skill) of the students.

Keywords: chemical laboratory guides, *chemoentrepreneurship* (cep), life skills, r&d and 4D models

Introduction

Education has a very important role in shaping the quality of human resources (HR). In the current era of globalization, the preparation of excellent human resources is a key element in the face of intense competition in the world of work. Education plays an important role in creating quality human beings. The purpose of education is provide skills to the future. While the function of education is build character of learners in order to have high integrity with good character and love of the nation.

Sumarti (2008: 305) states to succeed in life after graduating from secondary and tertiary education not only with a diploma, but must have ability to market knowledge, entrepreneurship spirit, honest, tenacious, creative and ability to understand and respond to market. One of the causes of high unemployment is lack of skill.

Unemployment in Indonesia is dominated by high school graduates. Latest data from the Central Bureau of Statistics (BPS) revealed that unemployment of high school graduates in Indonesia by 2016

reached 77.81% of total unemployment in Indonesia reaching 7.45 million people[15]. This problem is not only due to limited job vacancy available, but also generally high school graduates do not have the skills qualifications expected by the work world.

Another reason for the increasing number of unemployed high school graduates is that the majority of high school graduates (about 60%) come from low-income families or low-income families who are unable to continue their higher education stages. This is because state universities only absorb graduation according to available capacity, while private university fee is relatively bigger, so the underprivileged community is difficult to access private universities. Based on these data, it is necessary to prepare the high school students to be qualified and skilled graduates so that they can fulfill the employment opportunities in Indonesia.

The problem of low skills and high unemployment rate of high school graduates can be attributed to the learning process undertaken during the student's education. One of them is the learning process of chemistry. During this study of chemistry in high school still not emphasize on giving experience of learning through the use and development of process skill. As a result, learners find it difficult to associate between chemical learning materials with beneficial objects or phenomena around human life[2]. In fact, the true meaning of learning is an attempt to know the various phenomena or natural phenomena in order to get something useful for human life.

The high level of unemployment of high school graduates hence need to do steps so that education can equip learners with skill in the world of work (vocational skill). vocational skills are part of the life skill of the students so as to provide the ability and courage to face life problems, then creatively find solutions and be able to overcome them.

Development of Life Skill (life skills) that put forward the following aspects:

1. Relevant capabilities to be mastered by learners.
2. Learning materials in accordance with the level of development of learners.
3. Learning activities and activities of learners to achieve competence.
4. Facilities, tools and learning resources are adequate.
5. Abilities that can be applied in the lives of learners.

One approach that can be used to address unemployment is chemoentrepreneurship (CEP) approach.

CEP is a contextual chemistry learning approach, a chemical approach that links the material being studied with a real object. Thus in addition to obtaining subject matter students also have the opportunity to learn the process of processing a material into a useful product, economic value and foster entrepreneurship spirit. Through the CEP approach, students are expected to be more creative so they can apply the knowledge they have learned in their daily life.

Chemical learning was directed to finding out and doing something so that it can help learners to gain a deeper understanding of the natural world. Chemistry has studied of matter and its changes, the study materials of chemistry include among others the properties of substances including the structure of matter, change of substance (chemical reaction), energy involved, law, principle, and theory[3].

Chemistry is not just the mastery of knowledge in the form of facts, concepts, or principles alone, but also a process of discovery[5]. Facts, concepts, and principles of chemistry can be explained by proven theories through experiments. In other words, chemistry is a science gained and developed

based on experiments and continues with the development of theory. Chemistry evolves through a laboratory process to produce science. Chemistry grows and develops through experiments, so in chemistry learning in schools it is necessary to experimentally-based approach. The approach can be done through practicum activities.

Laboratory activities in the form of chemistry labs in school provide learning experiences to students to find concepts and prove the truth of the theories that students learn. Practicum helps students practice scientific thinking skills and instill discipline[7]. In other words, practicum activities allow students to learn with understanding because they are directly involved in the process of knowledge building by practicum. Through a practicum a trained student uses chemical means well, knows chemicals, and his understanding of the concepts practiced will be more profound. This is in line with what Edgar Dale proposes that the information or messages received by students is 75% obtained through the sense of sight, meaning that the practicum means students see and observe chemical phenomena more clearly (not just imagine), so the information obtained will be more than when only hearing [14].

Chemical practicum equips learners with skills, cooperation, independence and critical thinking skills, is expected to improve students' life skills so as to foster entrepreneurial spirit in their life [4].

Learning followed by observing activities in addition to attracting the attention of students as well as improve understanding because something that is seen will stick longer in the mind[6]. Further Oemar Hamalik argues that by practicing the students can also generate interest and motivation to learn students, clarify understanding, and provide a comprehensive experience.

In the process of practicum implementation, a practical guide for students is necessary. Guidelines (guides) practicum will facilitate students to do practical activities in a structured manner and direct students to apply scientific methods in finding the concept of science. The practical guides were developed with the addition of chemoentrepreneurship concept, making rice husk in hydrocarbon material, making hot ice compress on thermochemical matari, making toothpaste from baking soda on chemical equilibrium material, and making tofu (milk tofu) at reaction rate material.

A practicum guide using chemoentrepreneurship concept is expected to improve life skills such as skill, knowledge and attitude of learners so that they have the ability to work and / or self-employed in order to improve their quality of life. Increased Life Skill (life skill) is expected to make learners become an entrepreneur. Entrepreneurship is entrepreneurial spirit building by instilling a sense of spirit, attitudes, behavior, and ability of a person in handling an activity in searching, creating, and applying ways to improve efficiency and effectiveness in the achievement of an activity [8].

Entrepreneurship is a mental attitude and the nature of the soul that is always active in trying to advance the work of dedication in order to increase revenue in its business activities. In addition, entrepreneurship is a creative and innovative ability that is used as the basis, tips, and resources to find opportunities for success. The essence of entrepreneurship is the ability to create something new and different through creative thinking and innovative action to create opportunities in facing life's challenges. In essence, entrepreneurship is the nature, characteristics, and character of a person who has the ability to realize innovative ideas into the real world creatively [4].

Entrepreneur is the person who establishes, manages, develops, and institutes his own company. Entrepreneurs are those who can create work for others with self-help, everyone has the ability to become an entrepreneur of origin and want to have the opportunity to learn and work.

Method

This research is a type of research and development or Research and Development (*R & D*). R & D is a process to develop a new product or refine a product that already exists, which can be accounted for. Research and development is a research method used to produce a particular product and test the effectiveness of the product[9]. In accordance with the above understanding then this research is a development research that produces a new product in the learning that is in the form of a practical guide for chemistry learning high school semester odd class XI IPA.

The development model used in this research is the 4-D model (four D models) developed by Thiagarajan, S Semmel and M. Semmel in 1974. The 4-D model consists of 4 main stages: (1) define, (2) design, (3) develop and (4) disseminate [14]. Research development is conducted only until the limited test to obtain data on the validity and practicality.

This defining stage is an early stage that must be done before developing the product. The steps taken are front-end analysis, student needs analysis, task analysis and concept analysis and learning objectives specification. The design stage aims to design the practical guides developed in the chemistry of high school semester odds of grade XI IPA, the steps is selection of media, the selection of the format, and the initial design guidance lab. Development phase (Develop) to develop guidance chemistry chemistry high school chemoentrepreneurship for odd semester class XI IPA which have been revised based on expert suggestion, at this stage tested the validity and test of practicity. The disseminate stage is the final step of 4D Models. It is done to promote the development product to be acceptable to users, whether individuals, groups, or systems.

The type of data in this study is the primary data. Primary data in this research is data of validation result of practicum guide, practical practicum practice test result toward teacher and student. To collect research data, used data collection instruments. The instruments used in this research are validation sheet and practicum practicality questionnaire.

Results and Discussion

Define

In the 4D development model, the defining phase is the first step to be done before the development of a product. The steps taken at this stage are front-end analysis, task analysis, concept analysis, student analysis and learning objectives specification.

Front End Analysis

The analysis of the front end is done by spreading the questionnaire about several things, such as: the importance of practicum in chemistry learning, the implementation of high school chemistry chemistry in the odd semester of class XI IPA, the obstacles encountered in school to carry out the lab, and the need for the use of chemoentrepreneurship-based laboratory practicum. Questionnaires were given to 2 chemistry teachers from high school. Be aware of this analysis found that practicum activities are needed in chemistry learning as a supporter of consolidating the concept, making the material more aflikatif, developing psychomotor skills.

Through the practicum, learners are given the opportunity to experience themselves or conduct themselves, follow the process, observe an object, analyze, prove and draw their own conclusions about a particular object, state or process. During the lab, learners can create data from observable results that can be transformed into graphs, tables or diagrams and draw conclusions, so that students gain an understanding of what is being practiced. Implementation of practicum at school has been going well, but some material is still done demonstration only. The laboratory used has met laboratory standards and the practicum guides used are already available from PUDAK publishers, but chemoenterpreneurship-based laboratory guides have not been used. then to further facilitate teachers in connecting practicum activities with entrepreneurship guidance required chemoenterpreneurship-based practice.

Student Needs Analysis

Analysis of student needs is done by spreading the questionnaire on high school students about the implementation of practicum activities. The goal is to know the needs of students in the learning process of chemistry in school. Questionnaire given to the students of grade XI IPA high school that has completed the material X class IPA high school. Based on the result of questionnaire, it can be concluded that students need practicum activity in chemistry learning process. Implementation of the practicum can develop psychomotor skills, interesting, fun and helpful in understanding the chemistry.

The use of a chemistry practicum guide provides a diverse learning experience to students through group interaction during practical work such as discussion, co-operation in problem solving, finding concepts through observation, investigation, collecting data, interpreting data and making conclusions.

Task Analysis

At this stage of the analysis, an Analysis of the applicable curriculum is performed. In this study, the curriculum analyzed is adjusted to the Curriculum 2013. In the Curriculum 2013 there is Core Competence (KI), Core Competence is the translation or operationalization of SKL in the form of quality that must be owned by students who have completed education in a particular educational unit, the main competencies are grouped into aspects of attitudes, knowledge and skills (affective, cognitive and psychomotor) that learners should learn for a school, class and subject. Core competence should reflect a balanced quality between hard skills and soft skills achievement.

Concept Analysis

Conceptual analysis was conducted to identify and systematically arrange the material concepts that will be studied in the odd semester of class XI SMA. Materials presented include hydrocarbons and petroleum, thermochemistry, reaction rates and chemical equilibrium.

From KD 3.1 and 4.1, the basic material developed in the practical guidance is hydrocarbon. The material is poured in a practical guide that is in carbon compounds contain elements of carbon, oxygen, and hydrogen. The existence of these elements can be identified by the heating process. Burning of carbon compounds liberates carbon dioxide and water vapor. The carbon element is also present in the briquettes which are the source of energy. The most widely available briquettes are coal

briquettes. The rice husk briquettes come from the rice mill waste which is processed to be used as briquettes which can be used as alternative fuel. The practicum guide associated with this material is rice husk briquettes.

From KD 3.5 and 4.4 it was found that the main material developed in the practicum guide is the endothermic reaction and the exothermic reaction. Exothermic reaction, is an event where heat flows from system to environment. Thus, ΔH <O and the product temperature will be less than the reactant. Another feature, the ambient temperature will be higher than the initial temperature. An endothermic reaction is an event in which heat is absorbed by the system from the environment. Then, ΔH> 0 and the surrounding temperature drops. The practicum guide associated with this material is a hot ice pack.

From KD 3.6 and 4.7 found the principal material that developed in practical guidance is the factors that influence the rate of reaction. concentration, temperature / temperature, touch surface area, and catalyst are factors influencing reaction rate. The main material that developed in practice guide is knowing milk with heating process as one of factor which accelerate reaction rate.

From KD 3.8 and 4.8 found the principal material that developed in the practical guide is the factor that influences the shift of equilibrium direction. The main material that developed in the practical guide is pebuatan pasta gig (odol) from baking soda.

Indicators of Competence Achievement

At this stage visible Indicators of Achievement of Competence to be achieved in the learning process, especially practicum activities. Indicators are developed through KI and KD. Indicator of Competency Achievement based on KI and KD. The indicators developed in chemoentrepreneurship-based high school chemistry chemistry guide 4.1.1 identify carbon compounds, 4.4.1 designing products related to exothermic and endothermic reactions, 4.7.1 designing, practicing to produce products related to factors affecting reaction rate , 4.8.1 performs practicum to produce products related to factors that affect the shift in the direction of equilibrium.

Design

Once the learning indicators are formulated and the essential concepts are established then the next step is to design the practical guides to be developed.

Media Selection

At this stage selected appropriate and effective media that has been adapted to the concepts, materials, basic competencies 4, production capabilities and media dissemination. Based on the results of the defining stages, the development of chemoentrepreneuship practice guides for use by students in the odd semester of class XI IPA.

Format Selection

Selection of format includes systematic presentation of chemistry practicum guide developed. Systematics of practical guidance writing is designed in accordance with the format of practicum writing writing contained in Ministry of National Education No.36 of 2001. Based on the Ministry of National Education No 36 Year 2001 contains the title, purpose, theory, preparation of tools and

materials to be used, procedures for practicum implementation, data analysis and reporting data of the lab results.

Initial Draft of Chemical Practice Guidance

The first draft guidance of chemistry high school chemoentrepreneuship odd semester class XI IPA consists of four activities such as briquettes manufacture of rice husks, hot ice pack, tofu manufacture and toothpaste manufacture of baking soda. In addition, the components in the chemoentrepreneurship chemistry practice guide consist of cover, identity of the owner, introduction, table of contents, table list, list of images, character and character of entrepreneur, chemical application in entrepreneurship, guidance manual for students and teachers, laboratory, the introduction of the symbol of danger, the introduction of laboratory tools used, the solution making guide, you should know, core competence and practicum activities.

Develop

Development stage is done with the aim to produce a valid and practical products so that the resulting product feasible to be used in the learning process, especially practical activities. Activities undertaken at the development stage are product validation activities and product practice test. Assessment at this stage is done by using product validation instrument and product pratikality test. The instrument used in validity and practicality is a questionnaire. Instrument of practicality is distinguished from teacher pratikalitas instrument (teacher questionnaire) and student practice instrument (student questionnaire).

This validation activity is carried out to assess the feasibility of the practicum guide in terms of the content, presentation and language components used in the practical guides. The next stage is to validate the instrument of practicality (questionnaire of practicality of teacher and student practicality questionnaire). Stages of product practicality testing aims to determine the extent to which benefits, ease of use and efficiency of chemoentrepreneurship-based chemistry practice by teachers and students.

Product Validity

Validation activities are performed by providing chemoentrepreneuship-based practicum guides to the validator. This activity is done to 2 lecturers of chemistry and 1 lecturer of Indonesian language.

Validation is done in two stages. The first validation is B, which means valid with the fix. Aspects observed by the validator in the validation process of the practicum guide are aspects of the content, construct aspects, and language aspects.

Based on the result of validation of chemoentrepreneurship based practice guide from the aspect of the moment kappa language obtained for 0.78 with high category. Based on the results of data validation of the above three aspects obtained assessment of the validation process in Table 9.

Table 1. Average of Validity Kappa Moment

No.	Aspect	Penilaian
1.	Content	0.83
2.	Construct	0.83
3.	Language	0.78
Total		2.44
Average		0.81

Based on Table 9, the average value of chemoentrepreneurship-based practicum guide overall kappa moment is worth 0.81 with Very High category. this indicates that the guides practicum chemoentrepreneurship-based class XI semester odd that has been designed valid and feasible to be used in the learning process as a tool for both teachers and for learners in learning chemistry, especially on the implementation of chemistry lab in school.

Practicality of Produk

After the chemoentrepreneurship chem chemistry guide guide is valid by the validator then the next step is to test the product to know the extent to which product practicity is developed.

Instrument of practicity used in practice practice practicum test by teacher and student, has been validated with moment kappa 0.86 with category Very High for teacher questionnaire. As for the students gained moment kappa 0.88 with very High category.

Result of questionnaire for teacher practicality

In this practicality test the teacher is asked to provide assessments and responses to the practical guides that have been designed through a validated questionnaire of validity.

No	Statement	Teacher 1			Teacher 2			Teacher 3		
		Value	Cohen	Category	Value	Cohen	Category	Value	Cohen	Category
1	1	4	1	ST	4	1	ST	3	0.67	T
2	2	3	0.67	T	4	1	ST	3	0.67	ST
3	3	3	0.67	T	3	0.67	T	4	1	ST
4	4	4	1	ST	4	1	ST	3	0.67	T
5	5	4	1	ST	4	1	ST	4	1	ST
6	6	4	1	ST	3	0.67	T	3	0.67	T
7	7	3	0.67	T	3	0.67	T	3	0.67	T
8	8	4	1	ST	3	0.67	T	4	1	ST
9	9	3	0.67	T	3	0.67	ST	4	1	ST
10	10	4	1	ST	3	0.67	ST	4	1	ST
Total			8.68			7.82			8.35	
Kappa Cohen			0.87			0.78			0.84	
Average of Cohen				0.83					ST	

Based on Table 10 it can be seen that the chemoentrepreneurship-based laboratory guide that has been developed can help the teacher in carrying out the chemistry practicum activity and can apply

the application of entrepreneurship in chemistry subject this is reflected from the average value of the average kappa moment is 0.83 very high.

The result of questionnaires of MGMP Chemistry teacher of SMA Sekotamadya Padang

Practicality test of chemoentrepreneurship-based practicum guides was also conducted on MGMP chemistry teachers of Sekotamadya Padang conducted on October 6, 2017.

Table 3. Result of Practicality Chemistry MGMP Teachers in Padang

No.	Responden	Statement									
		1	2	3	4	5	6	7	8	9	10
1	1	0.67	1	1	0.67	1	1	1	0.67	0.67	1
2	2	1	1	1	1	1	1	1	1	1	1
3	3	0.67	1	1	0.67	1	0.67	1	1	1	1
4	4	1	0.67	0.67	0.67	1	1	0.67	1	1	1
5	5	0.67	1	0.67	0.67	0.67	0.67	0.67	1	1	0.67
6	6	0.67	0.67	1	0.67	0.67	1	1	0.67	1	1
7	7	1	1	1	1	1	1	1	0.67	1	1
8	8	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
9	9	1	1	1	0.67	0.67	0.67	0.67	0.67	0.67	1
10	10	1	1	1	0.67	1	0.67	0.67	1	1	1
11	11	1	1	1	0.67	1	0.67	0.67	1	1	1
12	12	1	1	1	0.67	0.67	0.67	0.67	0.67	0.67	1
13	13	1	1	1	0.67	0.67	0.67	0.67	0.67	0.67	1
14	14	1	0.67	1	1	1	1	0.67	1	1	1
15	15	1	1	1	1	1	1	1	1	1	1
16	16	0.67	0.67	0.67	1	1	1	1	0.67	1	1
17	17	1	1	1	1	1	1	1	1	1	1
18	18	1	1	1	1	1	1	1	1	1	1
Total						158.55					
Kappa Moment						0.88					
Category						Very High					

Information :

T : High

ST : Very High

Based on Table 11, it can be seen that the chemoentrepreneurship-based laboratory guide has been developed at a moment of cappa of 0.88 with very high category. Chemoentrepreneurship-based lab workshop received positive response from MGMP Chemistry Teachers in Padang. This is marked by the number of teachers who appreciate the development of this practical guide. Teachers argue that it is necessary to develop entrepreneurship character for learners especially in chemistry subject.3. Hasil angket untuk siswa.

Practical testing of chemoentrepreneuship-based practice guide is done on 30 students of grade XI IPA2 SMA N 5 Padang. Practicality test on students is done on 8-9 september 2017.

In practice test, students are asked to do practicum activities assisted by chemistry teacher in class. The students of IPA 2 class are divided into 4 groups. Students prepare tools and materials and perform practicum in accordance with the work procedures listed in the practical guide. After completion of the entire practicum activities students are required to assess the practicum guide developed through a validated validity questionnaire. The results of questionnaires for student questionnaires are shown in Table 12 below.

Based on Table 12 it can be seen that practicum using chemoentrepreneurship-based laboratory practicum can be used in chemical practicum activities, with kappa moment of 0.83 and Very High category. Practicum using chemoentrepreneuship-based laboratory guide makes the chemistry practicum activity more interesting, easy to understand and practical in carrying out any chemical experiments present in the guide.

Table 4. Result of PracticalityXI IPA 2 Students in SMA Negeri 5 Padang

No.	Responden	Statement										
		1	2	3	4	5	6	7	8	9	10	11
1.	1	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	1	1
2.	2	1	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	1	0.67
3.	3	0.67	0.67	0.67	0.67	1	0.67	1	1	0.67	0.67	1
4.	4	1	0.67	0.67	0.67	1	1	0.67	0.67	0.67	0.67	1
5.	5	1	1	1	0.67	1	1	0.67	0.67	0.67	0.67	1
6.	6	1	1	1	0.67	1	1	0.67	0.67	0.67	0.67	1
7.	7	1	0.67	0.67	0.67	0.67	1	1	1	1	0.67	0.67
8.	8	0.67	0.67	0.67	0.67	0.67	1	1	1	0.67	0.67	0.67
9.	9	1	0.67	0.67	0.67	0.67	1	1	1	1	0.67	0.67
10.	10	0.67	1	1	0.67	0.67	1	0.67	1	1	0.67	0.67
11.	11	0.67	0.67	1	0.67	1	1	0.67	0.67	0.67	1	0.67
12.	12	1	0.67	1	1	0.67	1	1	1	1	0.67	0.67
13.	13	0.67	1	1	1	0.67	1	1	0.67	0.67	1	1
14.	14	1	1	1	0.67	0.67	1	1	1	0.67	1	0.67
15.	15	1	0.67	1	1	1	1	1	1	0.67	1	1
16.	16	0.67	1	1	1	0.67	1	1	0.67	0.67	1	0.67
17.	17	1	0.67	1	0.67	0.67	1	1	0.67	0.67	1	0.67
18.	18	1	1	0.67	0.67	0.67	1	0.67	1	0.67	0.67	1
19.	19	1	0.67	1	0.67	0.67	1	1	1	1	1	0.67
20.	20	0.67	0.67	1	1	0.67	1	1	0.67	1	0.67	0.67
21.	21	1	1	1	0.67	1	1	1	0.67	0.67	1	0.67
22.	22	0.67	0.67	0.67	1	0.67	1	1	1	1	1	1
23.	23	1	1	0.67	0.67	0.67	0.67	1	0.67	0.67	0.67	0.67
24.	24	0.67	0.67	0.67	0.67	0.67	1	1	1	0.67	1	0.67
25.	25	1	0.67	0.67	1	1	1	1	0.67	0.67	1	1
26.	26	0.67	0.67	1	0.67	0.67	1	1	1	1	0.67	0.67
27.	27	1	1	1	1	1	1	1	1	1	1	1
28.	28	1	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
29.	29	1	0.67	1	0.67	0.67	1	1	0.67	0.67	1	0.67
30.	30	0.67	0.67	1	0.67	0.67	1	1	0.67	0.67	1	0.67
Total		273.9										
Cohen		0.83										
Category		Very High										

Information:

T : High

ST : Very High

Dessiminate

The deployment stage (dessiminate) is the final stage in the development of 4D Models. The deployment stage is done to promote the product to be acceptable to users either in individuals, groups or systems.

Conclusions

Produced Chemoentrepreunership (CEP) Chemical Practice Guides (CEP) for SAL XI Semester odd SMA IPA. The result of practicum guide has been able to used teaching odd semester semester classes of science at school. Chemoentrepreunership chemoentrepreunership experimental validation guide had average validation in moment kappa 0.84 with very high category. It can be concluded that the guides of practicum chemistry developed have been practical and easy to use both for teachers and for students.

References

Anwar. (2015). *Pendidikan Kecakapan Hidup (Life Skill Education)*. Bandung : Alfabeta.

BSNP. *Paradigma Pendidikan Nasional Abad XXI*. 2010. hal. 15.

Chang, Raymond. 2004. *Kimia Dasar: Konsep-Konsep Inti Jilid I. Jakarta: Erlangga.*

Haryono. 2013. *Pembelajaran IPA yang Menarik dan Mengasyikkan : Teori dan aflikasi PAIKEM*. Yogyakarta : Amara Books.

Oemar Hamalik. (2006). *Pendidikan Guru: Berdasarkan Pendekatan Kompetensi*. Jakarta: Bumi Aksara.

Perawati , Ni Kadek Ana, I Wayan Redhana dan Siti Maryam. 2014 Buku Pedoman Praktikum Kimia Ramah Lingkungan Untuk Pembelajaran Kimia SMA. *E-Journal kimia Visvitalis Universitas Pendidikan Ganeshsa Jurusan Pendidikan Kimia.* Volume 2 Nomor 1 Tahun 2014.

Saputra Kiki. (2015). *Pendidikan Berbasis Entrepreneurship.* Yogyakarta. Diva Press.

Sugiono. (2015). *Metode Penelitian & Pengembangan Research and Development*. Bandung. Alfabeta.

Sukardi. 2008. *Evaluasi Pendidikan Prinsip dan Operasionalnya.* Yogyakarta : Bumi Aksara.

Sumartini susilogawati S. 2008. *Peningkatan Kewirausahaan Mahasiswa Calon Guru Kimia Dengan Pembelajaran Pratikum Kimia Dasar Berorientasi Chemoentrepreneurship. Jurnal Inovasi Pendidikan Kimia, Vol 2. No. 2. 2008 hal 305-311* (Diakases 15 April 2017).

Suwanda. 2011. *Desain Experimen Untuk Penelitian Ilmiah.* Bandung : Alfabeta

Thiagaranjan, Sibasailam, Dorothy Semmel dan Melvyn Semmel. 1974. *Instructional Develoment for Training Teachers of Exceptionl Children: A Sourcebook.* Indiana: Indiana University

Tresna Sastrawijaya. (1998). *Proses Belajar Mengajar Kimia*. Jakarta: Depdikbud

Undang-Undang Republik Indonesia No. 20 Tahun 2003, *Tentang Sistem Pendidikan Nasional*. Jakarta: Depdiknas.

www.tirto.com. *Jumlah Pengangguran di Indonesia.* 2016 (di akses Tanggal 13 April 2017 Pukul: 09.00 WIB)