

An Analysis of Preliminary Creative and Critical Thinking on Entrepreneurial Attitudes and Behaviour Topic in Industrial Mechanical Engineering Class at SMKN 01 Pariaman

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Abstract. The problem of low critical and creative thinking skills in Vocational High Schools is a more significant concern to improve through various efforts. This study was aimed to describe the preliminary creative and critical thinking skills of students who have studied entrepreneurial attitudes and behaviours at SMKN 1 Pariaman. This type of research was descriptive quantitative. Preliminary analysis was carried out by giving ten items of creative and critical thinking essays that were valid (0.70) and reliable (0.82). The questions have passed the feasibility test on 150 students who have not studied entrepreneurship subjects on entrepreneurial attitude and behaviour topics at random. Written tests and questionnaires were given to 40 students of class XI-MI 1 and XI-MI 2 at SMKN 1 Pariaman. The preliminary analysis of critical and creative thinking skills was done in May 2021. The research data were collected based on scoring students' answers. The scoring of the critical and creative thinking test answers was in percentages according to critical and creative thinking categories. The analysis results of the critical and creative thinking indicators revealed that 51% of students got scores 1 and 2 (basic skills), while 49% of students got scores 3 and 4 (advanced skills).

Keywords: creative thinking skills, entrepreneurial

1 Introduction

Advances in technology and science are a form of life in the XXI century requiring various skills to face life's challenges [1,2]. Some of the skills used as indicators of the quality of education in learning in the XXI century for a country are creative and critical thinking skills [3]. Students are required to develop many ideas and argumen [4] and have proper reasoning [5]. Critical and creative thinking skills are one of the main focuses in the life of the XXI century (2,6–8). Creative thinking skills can train students to develop lots of ideas and arguments [9], Ask questions, Acknowledge the truth of statements, Even be able to make students open and responsive to different perspectives [4]. Creative thinking skills can be characterized by five components, including: 1) fluency, the expertise to generate lots of ideas, 2) originality, the

skills to generate new ideas or ideas that do not exist yet, 3) elaboration, developing and adding to ideas so that detailed ideas are produced, 4) flexibility, the skills to generate ideas broad and varied, 5) metaphor thinking, skills in analogizing something into an easy-to-understand conceptual understanding.

Critical thinking skills are important for problem solving, investigation, and discovery [13]. Critical thinking involves a person's mind in evaluating ideas and concepts [14,15], as well as comparing [16] and seeing from various points of view [12]; critical thinking skills guide students to have the right reasoning in solving problems[17]. Critical thinking consists of focus, supporting reasons, reasoning, organization, conventions, and integrations. In addition, according to the World Economic Forum report, the skills needed in 2015, 2020, 2025, and 2030 are still oriented towards creative and critical thinking skills. This follows the problems in the subject matter regarding entrepreneurial behavior and attitudes where students are required to solve problems that are often faced by entrepreneurs, such as opportunities in entrepreneurship, tips to avoid entrepreneurship failure, and solutions for growing businesses.

At the same time, training students' creative and critical thinking skills helps them position themselves later as someone who has entrepreneurial attitudes and behavior in real life. The same statement is supported by the Organization for Economic Cooperation and Development (OECD) in the 2030 learning framework oriented towards creative and critical thinking skills [22].

The World Economic Forum also predicts more than seven million jobs will be lost, and two million new jobs will emerge by 2025 [21]. This is because existing employment opportunities have shifted to automation and digitalization [6,23]. Graduates of the education world need to produce skills, namely critical and creative thinking[24,25]. The position of critical and creative thinking skills is a challenge faced by Vocational High Schools in increasing quality graduate output [26]. Vocational High Schools are expected to be able to produce graduates who have knowledge in creative and critical thinking skills [27], have factual knowledge of a specific field of work [28]; thus, they can choose available solutions to problems [29]. The assessment indicators for creative thinking questions are compiled based on Treffinger (2002) indicators, while the assessment indicators for critical thinking questions are based on Finken & Ennis (1993) indicators. The creative and critical thinking essay questions have been empirically and logically validated so that they are feasible to use.

Creative thinking questions are given to students in the form of articles about examples of business opportunities around students. Then students must solve the following problems, 1) students are able to apply entrepreneurial attitudes and behavior when they are running a business, 2) students are able to provide examples of opportunities businesses in the field of technology that exist around their environment, 3) students are able to act correctly if there are competitors who copy the products of the businesses that they have designed, 4) students are able to provide solutions in the form of actions that will be taken if one day they are at the point of almost going bankrupt, and 5) students know the steps to be taken if they want to open a new branch of an advanced business. While the critical thinking questions given to students include, 1) students are able to analyze how to create business opportunities in the surrounding environment, 2) students are able to provide solutions in order to remain able to survive if the business is run has great competitors, 3) students can analyze what kind of business is suitable to be established during a pandemic, 4) students are able to find solutions so that their business

can grow, 5) students can recruit new employees for their business. Therefore, this study aims to describe the preliminary analysis of creative and critical thinking skills of students who have studied creative products and entrepreneurship in entrepreneurial attitudes and behaviors at SMK Negeri 1 Pariaman.

2 Method

This type of research was descriptive quantitative, describing the preliminary conditions of the following two variables: [1] Creative thinking skills based on indicators of fluency, originality (authenticity), elaboration (detailing), flexibility, and metaphorical thinking; 2) Critical thinking skills based on indicators of focus (focus), supporting reasons, reasoning (thinking), organization, conventions, integrations. Creative and critical thinking questions got a validity value of 0.70 in the high category and a reliability value of 0.82 in the high category. Thus, the questions were suitable for use for preliminary tests. The questions have passed the feasibility test on 150 students of SMKN 1 Pariaman who have not studied entrepreneurship subjects on entrepreneurial attitude and behavior topics at random. Preliminary analysis of critical and creative thinking skills was carried out by giving a written essay test.

Written tests and questionnaires were given to 40 students of class XI-MI 1 and XI-MI 2 Industrial Mechanical Engineering Department, SMKN 1 Pariaman. The reason was given to 40 students because the preliminary analysis was given to students who had previously studied entrepreneurship subjects, and researchers were only given two classes for preliminary tests. The preliminary analysis of critical and creative thinking skills was conducted in May 2021. The research data were collected based on scoring students' answers. The scoring of the critical and creative thinking test answers was in the form of percentages according to critical and creative thinking categories.

3 Findings and discussion

3.1 Creative thinking skills

Creative thinking skills were measured using an essay that consisted of 5 items. Based on the analysis of the creative thinking questions test. It is known that the average creative thinking skills of students in class XI-MI 1 and XI-MI 2 Department of industrial mechanical engineering at SMKN 1 Pariaman were still in the low category, which was equal to 50. The following are descriptive statistics of students' creative thinking skills.

Table 1. Descriptive statistics of creative thinking skills per indicator.

Descriptive Statistics							
	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
Creative Thinking Skills	40	20	68	1000	50	14.8253	219.7895
Valid N(leastwise)	40						

Based on the results of the descriptive analysis, it is known that the creative thinking skills of students were still low, with an average of 50. The maximum score achieved by students was only up to 68, while the minimum score obtained was 20. The scores did not meet the minimum standard score that had been determined by the school, which was 75. Descriptively, this means that it takes an effort to improve students' creative thinking skills. The analysis of students' creative thinking skills per indicator of creative thinking skills can be seen from the following table.

Table 2. Student creative thinking skills score per indicator.

Number of Students	The number of students who get 1-2 and 3-4 scores on each indicator									
	<i>Fluency</i>		<i>Originality</i>		<i>Elaboration</i>		<i>Flexibility</i>		<i>Metaphorical Thinking</i>	
	1-2	3-4	1-2	3-4	1-2	3-4	1-2	3-4	1-2	3-4
40	6	14	18	22	18	22	24	16	26	14
Percentage (%)	30	70	45	55	45	55	60	40	65	35

Source: Creative thinking skills Per Indicator was adapted by Treffinger (2003)

The table above shows that students' creative thinking skills on the fluency indicator were obtained by a total of 30% of students who answered creative thinking questions on the topic of entrepreneurial attitudes and behavior at score 1 and 2. This means that 10% of students could only reach the score 1, namely stating ideas, suggestions, or alternative answers, 20% reached the score 2, namely mentioning several ideas or alternative answers that were not always different, 50% reached the score 3, namely mentioning three different ideas, suggestions or alternative answers, 20% reached the score 4, namely mentioning more than five different ideas, suggestions, or alternative answers. For the originality indicator, a total of 45 % of students' skills were in the score 1 and 2 categories. It means that 10% of students could reach the score 1, namely, mentioned some common, logical, and relevant ideas to the given problem, 35% reached the score 2, namely mentioned some logically interesting and reasonably unique ideas, and relevant to the given problem. Meanwhile, a total of 55% of students were already at score 3 and score 4 of the originality indicators. The students could reach score 3, namely mentioned some unique ideas that are logically interesting, relatively new but less relevant to the given problem, with 35%, and score 4, namely mentioned some unique ideas that are logically interesting, fairly new, and relevant to the given problem with 20%.

Students' skill for elaboration indicator was still in the score 1 and 2, namely did not add details to existing ideas, so that the formulation of ideas was less applicable, with 15%, and explained some logical details on an existing idea, but not following the main idea concept, so that it could

not be used to clarify the idea, with 30%. Only 55% of students could reach the score 3 and 4 of the elaboration indicator, namely explained one logical detail on an existing idea so that the formulation of the idea becomes easier to apply and clear, with 40%, and explained some logical details on an existing idea so that the formulation of the idea becomes easier to apply clearly, with 15%. Students' creative thinking skills on the flexibility indicator showed that 60% of students were in score 1 and score 2. It showed that 25% of students could write down one answer that is quite logical and relevant to the given problem from one point of view, and 35% could write down some logical alternative answers but less relevant to the problem given from several different points of view. Meanwhile, only 40% of students got score 3 and score 4. Score 3 means that the students were able to write down some alternative answers that are quite logical and relevant to the given problem from several different points of view (30%). Meanwhile, score 4 means that the students were able to write down some alternative answers that are logical and relevant to the given problem from several different points of view (10%).

The results of the analysis also showed that a total of 65% of students were at the score 1 and score 2 of the metaphorical thinking indicator where 35% of students were at the stage of less able to combine relevant ideas to become a coherent unity and 30% of them were able to combine several relevant ideas but do not explain the formulation of ideas with a logical analogy. However, only a total of 35% of students were already on score 3 and score 4, namely, students were able to combine several ideas, modifying, but unable to explain the formulation of ideas with a logical and coherent analogy (25%) and combining several ideas, modifying, and explaining the formulation of ideas with a logical and coherent analogy (10%). Overall, students' creative thinking skills for all indicators showed that 51% of students got a score of 1 and 2, while 49% of students got a score of 3 and 4. Students with score of 3-4 got an average percentage of 49% obtained from the total percentage of each creative thinking indicator, including fluency, originality, elaboration, flexibility, and metaphorical thinking, divided by the total number of indicators.

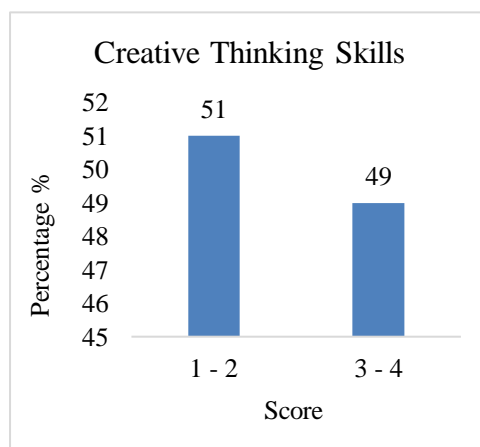


Fig. 1. Students' creative thinking skills for all indicators.

The following were examples of creative thinking questions and answers students gave in the preliminary analysis of creative thinking skills.

Table 3. Example of creative thinking questions.

Skills	Questions	Student Answers
Creative Thinking	After reading the article above, share your opinion about a person's attitude and behavior when just starting a business!	Student 1 First of all, we must have capital, then we hone the skills we have to have a business and try in earnest.
		Student 2 Strive diligently, get up early and routinely carry out business activities carefully.

Table 3. shows that students' answers were only limited to short answers without elaboration, which could indicate their creative indicators. Students did not provide answers that have a renewable value. They barely responded briefly and delivered a short response. Students have not been able to develop the attitude that an entrepreneur must own. Students' responses did not appear to be creative, indicating that more work was required in learning both methods and media and instructional materials. Thus, students' creative thinking skills can be improved in the future.

3.2 Critical thinking skills

Critical thinking skills were measured using an essay that consisted of 5 items. Based on the analysis of critical thinking test questions, it is known that the average critical thinking skills of class XI-MI 1 and XI-MI 2 students of the industrial mechanical engineering department at SMKN 1 Pariaman were still in the low category, equal to 49.2. The following is a statistical descriptive of students' critical thinking skills.

Table 4. Descriptive statistics of critical thinking skills per indicator.

Descriptive Statistics							
	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
Critical Thinking Skills	40	36	64	984	49.2	8.618218	74.27368
Valid N(listwise)	40						

Based on the results of the descriptive analysis, it is known that the critical thinking skills of students were still low, with an average of 49.2. The maximum score achieved by students was only up to 64, while the minimum score obtained by students was 36. The score also did not meet the minimum standard score that has been determined by the school, which was 75. This means that an effort was needed to improve students' critical thinking skills, either through learning methods, learning media, or teaching materials. The analysis of students' critical thinking skills for per indicator of critical thinking skills can be seen from Table 5.

Table 5. Student critical thinking skills score per indicator.

Number of Students	The number of students who get 1-2 and 3-4 scores on each indicator									
	<i>Focus</i>		<i>Supporting reason and reasoning</i>		<i>Organization</i>		<i>Convention</i>		<i>Integration</i>	
	1-2	3-4	1-2	3-4	1-2	3-4	1-2	3-4	1-2	3-4
40	22	18	32	8	10	30	18	22	20	20
Percentage (%)	55	45	80	20	25	75	45	55	50	50

Note: No one student got five scores for each indicator (0%) and critical thinking skills Per Indicator was adapted by Finken & Ennis (1993)

From Table 5, it can be seen that students' critical thinking skills on the focus indicator gained a total percentage of 55%, where students were only able to answer questions with answers at the score 1 and score 2 where all concepts are incorrect or insufficient, with 20%, and the idea was unfocused or exaggerated, or dubious, with 35%. The ability of students at the score 3 and score 4 obtained a total percentage of 45%, where students were able to provide answers with the criteria of some of the concepts were true and clear (40%), and most of the concepts were correct, obvious, but less specific (5%). No one student had been able to get score 5; namely, all concepts were correct, clear and specific (0%). The total percentage for students' abilities on the indicators of supporting reason and reasoning was 80%. Students could only reach the score 1, namely the reasons are not true (30%) and score 2 the answer description was not supportive (50%). As for the score 3 and score 4, it is known that the total percentage of students was as much as 20%, with details of students providing answers with criteria. A small part of the description of the answers is correct and clear, but the reasons and arguments are not clear (20%), while for criteria most of the descriptions of the answers are correct, clear, but less specific (0%). And also, there were no students who have reached score 5, namely with the criteria of all descriptions of the answers are correct, clear, and specific, supported by strong reasons, correct, clear arguments (0%).

Furthermore, on the organization indicator on students' critical thinking skills, students got a total percentage of 25% for the score 1 and score 2, with the categories such as the flow of thinking was not good (5%), and the flow of thinking was not good, the concepts were not interrelated (20%). Meanwhile, the total percentage at the score 3 and score 4 was 75% with the criteria such as the flow of thinking was quite good, to a lesser extent related to each other (40%), and the flow of thinking was good, some concepts were interrelated and integrated (35%), and no students got a score 5 in the category of good thinking flow, all concepts were interrelated and integrated (0%). It revealed that the total score of students at the score 1 and score 2 for convention indicator was 45% with the criteria of bad grammar (20%), and good grammar, incomplete sentences (25%). Meanwhile, the student's skill at the score 3 and score 4 of the convention indicator was total of 55% with the criteria of the grammar as quite good, there were spelling mistakes (50%), and grammar was good and correct, there were small

mistakes (5%). However, no one had obtained the highest score with the grammar being good and correct criteria (0%).

The next indicator was the integration indicator, with the percentage of the total skill of students at score 1 and score 2 was 50%. The criteria include; the overall aspect was insufficient (25%), and a few of the aspects that seem right (25%). Meanwhile, for the score 3 and score 4, a total was obtained 50% with the criteria most of the aspects seem correct (30%), and all aspects were visible, but not balanced yet (20%). There were no students who achieved the maximum score with the criteria of all aspects were visible, the evidence was good and balanced (0%).

Overall, students' critical thinking skills for all indicators were the same as creative thinking skills, where 51% of students got a score of 1 and 2, while 49% of students got scores of 3 and 4. It means that the flow of thinking of students was quite good, to a lesser extent related to each other and the flow of thinking was good, some concepts were interrelated and integrated. Students with a score of 3-4 got an average percentage of 49% obtained from the total percentage of each critical thinking indicator, including focus, supporting reason and reasoning, organization, convention, and integration, and divided by the total number of critical thinking indicators.

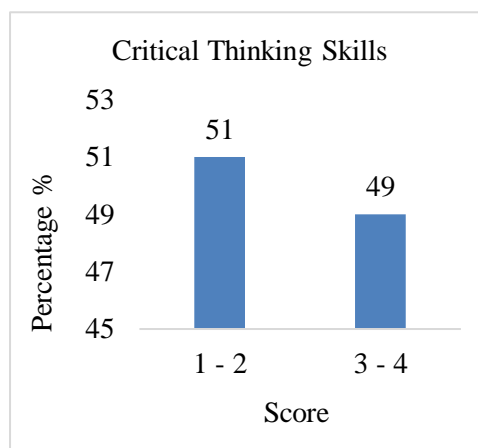


Fig. 2. Students' critical thinking skills for all indicators.

The importance of critical thinking in entrepreneurship material, namely critical thinking, is a powerful entrepreneur in carrying out business and making decisions to survive and progress. An entrepreneur must be able to analyze market needs and be able to solve problems. The ability to think critically helps entrepreneurs to find out how superior the product is and how to process the product so that it sells in the market. When critical thinking and creative thinking are combined, problem-solving or problem-based learning emerges. The following are examples of creative and critical thinking questions, along with examples of answers given by students in the preliminary analysis.

Table 6. Examples of critical thinking questions.

Skills	Questions	Student Answers
Critical Thinking	After reading the article above, analyze how to create business opportunities in your environment!	Student 1 By looking at the community's needs, such as when people need masks during a pandemic, so we can open a business to sell masks.
		Student 2 It must be started with capital and support from the family. Then with the family try to open a business such as selling and opening a food shop because food is a basic need, but the pillar is capital.

Based on the examples of student answers above, it can be seen that there were still students who relied on the family as a solution for business opportunities, and students were still not able to develop answers according to the indicators of critical thinking skills. Students only responded to the answers in general, not specifics. Thus, an effort to improve student's critical thinking skills was needed, both in learning and in terms of media and teaching materials.

4 Conclusion

Based on the results of the descriptive analysis, it was concluded that the creative thinking skill of students was still low, with an average of 50. The maximum score that students achieved was only up to 68, while the minimum score obtained was 20. The critical thinking skill of students was still low, with an average of 49.2. The maximum score achieved by students was only up to 64, while the minimum value obtained was 36. The score for creative and critical thinking skills still did not meet the minimum standard score that has been determined by the school, which was 75.

Overall, students' creative and critical thinking skills for all critical and creative thinking indicators, each of which obtained 51% of students who got a score of 1 and 2, while 49% of students got a score of 3 and 4. This means that an effort was also needed to be able to improve students' creative thinking and critical thinking skills through learning methods, learning media, or teaching materials. One of the efforts was developing creative and entrepreneurship product modules to improve students' creative and critical thinking skills. The development of modules based on 21st-century learning approaches, such as problem-based learning modules, was regarded as a feasible alternative due to the fact that learning in schools is still conducted online.

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References

- [1] Dewi F. Proyek buku digital: Upaya Peningkatan Keterampilan Abad 21 Calon Guru Sekolah Dasar Melalui Model Pembelajaran Berbasis Proyek. *Metod Didat*. 2015;9[2]:1–15.
- [2] Wagner T. The Global Achievement Gap, 21st Century Skills [Internet]. Vol. 29, *Journal of Physics D: Applied Physics*. 2008. 163–178 p. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21226399>
- [3] Ledward BC, Hirata D. 21st Century Skills for Students and Teachers. Honolulu: Kamehameha Schools, Research & Evaluation Division. 2010;1–25.
- [4] Forrester V, Hui A. Creativity in the Hong Kong classroom: What is the contextual practice? *Think Ski Creat*. 2007;2[1]:30–8.
- [5] McKendree J, Small C, Stenning K, Conlon T. The role of representation in teaching and learning critical thinking. *Educ Rev*. 2002;54[1]:57–67.
- [6] Daugherty R, Wilson H. *Human + Machine: Reimagining Work in the Age of Ai*. Boston: Boston: Harvard Business Review Press; 2018.
- [7] Sudira P. *TVET Abad XXI Filosofi, Teori, Konsep, dan Strategi Pembelajaran Vokasional*. Yogyakarta: Yogyakarta: UNY Press; 2017. 197–199 p.
- [8] Trilling B, Fadel C. *21ST CENTURY SKILLS learning for life in our times*. San Francisco: San Francisco: John Willey & Sons; 2009. 48 p.
- [9] Blegur J, Tlonaen ZA. Keterampilan Berpikir Kreatif dan Hubungannya dengan Hasil Belajar Peserta Didik. *J Kejaora (Kesehatan Jasm dan Olahraga)* [Internet]. 2017;2[1]:60–7. Available from: <http://dx.doi.org/10.1016/j.precamres.2014.12>
- [10] Mahanal S, Zubaidah S. Model Pembelajaran Ricosre yang Berpotensi Memberdayakan keterampilan Berpikir Kreatif. *J Pendidik Teor Penelitian, dan Pengemb*. 2017;2(5):676–85.
- [11] Tumurun SW, Gusrayani D, Jayadinata AK. Pengaruh Model Pembelajaran Discovery Learning terhadap Keterampilan Berpikir Kreatif Siswa pada Materi Sifat-Sifat Cahaya. *J Pena Ilm*. 2016;1[1]:101–10.
- [12] Treffinger DJ, Isaksen SG, Dorval . B. *Creative Approaches to Problem Solving: A Framework for Innovation and Change*. California: California: SAGE Publication, Inc.; 2003. 122 p.
- [13] Thompson C. Critical Thinking across the Curriculum: Process over Output. *Int J Humanit Soc Sci*. 2011;1(Special Issue-July 2011).
- [14] Nafiah YN, Suyanto W. Penerapan Model Problem-Based Learning untuk Meningkatkan Keterampilan Berpikir Kritis dan Hasil Belajar Siswa. *J Pendidik Vokasi*. 2014;4[1]:125–43.
- [15] Arifin S. The Role of Critical Reading to Promote Students' Critical Thinking and Reading Comprehension. *J Pendidik dan Pengajaran*. 2020;53[3]:318.
- [16] Suarsana IM, Mahayukti GA. Pengembangan E-Modul Berorientasi Pemecahan Masalah Untuk Meningkatkan Keterampilan Berpikir Kritis Mahasiswa. *J Pendidik Indones*. 2013;2[3]:264 75.
- [17] Zetriuslita, Ariawan R, Nufus H. Students' Critical Thinking Ability: Description Based on Academic Level and Gender. *J Educ Pract* [Internet]. 2016;7(12):154–64. Available from: <https://files.eric.ed.gov/fulltext/EJ1099476.pdf>
- [18] Finken M, Ennis RH. Illinois Critical Thinking Essay Test [Internet]. Illinois; 1993 [cited 2021 May 5]. p. 1–17. Available from: <http://criticalthinking.net/wp-content/uploads/2018/01/IICTEssayTestFinken-Ennis12-1993LowR-1.pdf>
- [19] Adam Jezard. The 3 key skill sets for the workers of 2030 [Internet]. World Economic Forum. 2018 [cited 2021 May 3]. Available from: <https://www.weforum.org/agenda/2018/06/the-3-skill-sets-workers-need-to-develop-between-now-and-2030/>

- [20] Jenny Soffel. What are the 21st-century skills every student needs? | World Economic Forum [Internet]. World Economic Forum. 2016. p. 1–7. Available from: <https://www.weforum.org/agenda/2016/03/21st-century-skills-future-jobs-students/>
- [21] Kate Whiting. What are the top 10 job skills for the future? | World Economic Forum [Internet]. The World Economic Forum. 2020. Available from: <https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/>
- [22] OECD. The Future of Education and Skills: Education 2030. OECD Educ Work Pap [Internet]. 2018;1–23. Available from: [http://www.oecd.org/education/2030/E2030_Position_Paper_\(05.04.2018\).pdf](http://www.oecd.org/education/2030/E2030_Position_Paper_(05.04.2018).pdf)
- [23] Soltanifar M, Hughes M, Göcke L, editors. Digital Entrepreneurship. Future of Business and Finance. Future of Business and Finance; 2021. 22–26 p.
- [24] Akpur U. Critical, Reflective, Creative Thinking and Their Reflections on Academic Achievement. *Think Ski Creat.* 2020;37.
- [25] Rivas PG. Strategies for Teaching and Dissemination of Artistic Heritage by Promoting Critical and Creative Thinking Among Future Primary Education Teachers. *Procedia - Soc Behav Sci* [Internet]. 2017;237(June 2016):717–22. Available from: <http://dx.doi.org/10.1016/j.sbspro.2017.02.112>
- [26] Lestari D, Haryani S, Sumarti SS. Analysis of Critical Thinking Skills in Vocational High School Automotive Engineering Students. *J Innov Sci Educ.* 2020;9[1]:103–8.
- [27] Samani M, Sunwinarti S, Putra BAW, Rahmadian R, Rohman JN. Learning Strategy to Develop Critical Thinking, Creativity, and Problem-Solving Skills for Vocational School Students. *J Pendidik Teknol dan Kejuru.* 2019;25[1]:36–42.
- [28] Sudana IM, Oktarina N, Apriyani D, Ali T. An Implementation of HOTS Based Learning Strategy in Vocational High Schools. 2020;13(12):1327–40.
- [29] Subijanto, Sumantri D, Martini AID, Murdiyaningrum Y, Soroeida T. *Kesesuaian Kurikulum SMK Dengan Kompetensi Yang Dibutuhkan Dunia Kerja.* Jakarta: Kementerian Pendidikan dan Kebudayaan; 2019. 104 p.
- [30] Treffinger DJ, Ritter SM, Mostert N, Young GC, Selby EC, Shepardson C, et al. *Assessing Creativity: A Guide for Educators* [Internet]. Journal of Education and Learning. 2002. 121p. Available from <http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED505548%0Ahttp://dx.doi.org/10.1007/s41465-016-0002-3>