Improving the ability of entrepreneurs to use alternative learning models in the automotive field

R Ridho$^{1}$ and A G Abdullah$^{1,2,*}$

$^{1}$Jurusan Pendidikan Teknologi dan Kejuruan, Sekolah Pascasarjana Universitas Pendidikan Indonesia, Bandung, Indonesia
$^{2}$Jurusan Pendidikan Teknik Elektro, Universitas Pendidikan Indonesia, Bandung, Indonesia

*ade_gaffar@upi.edu

Abstract. Entrepreneurial activity is believed to be a tool to encourage economic growth and to solve other economic problems such as unemployment. Entrepreneurship has been widely applied in schools, especially in vocational schools that aim to produce graduates so they can work and be entrepreneurs. There are many learning models that exist in vocational schools at this time, but the learning model does not have an impact on students to have a soul or desire to become entrepreneurs. Therefore, we have conducted a literature review to explain an alternative learning model, which is a self-designed project learning model that is expected to trigger students to become entrepreneurs. A systematic mapping study is used as a basic method for conducting literature reviews. Various relevant journals, which are learning models that can enhance one's entrepreneurship from various circles, were selected by researchers as preliminary data for a literature review. The various learning models that currently exist do not have enough impact to foster a sense of entrepreneurship in students, whereas learning in SMK should every productive learning must make students master and can make students have a sense of entrepreneurship when learning has ended. In this study describes a self-designed project learning model that will be applied in the automotive field in light vehicle engine tune-up subjects. This alternative learning model has been used by other studies, the researcher applies this alternative learning model in the field of machining that produces an impact on students, i.e. students can increase or make it have the desire to become entrepreneurs.

1. Introduction

Vocational High Schools (SMK) have a strategic role to organize education and training tailored to the needs of employment and entrepreneurship. Aiming to be a workforce, must have the knowledge, skills, and attitudes in accordance with the qualifications of the workforce [1]. To be able to work and compete in industry and entrepreneurship, vocational schools must have competencies, as well as the abilities needed to complete certain jobs in the world of work and some are related to these abilities. Competencies that are suitable for work in the industrial world are grouped in the Indonesian National Work Qualifications (KKNI) while recognition of these competencies can be carried out by the National Professional Certification Agency (BNSP) through its extension made by the Professional Certification Agency (LSP). Not only in Vocational Education, but will become the term "entrepreneurship" is now a daily keyword, because everyone is talking about it, both in a macro context or even an individual context. In the macro context, he opposed it as a driver of economic growth and other economic
indicators [2-5]. Educational institutions are under greater pressure to instill entrepreneurship in their various curriculums, accessible to all students, regardless of their discipline, including higher education institutions [6-9]. In the world of Vocational Education in Indonesia, entrepreneurship subjects so that students can actualize themselves in entrepreneurial relationships will teach entrepreneurship learning in Vocational Schools currently conducted using lecture, recitation, and reading textbook methods. Entrepreneurship education in vocational schools should be in accordance with the needs of industry, there is research that questions, entrepreneurial universities commercialize their knowledge and complete it in the process of transferring and utilizing technology. With so meaning that issued here is not just the school, but must be questioned by the school and the government [10].

Because entrepreneurship is believed to be the solution to solving the unemployment problem of SMK graduates, we must, therefore, find a way to create new entrepreneurs, right after or even before they graduate. In other words, we must produce more graduate entrepreneurs and to do that, higher education in general and entrepreneurship education, in particular, can help promote entrepreneurial activities among students [11,12]. The existence of entrepreneurship learning in schools is good to start introducing an entrepreneurial spirit early on even though the entrepreneurial learning model is still an Oriented text-book. The model is the implementation of learning by using the lecture method that is varied with the discussion method has not emphasized the students' thinking processes independently. Because in general the discussion was conducted in large classes that were still dominated by teachers, the material discussed was not in accordance with the context and moral issues that were developing in society, especially those related to entrepreneurship. There is a tendency for students to be merely listeners to the teacher's explanation or merely to complete the Student Worksheet (LKS). His condition became increasingly serious because educators lacked developing their learning material according to students' needs. Even though paying attention to students' interests, a teacher will be able to teach effectively. The impact of this should be thought about increasing entrepreneurial skills for vocational graduates through alternative learning models. There are so many learning models in schools today, but the management of the learning process in schools is still dominated by uniformity models, which pay less attention to students' cultural backgrounds so that boredom and boredom arise from students to learn them because they are only directed to memorizing them. This happens because all this time the material learned has not touched their needs. Therefore the concept of the self-design project learning model was initiated for vocational students so that they have the ability to work in relevant fields so that it is expected to overcome the problem of unemployment in Indonesia because through a study entitled "The Impact of Entrepreneurship Education on Entrepreneurial Outcomes." reported that entrepreneurship education had a positive impact on entrepreneurial production, where many graduates began to open their own businesses, which eventually grew into strong companies [11]. Studies also show that individuals with high entrepreneurial qualities will be active, flexible, able to adapt to the learning environment and able to see change as an opportunity [11,13].

2. Method
This research uses a systematic mapping study, which aims to help the authors carry out a systematic review. Systematic reviews are valuable data, where the authors summarize and analyze literature reviews that are relevant to the topic then compare them so that different researchers can use them as reference material for further research [14,15].

2.1. Strategy
This stage the authors choose articles related to learning models that can improve abilities or lead to a desire for entrepreneurship both within students and the general public. The search is done through a journal publisher database or proceeding, then some from internet blogs and books or theses, and dissertations. The search was conducted using the keywords "entrepreneurship", "learning model", "automotive", "learning model self-designed project". The search for this article was carried out randomly as needed, in 2004, and was vulnerable from 2007 to 2018. The next stage of the article was chosen according to the topic.
2.2. Inclusion and exclusion criteria
The inclusion and exclusion criteria will be explained in table 1. According to the exclusion criteria, articles that have fulfilled the requirements are selected, except those using languages other than English and Indonesian. Then a time less than 2004 was deleted. Seeing the appropriate article is done by looking at the appropriate title and abstract based on the relevance of the article related to learning that enhances entrepreneurship or activities that generate interest in entrepreneurship. In this stage, a total of 32 articles, books, the internet, and other sources in accordance with the inclusion criteria and relevant to this literature research.

| Inclusion criteria | exclusion criteria |
|--------------------|--------------------|
| English and Indonesian | Articles in other languages |
| Timing: 2004-2018 | Before 2004 |
| Related to learning that enhances entrepreneurship | All disciplines except learning that enhance entrepreneurship |

2.3. Data extraction and analysis
The final step, 42 full-text data which will contribute to this literature review for an overall review. A thorough data check to extract and summarize the information needed in order to answer the objectives of this research literature. Based on the information needed, we consider several classifications and criteria that fit the objectives. Based on the analysis of data extraction, we can achieve the best results and recommendations. Criteria are the author, year of publication, type of article, journal or conference, sample size, context, type of data, enhancement or growing sense of entrepreneurship. After reviewing and summarizing the articles collected.

3. Results and discussion
Many ways or methods are used to make students or the community have an entrepreneurial spirit, one method that gives good results to influence or add intentions to become entrepreneurs is higher, the self-efficacy method [16]. In schools, although entrepreneurship education does not teach students to pursue entrepreneurial careers, but to apply what they learn to their future work whether they are entrepreneurial or working in government or industrial agencies [17]. However, it is expected that by having the provision of entrepreneurship learning that has been carried out at school, especially on productive subjects, students are expected to have an initial intention to entrepreneurship, at least it will reduce unemployment in Indonesia. In order to achieve this, learning in Vocational High Schools must use learning models that will trigger students to foster a sense of entrepreneurship, one of which is by using this Self Designed Project learning model because this learning model is related to entrepreneurship, as similar research reveals that entrepreneurship education is important for raises students' intention to start a business [12].

3.1. Self designed project learning model
Learning is the process of student interaction with educators and learning resources in a learning environment. Another opinion says that learning is a process carried out by individuals to obtain a new behavior change as a whole, as a result of the experience of the individual itself in interaction with his environment [18,19]. By doing so, it means that a student is expected to have a provision or ability after there is an interaction of learning in school, and that ability must be able to be applied by students in social life. Learning model is a term used to describe the implementation of the teaching and learning process from beginning to end. In the learning model already reflects the application of an approach, method, technique or tactic of learning as well. Other researchers with learning models are conceptual frameworks that describe systematic procedures for organizing learning experiences to achieve specific goals [20] accessed from a link [21]. From the understanding that has been explained, that the learning model must be able to make students achieve the success of learning itself. Models of learning in schools
today are numerous, following various learning models that are often used, especially in SMKs accessed from the web, [22] namely:

- Inquiry
- Discovery
- PBL
- PBJL
- PBT/PBET
- TEACHING FACTORY

From the various learning models mentioned above, all learning models are good, but in reality, every teacher does not practice them correctly. If the teacher is good at using the learning model, students will prove successful in mastering the knowledge they learn. There are studies that reveal that research learning models that affect learning outcomes, show the ability of students who are quite significant for those who use modeling and those who do not. As research on the use of taking and give learning models can improve students' ability to understand teaching material quickly and accurately [23,24].

All learning models are good and are very useful for teaching if mastered by the teacher himself. However, the existing learning model does not have enough impact to foster a sense of entrepreneurship in students. Therefore, the Self Designed Project learning model is made for vocational teachers, especially those who teach productive subjects, one of which is about tune-up engine in light vehicle expertise program. The concept is the implementation of production-based learning one of which is the method in which students are invited to participate in production planning. Beginning student learning is introduced to tangible products taken from industry (existing engines in the industry) then students are taught how to plan maintenance or product repairs. The results of this planning are called learning outcomes (evident learning). Physical learning outcomes in the form of product planning documents that later the product must be implemented. The steps of the Self Designed Project learning model are as shown below.

![Figure 1. Steps for learning the self-designed project [19].](image-url)

The self-designed project learning steps are made to make students have the desire to be entrepreneurs after getting tune-up engine lessons with the teacher using this self-designed project learning model. Before starting learning using this alternative learning model, students are initially given a pre-test on entrepreneurship, after that only learning uses this alternative learning model. This self-designed project
learning model in its preparation must be done in a Group Discussion Forum (FGD) because it is for compiling entrepreneurial material related to the practice of tune-up engines. This activity involved teachers who were able to practice tune-up engines and entrepreneurial teachers and then involved professional certification bodies (LSP) and industry. The results of this FGD are as learning material when the two teachers will deliver the material in accordance with their subjects.

The design of the learning model developed is expected to be an alternative learning that can improve entrepreneurial abilities. The scenarios of this learning alternative are:

3.1.1. Design

3.1.1.1. Learning objectives. Improving student entrepreneurial competence in productive subjects in light vehicle engineering tune up engines through their own skills using workpieces and procedures according to industry standards.

3.1.1.2. Learning materials
- Changes in learning management include 1) the rational need for learning conditions such as industry conditions, 2) a general description of work in industry, 3) an overview of the workforce of vocational graduates in industry, 4) a description of a junior technician, 5) a product evaluation system work in industry and 6) Discipline, work ethic and productivity.
- Ability to plan work and design products which include the compilation of 1) The importance of the work to be done 2) The function of work 3) examples of work in accordance with Industry SOP, 4) products, 5) Facilities/equipment, 6) The process of work (Work steps), 7) Cost budget plan 8) Target consumers, and 9) Implementation schedule.
- Work on the results of work planning including 1) working with machines, 2) doing occupational safety and health, 3) using appropriate tools and materials and 4) carrying out quality control measures.

3.1.1.3. Learning activities. This learning model activity begins with preparations which include administration preparation, subject matter, workpiece preparation, work safety equipment preparation, and equipment preparation. The implementation of this model starts with preparation and continues with the next step, which are:
- Creating school conditions into working conditions in the industry, the teacher invites students to learn like working in the industry.
- Explain the steps to plan making work which includes the preparation of 1) The importance of the work to be done 2) The function of work 3) examples of work in accordance with Industry SOP, 4) products, 5) Facilities/equipment, 6) The process of work (Steps work), 7) Cost budget plan 8) Target consumers, and 9) Implementation schedule.
- Guiding students to work on projects that have been designed.

3.1.2. Implementation scheme. Scheme of the implementation of alternative learning can be seen in the picture below:
3.1.3. Main activities

- Preliminary stage. Step 1, students act as workers accepting/choosing the type of product to be worked on. Workers inspect products that must be serviced.
- Core stage. Step 2, workers make plans for product improvement including the preparation of 1) the state of the product to be repaired 2) The function of the product/service, 3) Materials that must be repaired, 4) Facilities/equipment, 5) The process of repair (Work steps), 6) Cost budget plan and 7) Implementation schedule.
- Closing stage. The teacher is responsible for the entire learning program, observing and evaluating learning outcomes, learning processes and programs.

After the learning process uses this self-designed project learning model, the teacher will provide a post-test in the form of a questionnaire so that they can see the extent to which students' desire to become entrepreneur's increases. The self-designed project learning model has been proven to increase student entrepreneurship in research that uses the self-designed project learning model in the field of research revealed that, on average, students' personal entrepreneurship on every aspect has increased even though based on the International Management System is still in the medium category. Based on the results of the measurement, there are two components that still constrain students' progress in entrepreneurship, namely to bear the risk, and self-confidence [19]. According to research, giving spirit to become entrepreneur, is to do exercises in their fields so as to make a habitat in accordance with their fields and abilities [18]. Entrepreneurial ability is one factor to develop an entrepreneurial spirit, such as being independent, being brave to take risks, being able to seize opportunities, be creative and innovative. The same research revealed that at this stage students experience real activities as workers/entrepreneurs who are able to apply entrepreneurial materials that have been given previously. It is expected that students' entrepreneurial abilities will be better because they have experienced real activities compared to making previous work. The results of the study said, there was an increase in the competence of the experimental class group that fostered the formulation of integration material on the application of learning self-designed project learning [19].

3.2. Entrepreneurship

The word "entrepreneurship" comes from the 17th-century French Entrepreneur word "entreprendre" which means someone who is risking a new company. Looking at entrepreneurship in modern languages, saying it is the art or science of innovation and risk-taking for the sole purpose of generating profits in business [25]. Whereas, an entrepreneur is a person who assumes the main risk of creating additional wealth by making time equity and/or career commitment to provide value to a product or service [26]. The product or service may be new or different, but the value is added by an entrepreneur [27].
It has been proven that there is one study that states, entrepreneurship education has developed rapidly among universities in Taiwan. The number of universities offering relevant entrepreneurship courses has increased from 18 in 2003 to 89 in 2007, which is a 56% increase in the total number of universities. Meanwhile, the number of entrepreneurship programs has also grown rapidly from 102 in 2005 to 145 in 2007. In addition, in 2009, nine universities had opened modular entrepreneurship courses and brought the total to 550 relevant entrepreneurship courses offered in Taiwan [28]. In 2011, the number of technical universities that provided entrepreneurship education reached 45 and the number of relevant entrepreneurship courses grew to 110. Among them, 1/4 of the universities listed entrepreneurship programs as required credits [28-30]. The level of entrepreneurial ability in Indonesia is still low when compared to countries in the Asia Pacific region. The ratio between the number of entrepreneurs compared to the population of Indonesia is only 1:83, while the Philippines 1:66, Japan 1:25, even Korea is less than 20. Judging by the ratio of entrepreneurs internationally, the ideal ratio is 1:20 [31]. To reduce unemployment one way that can be done is to develop the spirit of entrepreneurship as early as possible. This is because a nation will advance if the number of entrepreneurs is at least 2% of the population. In 2010 Indonesia had around 400,000 entrepreneurs = 0.18% of the population. If a formula for 2% of the population is needed to achieve prosperity, then Indonesia must now have around 4,600,000 entrepreneurs [32].

Synthesized from all the scientists’ opinions cited above, this study uses the definition of entrepreneurship as "the situation of school graduates, especially vocational schools currently in Indonesia, which are the most unemployed, with entrepreneurship learning believed to be able to reduce the unemployment rate in Indonesia and by student entrepreneurship is able to open their own business with the knowledge that has been learned at school. Therefore, the learning model at school must always be angels with entrepreneurship because that way students will get used to the entrepreneurial environment so that it is expected that students will want to become entrepreneurs in accordance with the relevant industrial world ".

4. Conclusions

Nowadays everyone must be demanded to have a creative and innovative person in the work both in the business world or in the industrial world. In the world of work, competition is increasingly fierce because of the incompatibility of industry needs with existing school graduates. Entrepreneurship is a solution to overcome this problem, many research findings have revealed that entrepreneurship education is important to reduce unemployment in various countries, especially developing countries. With the existence of entrepreneurship education or learning models based on increasing entrepreneurship in vocational schools such as self-designed project, learning models are expected to continue to be developed, so that it can have a positive impact and especially the success of the objectives of the vocational school itself.

An alternative learning model, the self-designed project, has been applied in one of the studies and has been proven to provide students with an increase in entrepreneurship. Research that uses the self-designed project learning model has been applied to the machining expertise in vocational high schools, it is hoped that further research can apply it to different fields, one of which is automotive.

References

[1] Klotz1 V K 2014 Promoting Workforce Excellence: Formation And Relevance Of Vocational Identity For Vocational Educational Training Journal of Empirical Research In Vocational Education And Training 6(6) 1-20

[2] Bernstein A 2011 Nature Vs. Nurture: Who is Interested in Entrepreneurship Education? A Study of Business and Technology Undergraduates Based on Social Cognitive Career Theory (Dissertation Submitted to The Faculty of the School of Business Of The George Washington University, UMI 3433540)

[3] Engle R L, Dimitriandi N, Gavidia J V, Schlager C, Delance S, Alvarado I, He X, Buame S and
Wolff B 2010 Entrepreneurial intent A twelve-country evaluation of Ajzen’s model Of planned behavior International Journal of Entrepreneurial Behaviour and Research 16 1 35-57

[4] Packham G, Jones P, Miller C, Pickernell D and Thomas B 2010 Attitudes towards Entrepreneurship education: A comparative analysis Education + Training 52 8/9 568-586

[5] Respati A D and Astuti A K 2011 Entrepreneurship Education: Influencing Students Intensions to Become Entrepreneurs in proceding of Indonesian International Conference on innovation, entrepreneurship and sustainability, CIEL,SBM, ITB

[6] Bagheri A and Lope-Pihie Z A 2013 Role of university entrepreneurship programs in developing students' entrepreneurial leadership competencies: perspectives from Malaysian undergraduate students Journal of Education for Business 88 51e61

[7] Cheng M-Yu, Chan W-S and Mahmood A 2009 The effectiveness of entrepreneurship education in Malaysia Education + Training 51 555e566

[8] Jafaar M and Abdul Aziz A R 2008 Entrepreneurship education in developing country: exploration on its necessity in the construction programme Journal of Engineering, Design and Technology 6 178e189

[9] Gibb A, Haskins G and Robertson I 2013 Leading the entrepreneurial university: Meeting the entrepreneurial needs of higher education institutions

[10] Adekriya A A and Ibrahim F 2016 Entrepreneurship intention among students. The antecedent role of culture and entrepreneurship training and development International Journal of Management in Education 14(2) 116–132

[11] Chou C-M, Shen C-H, Hsiao H-C and Chen S-C 2010.A study on constructing entrepreneurial competence indicators for business department students of vocational and technical colleges in Taiwan World Transactions on Engineering and Technology Education 8(3) 316-320

[12] IIICIES 201. Is Entrepreneurship Education Really Needed ? : Examining the Antecedent of Entrepreneurial Career Intention The 5 Indonesia International Conference on Innovation

[13] Shartrand A, Weilerstein P, Besterfield-Sacre M and Olds B M 2008 Assessing student learning in technology entrepreneurship (Saratoga Springs, NY: IEEE) 12-17

[14] Gopalakrishnan S and Ganeshkumar P 2013 tinjauan sistematis dan meta-analisis: pemahaman bukti terbaik dalam perawatan kesehatan primer Jurnal kedokteran keluarga dan perawatan primer 2(1) 9

[15] Amelia N, Abdullah A G and Mulyadi Y 2019 Meta-analysis of Student Performance Assessment Using Fuzzy Logic Indonesian Journal of Science and Technology 4(1) 74-88

[16] Piperopoulos P and Dimov D 2014 Burst Bubbles or Build Steam? Entrepreneurship Education, Entrepreneurial Self-Efficacy, and Entrepreneurial Intentions Journal of Small Business Management

[17] Chen S C, Hsiao H C, Chang J C, Chou C M, Chen C P and Shen C H 2013 Can the entrepreneurship course improve the entrepreneurial intentions of students? New York: Springer Science+Business Media

[18] Surya M 2004 Psikologi Pembelajaran dan Pengajaran (Bandung: Yayasan Bhakti Winaya)

[19] Hamdani A 2017 Pemberdayaan smk melalui penerapan model pembelajaran Self designed project learning untuk meningkatkan kemampuan wirausaha lulusan pada bidang pemesinan bubut, penelitian produk terapan (Universitas Pendidikan Indonesia)

[20] Endang M 2010 pembelajaran aktif, kreatif, inovatif, efektif dan menyenangkan (paikem) (direktorat jendral peningkatan mutu pendidik dan tenaga kependidikan)

[21] https://www.academia.edu/10078469/MACAM-MACAM_MODEL_PEMBELAJARAN

[22] https://slideplayer.info/slide/12987305/

[23] Riani N and Supraptono E 2016 Penerapan Model Pembelajaran Take and Give dalam Materi Ajar Media Komunikasi Data jaringan Jurnal Pendidikan Tindakan Kelas 6 2

[24] Sulasih B, Syamwil R and Wilonoyudho S 2017 Pengembangan Model Pembelajaran Outdoor Study Berbasis Keunggulan Lokal pada Siswa Sekolah Menengah Kejuruan Journal of
Vocational and Career Education

[25] Soanes C 2010 Oxford Dictionary of Current English (Oxford: Oxford University Press)

[26] Dennis I E 2007 Entrepreneurship and economic development: Blueprint for self-reliance (Kaduna: Expression Publishers)

[27] Inyiagu E E 2014 Exploring E-Entrepreneurship Opportunities for Nigerian Universities Graduates in the Digital Economy: The Missing Link in the National Universities Commission (NUC) Curriculum for Entrepreneurship Education International Journal of Scientific Engineering and Research (IJSER) 3 2347-3878

[28] Chen S C, Hsiao H C, Chang J C, Chou C M, Chen C P and Shen C H 2013 Can the entrepreneurship course improve the entrepreneurial intentions of students? (New York: Springer Science+Business Media)

[29] Chang J C, Chen S C, Chen C P and Chou C M 2011 The necessity of the implementation of entrepreneurship education for higher technical and vocational education: From the point of view of innovation and creativity The 2011 Cross-Strait Conference on Application of Higher Education, China: Shanghai.

[30] Chen S C and Jing L L (2012). The dilemmas and strategies for promoting entrepreneurship education in Taiwan Journal of Guangdong Polytechnic Normal University 33(1) 30–32

[31] Yuyus S and Kartib B 2010 Kewirausahaan: Pendekatan Karakteristik Wirausaha Sukses. Edisi Pertama (Jakarta: Prenada Media Grup)

[32] Frinces Z H 2010 Pentingnya Profesi Wirausaha Di Indonesia Jurnal Ekonomi and Pendidikan 7 1 34-57