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Implementation of BMC-based teaching and learning factory model in increasing student competencies in leather creative skills concentration and imitation in vocational school

Cucu Sutianah *, Meita Annisa Nurhutami, Alfian Azhar Yamin
Universitas Pendidikan Indonesia, Indonesia..
* Corresponding Author. Email: cucusutianah34@gmail.com

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ABSTRACT

Learning in vocational education must be carried out with collaboration between educators, vocational schools, curriculum alignment, and learning in factories as miniature industries stakeholders to achieve assessment in the form of real assessment so that the achievement of learning objectives follows the needs of students and the world of work. Assessment in the form of assessment must be measured in real terms, with religious, character, moral, and cultural education values and work competencies following community expectations. The objectives to be achieved through this research are to produce a learning program that can improve student competence in Vocational High School (VHS), including identifying the current condition of learning implementation, obtaining learning planning findings, obtaining learning implementation findings, obtaining findings regarding the assessment of learning outcomes, identifying supporting and inhibiting factors, knowing students' perceptions of the implementation of the BMC-based teaching and learning factory model in improving student competence in the concentration of leather and imitation craft design and production expertise in VHS. With the implementation of a learning system using a block system as a teaching and learning factory, the implementation of learning must stimulate students to be more active in improving social skills, emotional skills, spiritual skills, scientific skills, mental skills, kinesthetic skills, as well as entrepreneurial skills, work ethics and safety, and work safety and the environment, which in turn can improve the competence and entrepreneurial character of students, following the vision and mission of the education unit.

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INTRODUCTION

Participants are educated graduates of Vocational High School (VHS) expected to become pious human beings, have work skills or competencies following the hope industry, and be spirited, creative, innovative, sporty, and entrepreneurs based on life skills or prowess life, which needed public, as well as produce a product which has score economical as support economy national (Rukmana et al., 2021). It means process education must produce a Source of Power Man (HR) that can humanize humans to be accepted in the human environment and between humans with human

values and norms directed at learning for life (Andra et al., 2022). Efforts to reach learning for life must embodied with an innovative curriculum that becomes curriculum implementation or customized curriculum with needs participant education and the needs of the world of work real method/model (collaborative learning) in order to produce creativity that is realized in an innovative, real medium, real assessment, real job, real results, real word and real life (life skills) (Diwangkoro & Soenarto, 2020).

Implementation of the learning process and, more broadly, the scope of education must result in competency, not a score result of one course because after the plunge to public, institution education or sector industry, results learning be measured with competent and not yet competent. Produce competence is a learning process leading to work competence to sustain life. The definition of competence must be viewed more broadly (Mourtzis et al., 2020). namely a combination of the realm of knowledge, concepts, rational views, the realm of hard skills that forms practice skills and ability as well as intelligence actual, then the realm of soft skills, which is embodiment from characters individual which next showed with prowess, emotional, prowess social, prowess spiritual, mental skills (morals, attitudes, personality, values and norms, behavior, act in demand, character, ethics, aesthetics and polite) as well as prowess kinesthetic.

Program synergy or integration of hard, soft, and life skills in learning should already be implemented in the 21st Century Education today. One of the characteristics of learning in the 21st century is a collaboration between good individuals, educators, and students in an integrated learning process, interacting between competence in a group with develop creativity embodied in innovation with the Teaching And model learning based on life skills (Zancul et al., 2020). The learning model assessed as the container for connect-between-eye lessons, called inter-multidisciplinary thinking, combines various domains of each competency resulting from the evaluation development of innovative learning, which positively impacts students' competence. This is evidenced by the value of learning outcomes for students who, on average, improved better than before. Besides, quality study participants are educated intellectually, emotionally, spiritually, and more focused.

Based on various views as well activities based on hard skills, soft skills, and life skills, the has a positive impact, so that push especially the role of educators to further maximize the hard synergy skills, soft skills, and life skills into the integrated learning process in reach enhancement competence participant educate following level development and needs. It is against this background that we, as the authors, are interested in conducting more in-depth research on the synergy of hard skills, soft skills, and life skills in model learning (Santosa, 2018).

Become consideration why use model teach and learning factory in implementation learning in one semester which juxtaposed with eye lesson product creative entrepreneurship which produce goods or services, or appropriate technology, so that learning becomes more meaningful, full of creativity which is manifested in an appropriate innovation with the demands of industry, institutions, and society, or life skills (Lestari et al., 2021). In efforts to realize various innovations, institutions take advantage of the potential and services of participants to educate process study, teach get and deepen as well as expand theory lectures (Elbestawi et al., 2018). This learning model can combine several eye lessons in an expertise study program in one semester, but what is seen is the essence of each subject, so there will be efficiency, effectiveness, and meaningfulness in studying needs-based in a public manner.

Destination education in VHS development not only fulfills the need for job positions in industry or continuing education to a higher level but is more focused on developing entrepreneurial character for stock independence in the public (ElMaraghy et al., 2017). Development VHS moment this, determined by the network built on government, good both at the central and national level (Jooste et al., 2020). Understanding which appropriate vocational development programs by various parties conducted steps strategically, particularly in planning and implementation by VHS administrators, good in the center, province, district, and city, other related agencies as well as society and world effort (Andersen et al., 2019).

VHS graduates must have faith and piety, have a mind and noble character through learning, and develop creative, innovative, sporty, and entrepreneurial (Triyanto et al., 2019). Process learning must support the development of economic creative and creative industries, namely the development of economic activity based on creativity, skill, and talent participants' education to create creative

power and individual creativity, which worth economical and have score sell, as well as take effect on well-being Public Indonesian (Simanjuntak, 2021). Implementation service prime education medium vocational for form graduate of which able and have religious education, moral education, character education, cultured education with a soul Entrepreneur, smart, ready to work, competitive, and have the teak self nation, as well as capable develop superiority local and can compete in the market (Bauer et al., 2018).

VHS education must be run based on the principle of investment in human resources (human capital investment); the higher the quality of education and training received by somebody, the more productive the person so that apart from improving productivity, increase also increases power energy competitiveness work in market work global. Efforts in competing in the global market, process learning in VHS, centered on making products that score economically according to the package of expertise. VHS must adopt values applied in carrying out disciplined work, be obedient to the principles, be effective and efficient, be responsible, and have a good work ethic (Mourtzis et al., 2020). With the deep effort to reach the destination, quality education must continuously improve.

Quality education related to process and product quality. Process quality could be achieved if learning is going on effectively, and students can appreciate and carry out the learning process meaningfully (Pittich et al., 2020). Quality products are achieved if participants are educated and show a high level of mastery of tasks studied following their needs in life and demand world work, good work in industry, or work as an entrepreneur. As an education system, VHS has a chance to follow as well as in a development system economy that rests on strong people and permanently grows in crisis (Büth et al., 2018). Efforts reach results the system economy national need sustained by perpetrators business which creative, innovative and powerful stand to change (Kucukaltan et al., 2022; Suhariyanto, 2019; Tvenge et al., 2016). Learning activities in VHS have potency, designed as a vehicle for developing potential perpetrator entrepreneurs who are creative, innovative, and have the power to change.

Learning moment this in VHS, yet to be able to produce students with the attitude, character, entrepreneurial behavior, and life skills. Many VHS graduates still need to work or are self-employed because they are unable to meet the work competencies required by the industrial world and create their own employment. Often, the industrial world finds that graduates of VHS entering the workforce need more provisions adequate for the expected qualifications of workers. VHS students must be prepared to do some of the activities that make it possible to become entrepreneurs following the concentration of expertise they chose.

The phenomenon is not optimal; mastery of work competence and entrepreneurial character by students caused by several factors among other responses participants educate to entrepreneurship, the ability of the teacher to convey method learning as well as still at least, involvement of the business world to participate in creating graduates which have the strong entrepreneurial spirit (Centea et al., 2019). VHS must work together in partnership with the world effort and the industrial world in an inherent, tenuous, or detached manner. With working models like this, the VHS graduate preparation program can achieve the maximum with complete skills, i.e., theory, practice, and work.

VHS, as an important part of the vocational education system in Indonesia, consists of a special field of expertise in arts and creative economy, namely concentration on craft products, leather, and imitation to equip students with skills, knowledge, and attitude, an entrepreneurial character in order to have competence in the product design of various bases legs, bags and non-fashion using leather or imitation.

Another potential possessed by Bandung, Garut, Indonesia as a city of creative industry or economy, leather and imitation craft products provide enormous opportunities for employment creative craft product design vocational high school graduate leather and imitation, to become one of the important parts of the new development direction of field arts and creative economy. Related to enhancement competence, participants should learn PKK integrated with eye lesson general and project real subjects concentration expertise (Louw & Droomer, 2019).

Results study about learning held in VHS observed not being able to produce graduates with the attitude, character, behavior, culture, and manners to work and not yet comply with K3LH, so many graduates of VHS still need to be ready for independence. This condition occurs because graduates have yet to meet the required competencies in the industry world and cannot open jobs

independently. On recruitment, often the industrial world gets participants educated, which enter the workforce, need more provisions for qualification expected worker. Even after not being accepted into the industry, I am not interested in entrepreneurship. High school graduates must be prepared in the process and results study, which can develop an entrepreneurial character to open the field work and entrepreneurship, according to the package chosen skill (Mudassar et al., 2018).

The condition here that drives us, the researchers, to study for the plan, doing process learning which integrates several eye lessons General in form project strengthening profile Pancasila student, culture work and K3LH, project and required interest and eye lesson project creative entrepreneurship, in implementation of the BMC-Based Teaching and learning factory learning model for increase competence participant design education and production crafts at VHS (Mavrikios et al., 2018).

BMC-based teaching and learning factory learning model based on the demands of the 2021 Education Unit Operational Curriculum (KOSP), project-based learning models, industry and work culture learning in the world of work, support for quality education and training that is oriented towards school relations with the industrial world and the business world in implementing production units in schools. Another basis is the increasingly high cost of materials for student practice, equipment that must be maintained in standard conditions, motivation to improve welfare for school members, and self-confidence and pride for its graduates (Lindvig & Mathiasen, 2020; Umeda et al., 2019). In general, the teaching factory learning model aims to train students to achieve punctuality the quality demanded by the industry, prepare students according to their competency skills, instill a work mentality by adapting directly to industrial conditions and situations, and master managerial skills and be able to produce products. So, that has industrial quality standards.

RESEARCH METHOD

The approach in this study uses mixed methods developed by Creswell (2014). Mixed method research is mixed research that combines qualitative research with quantitative research. Figure 1 is a chart of the mixed-method research design used in this study.

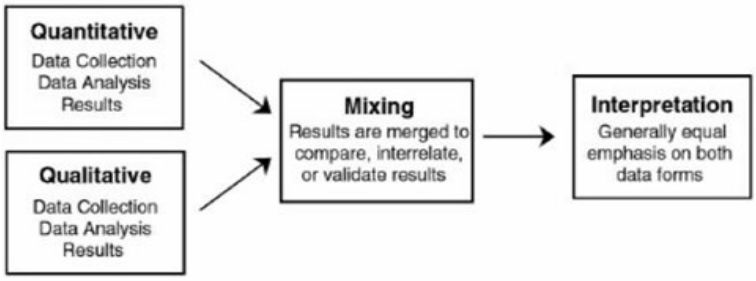

Figure 1. Mixed Method Flowchart
(Source : Creswell (2014))

This type of mixed research is a triangulation design based on the researcher's goal of obtaining different but complementary data to examine research problems with the same topic (Mourtzis et al., 2020). Furthermore, researchers want to directly compare and contrast quantitative statistical analysis results with qualitative findings to validate the quantitative results with qualitative data obtained so that they are more comprehensive, valid, reliable, and objective.

The design of this study was a quasi-experimental study with a control group pretest-posttest design, where research data could be collected before and after intervention or treatment. The qualitative method used to describe related details implementation of learning models BMC based teaching and learning factory for enhancement competence participant educates on concentration creative craft product design expertise leather and faux. In contrast, quantitative methods used to see development competence think critical participants educate from the pretest and posttest results.

This research pretest was conducted before the intervention, and the posttest was conducted after the intervention. Activities studies preliminary development design learning covers activities as follows. Studies field addressed the condition of readiness subject and object for application of models. This activity covers the survey at SMK Negeri 3 Tasikmalaya, concentration subject project creative craft product design skills Leather and Faux, subjects PKK, related to planning, process, and evaluation activity ordinary learning done by teachers. The survey covers the use of facilities and infrastructure, resources study, state students, and climate school in a general manner.

Next, study and analysis of draft or theory learning constructivism models, teaching models, learning approaches and strategies, and results study previously related to developing learning models eye lesson productive (Büth et al., 2018; Lang et al., 2018). Finally, a review and analysis of the 2021 KOSP document was conducted, especially in the general subject group, creative craft product design, leather and imitation craft project concentration subjects, PKK subjects, and several guidelines on curriculum implementation.

The activities of preparing and developing learning models include the preparation of learning constructs and models in general subjects, subjects with a concentration of expertise in the design of creative leather and imitation craft products in PKK P5BK K3 LH subjects. The constructs and models are then discussed with all subject teachers, industry practitioners, curriculum experts, heads and deputy principals, and school committees to obtain validation. The activity was carried out using the direct focus group discussion method.

The model trial is conducted in a limited environment. Analysis of the trial results is carried out through activities to determine the place of limited trials, conduct limited trials, analyze or evaluate the results of limited trials based on predetermined criteria, and improve the learning model through trials on a wider scope so that an adequate model is obtained and ready to be tested for validity. Validation of the learning model is carried out to determine the experimental group and control group, research into the field, validation test on a predetermined sample, analyze or evaluate the validation test results, and compile a report on the validation test results.

The validation test tests the BMC model learning program based on a teaching and learning factory resulting from a wider trial. The validation test is related to the implementation and the quality of the model, as seen from the success of increasing the competence of education participants and the impact of mentoring. By conducting the validation test, the effectiveness of the learning program model that will be developed can be known. The validation test was carried out on four study groups, namely class XII students in the creative concentration of leather in the subject of workshop and entrepreneurship skills in leather craft product design and imitation. This validation test obtained a reliable learning program model and is ready to be implemented in VHS.

The stages used as a reference in implementing the BMC-based teaching and learning factory learning model are as follows: (1) Studying the analysis of the Merdeka Curriculum syllabus in the leather and imitation craftsmanship concentration subjects; (2) Developing a full block system schedule for 1 Semester; (3) Developing programs and carrying out syllabus analysis; (4) Designing Product Manufacturing Plans (RPP) and teaching materials according to product types using BMC-based teaching and learning factories; (5) Developing appropriate research grids and instruments to measure the results of the implementation of BMC-based teaching and learning factories, in improving competencies including, pretest questions, posttest questions, knowledge test questions according to the subjects taught, observation sheets of hard skills and soft skills, and soft skills of PKK subjects, real projects for the concentration of leather and imitation craft product design expertise.

The next activity was to test the research instruments to obtain the validity and reliability of the questions, difficulty level, and differentiating power. After the test was carried out, the next step was to make improvements based on the results of the instrument trials that had been carried out. The next stage of activities is to carry out industrial visits and direct observation of the world of work that is relevant to the competence of expertise, make industrial visit reports in the form of papers and presentation slides, presentations of industrial visit groups, make agreements between teachers and students, practice communicating in the workplace with customers in product manufacturing and marketing.

FINDINGS AND DISCUSSION

The competence resulting from learning using the BMC-based teaching and learning factory model or using the conventional model is described in cognitive scores and vocational competence. The research results show that the average cognitive gain of experimental group students is relatively higher than the average cognitive gain of control group students (see Table 1). This shows an increase in the cognitive ability of students whose learning uses the BMC-based teaching and learning factory model rather than learning using conventional models. The average confidence interval of the competence of experimental group learners from all projects undertaken is the same as the average gain. Learners' competence significantly differs between the experimental and control groups in terms of the projects undertaken.

The project competency scores of learners who took part in learning using the BMC-based teaching and learning factory learning model were significantly higher than those of learners who took part in learning using the conventional model. The description of learner competence shows that the BMC-based teaching and learning factory model is highly effective in improving learner competence in PKK, P5BKK3LH, and real project subjects in the concentration of expertise. Other data about learners tested for validation are the ability of soft skills, hard skills, learners' perceptions of the learning model, data on learner attendance, application of work culture, adherence to K3LH, and SOP standards, which are described in Table 1.

Table 1. Perception of Student Entrepreneurship Character Development

Group	Treatment	Statistics	Leather Craft Product Design
Experiment	Pre test	N	32
		Average	63.35
		Std. Dev.	3.7
		Max	70
		Min	55.83
	Post test	N	32
		Average	73.84
		Std. Dev.	7.49
		Max	89.17
		Min	63.33
	N-Gain	N	32
		Average	0.06
		Std. Dev.	0.04
		Max	0.15
		Min	0.01
Control	Pre test	N	36
		Average	62.66
		Std. Dev.	4.9
		Max	69.17
		Min	53.75
	Post test	N	36
		Average	63.78
		Std. Dev.	3.82
		Max	69.17
		Min	56.25
	N-Gain	N	36
		Average	0.01
		Std. Dev.	0.01
		Max	0.02
		Min	0

The overall average acquisition of soft skills of experimental group students after participating in learning with the BMC-based teaching and learning factory model shows an increase. The soft skills ability of students is in the sufficient category after participating in learning with the BMC-based teaching and learning factory model. Students' total soft skill ability after participating

in learning by using the BMC-based teaching and learning factory model is higher than the average value. The overall average acquisition of hard skills of experimental group students after participating in learning by using the BMC-based teaching and learning factory model shows an increase. Learners' hard skills are in the high category after participating in learning with the BMC-based teaching and learning factory model. The BMC-based teaching and learning factory model can significantly improve students' hard skills.

Based on the research data, learning using the BMC-based teaching and learning factory model can improve learning achievement. Using the BMC-based teaching and learning factory model exposes learners to a new atmosphere and experience in teaching and learning activities. The new experience that learners feel is that students must be able to apply what they have learned in a new place in the form of an industrial situation so that students feel the need to master the concepts and skills needed before doing the next profession. A person's behavior changes can be triggered based on experiences gained through observation, hearing, reading, or imitation. The direct experience gained by learners from BMC-based teaching and learning factory is expected to develop the potential of learners as a whole and in-depth, both personal skills, social skills, emotional skills, academic skills, and vocational skills following the demands of competency standards.

The BMC-based teaching and learning factory learning model will further improve learning outcomes because students will directly apply knowledge, psychomotor, and attitudes in the form of creativity and innovation, application of work culture, and HSE, which are obtained during practical learning. Learners are required to learn independently with direct supervision by the teacher so that the learning carried out will take place in an organized manner, and this condition will make learners feel important because they can independently acquire practical skills following relevant knowledge. This organized learning condition makes learners feel needed and important. When learners make clothing orders to serve consumers, they must learn by extracting information from guidebooks or other sources. The aim is that learners can fulfill consumer requests, which is needed to answer and satisfy the consumers they serve. This sense of responsibility towards consumers makes learners more independent in learning and practicing.

Table 2. Students' Perception of Conventional Learning in the Experimental Group

Data	Average Student Perceptions of Conventional Learning Control Group	Criteria
N	23	
Average	56.17	
Std. Dev.	3.59	Average
Max	62.50	
Min	50.50	

Experimental group students' perceptions of conventional learning models decreased after students took part in learning with the BMC-based teaching and learning factory model. Based on the results of data analysis, it is known that students' perceptions of conventional learning models are lower than those of BMC-based teaching and learning factory models. Thus, the BMC-based teaching and learning factory model has fulfilled the ideal value students desire. This means that the BMC-based teaching and learning factory model is preferred by learners over conventional learning models.

In essence, the BMC-based teaching and learning factory model is based on the following assumptions and rationale: (1) Vocational education must be organized holistically, realistically, and realistically as in the world of work so that all aspects of learners' potential can be developed; (2) Learners must be trained in reconstructing knowledge as well as being able to construct thoughts; and (3) Education in VHS does not solely focus on vocational skills, but also includes academic skills, personal skills, social skills, emotional skills, communication in the workplace, man work and HSE, and complying with SOPs/work sheets.

Table 3. Average Student Perception of Conventional Learning in Control Group

Expertise Program	Criteria	Interval	Frequency	Percentage
Leather and Imitation Crafts	Very High	80.1 - 100.0	0	0
	High	60.1 - 80.0	0	0
	Currently	40.1 - 60.0	19	82.61
	Low	20.1 - 40.0	4	17.39
	Very Low	1.0 - 20.0	0	0

Based on the data in Table 3, it can be explained that the average perception of students in the control group towards conventional learning is in the medium criteria. This data shows that students feel normal with conventional learning. The following presents the perceptions of experimental group students towards the BMC-based teaching and learning factory model presented in Table 4.

Table 4. Student Perception of Teaching and Learning Factory Learning Model based on BMC Experiment Group

Expertise Program	Criteria	Interval	Frequency	Percentage
Expertise concentration in leather and imitation creative craft product design	Very High	80.1 - 100.0	18	78.26
	High	60.1 - 80.0	5	21.74
	Currently	40.1 - 60.0	0	0
	Low	20.1 - 40.0	0	0
	Very Low	1.0 - 20.0	0	0

Table 4 shows that the experimental group students' perceptions of the BMC-based teaching and learning factory model learning are in very high criteria, namely 78.26%. Furthermore, Table 5 explains that the average student perception of implementing the BMC-based teaching and learning factory learning model is very high, with a value of 87.93. This criterion shows that students feel enthusiastic, happy, and excited about implementing the BMC-based teaching and learning factory model.

Table 5. Average Student Perception of Teaching and Learning Factory Model Implementation Based on BMC Experiment Group

Data	Vocational High School A	Criteria
n	23	
Avarage	87.93	
Std. Dev.	5.20	Very High
Max	98.5	
Min	78	

More clearly, the following presents the average perception of students towards learning by using the BMC-based teaching and learning factory model. The soft skills of learners that develop during the use of the BMC-based teaching and learning factory model are the ability to negotiate in project work, communicate in the workplace, express willingness and interest in project work, submit the final results of work, comply with SOPs, obey Work Culture and HSE, punctuality in project work, punctuality in attendance at work, and punctuality in worship or religious spirit (faith and devotion to Allah SWT God Almighty, experienced a positive and significant increase.

The results of the data calculation show that implementing the BMC-based teaching and learning factory model can improve students' soft skills. The hard skills of learners in the BMC-based teaching and learning factory model include analyzing projects, creating new, unique, and different types of projects or products of goods and services so that they become solutions, the ability to determine the main and supporting materials for doing projects, the ability to operate and maintain the main and supporting tools, the ability to work on projects, comply with SOPs, implement work culture and HSE, and carry out quality control. The hard skills of students while using the BMH-

based teaching and learning factory model have increased significantly and positively. In terms of entrepreneurial character development, the application of the BMC-based teaching and learning factory model and digital marketing in marketing the results of students' professions or projects, including achievement motivation, future orientation, business networking, leadership, and responsiveness and creativity to change, online shop implementation shows a positive and significant increase. This proves the BMC-based teaching and learning factory model can develop entrepreneurial character and digital markets through online shop implementation in marketing development.

The condition of learning implementation at the VHS, where the research was conducted, is a center of excellence school that uses the Merdeka Curriculum. As the implementer of the teaching factory program, it can be described as follows: lesson planning (RPP) has been previously prepared by the subject teacher by including components of subject identity, Core Competencies (KI), Basic Competencies (KD), indicators, learning objectives, theoretical learning materials, sources, tools, materials, learning methods or approaches, learning activities, and evaluation. Teachers make teaching materials, job sheets, and evaluation instruments for knowledge, psychomotor, and attitude. The preparation of lesson plans still needs sharpening on competency indicators cognitive, psychomotor, attitudes, work culture, and HSE, which follow learning objectives.

The implementation of learning has been carried out quite well but still requires development in achieving the expected competency indicators. Implementing general subject learning, basic vocational projects, the concentration of expertise projects, PKK, and P5BK K3LH has only fulfilled the value of assignments. It has yet to be directed at making projects with economic value following customer expectations. Entrepreneurship learning has only instilled the concept of entrepreneurial character and has yet to focus on developing student entrepreneurial character. The learning process of general courses, basic vocational projects, the concentration of expertise projects, PKK, P5BK K3LH are still separated and not fully integrated according to the needs of students, the world labor market, so that the time to achieve competence becomes longer and even the desired competence is not achieved due to time delays. Learning implementation has yet to be oriented toward achieving competency indicators. It has not been following learning objectives, so a learning model is needed that can position students to learn to develop creativity and entrepreneurial character and can be used to improve my competence.

Observations of learning outcomes evaluation planning and implementation have gone quite well. However, sharpness is needed in formulating aspects and indicators of competency achievement in general subjects, basic vocational subjects, concentration of expertise subjects, PKK, and P5BK K3LH. In addition, completion time has yet to be calculated based on industry-standard time efficiency. Implementation of tasks is carried out separately from each subject. It is necessary to utilize the learning process time in an integrated, collaborative manner to achieve the expected competencies. Attitude assessment is more directed at the attitude of work culture, K3LH, how to communicate correctly in the workplace, and not only on attitudes in the form of soft skills.

Evaluation of learning outcomes is still influenced by the formality of assessments limited by KKM, so students have yet to interpret the assessment because it is only limited to fulfilling report cards. Learning facilities and infrastructure follow industry standards but are only used conventionally and conditionally when learning takes place, and their use has yet to be optimally, efficiently, and effectively utilized without any income for practical and maintenance costs. Teachers and education personnel have been certified following their educational background, as a professional teacher, and as a requirement as an assessor (Nurhasanah et al., 2022).

Preparations for the implementation of learning have been carried out quite well and completely but still need improvement to facilitate the implementation of this model. Based on the results of observations covering the process of changing school management to industrial management, communication training activities in the workplace, negotiation projects, and practice analyzing projects have been running with good enough criteria. However, it is very necessary for teachers of general subjects, basic vocational projects, the concentration of expertise projects, PKK, and P5BK K3LH to more thoroughly understand the process, stages, and steps of implementing the BMC-based teaching and learning factory model, either through workshops, seminars, and other discussions.

Based on the observations, the implementation of the BMC-based teaching and learning factory model at the preliminary stage, namely the project negotiation step, the step of analyzing the project, and the step of declaring the project's workability, has been carried out well, it is very necessary to understand the concepts and practice communication and analyzing projects continuously, to improve the quality of the next implementation. Implementation at the core stage includes the step of doing the project, the step of doing quality control, the step of submitting the final project results, and it has been done well, but it is still necessary to do careful quality control to improve the quality of the next project work.

As consultants, assessors, and facilitators for teachers of subjects in the concentration of expertise in creative leather and imitation craft product design, including general subjects, basic vocational projects, concentration of expertise projects, PKK, and P5BK K3LH, it has done quite well, but still needs a more intensive understanding in formulating the aspects and indicators needed in the assessment of related subjects.

Cognitive assessment is obtained from project analysis exercises and the implementation stages of the BMC-based teaching and learning factory model. The results of the cognitive ability assessment show a significant increase so that students can link essential subjects into creativity and realize them in innovation and have an average of mostly high criteria, including for the experimental class. The control group was at medium criteria. The assessment of results during project negotiations experienced a significant increase, especially during project work and the final project. The average improvement at these stages is mostly at high criteria. The results of observations on the hard skills show a significant increase. This can be seen from the implementation of the steps of analyzing projects, working on projects, carrying out quality control, and applying work culture and HSE, and it can be concluded that the average increase at these stages is mostly at high criteria (Rukmana et al., 2021).

There is no significant difference between the perceptions of educated participants towards conventional learning models at the beginning and end of learning in the control class. While in the experimental class, there was a significant change and decrease. Based on these data, it shows that the experimental class negatively assessed the conventional model. The experimental class students' perceptions of the implementation of the BMC-based teaching and learning factory model are included in the high criteria, especially in improving the competence of students with the concentration of leather and imitation craft product design expertise, developing entrepreneurial character, applying BMC, applying work culture and HSE, and how to communicate work in the workplace. This illustrates that students in the experimental class took part in learning happily and enthusiastically. Furthermore, the research data proves that there has been an increase in students' cognitive abilities, soft skills, hard skills, and entrepreneurial character.

Students' perceptions of entrepreneurial character development are significantly different, on average, most of the students in the experimental class, most of them are in the high criteria, while the average in the control class is in the medium criteria. Implementing the BMC-based teaching and learning factory model in improving student competence in the concentration of creative leather and imitation craft product design expertise entrepreneurial character development has increased cognitive knowledge, hard skills, soft skills, and student entrepreneurial character values. This achievement is reflected in the achievement of each aspect and indicator, which includes achievement motivation, future orientation, business leadership, business networking, responsiveness, and creativity, all of which are at high criteria. The results of combining the six steps in the implementation of the BMC-based teaching and learning factory model with the development of entrepreneurial character, work culture, and HSE are at high criteria.

Supporting factors in the implementation of the BMC-based teaching and learning factory model are that the VHS learning place is a center of excellence school, which uses the Merdeka Curriculum, which has been aligned with the needs of students and the world of work which has been supported by human resources, infrastructure, and learning facilities following industry standards. The VHS management is very supportive of implementing the BMC-based teaching and learning factory model with a concentration of expertise in creative leather and imitation craft product design, with the hope that it can mutually support the implementation of production unit activities with the learning system so that it is relevant to the needs of education participants and the world of work.

Teachers with a concentration of expertise in creative leather and imitation craft product design, general subjects, basic vocational subjects, the concentration of expertise subjects, PKK, P5BK K3LH, are very enthusiastic and eager, supporting the implementation of the BMC-based teaching and learning factory model, with the hope of increasing students' knowledge, skills, attitudes, learning motivation and creativity and innovation, increasing the implementation of work culture and K3LH, and instilling Pancasila character and student behavior following the demands of society, stakeholders, students and the needs of the world of work. The learning infrastructure for practical learning of the concentration of expertise in creative leather and imitation craft product design, general subjects, basic vocational subjects, concentration of expertise subjects, PKK, and P5BK K3LH follows industry standards (Diwangkoro & Soenarto, 2020).

The inhibiting factors in the implementation of the BMC-based teaching and learning factory model are that, at first, it takes time and serious effort to convince the Principal, as the highest policyholder in the school, to make it easier to change school management into industrial management so that it requires scheduling adjustments in the concentration of expertise in leather and imitation creative craft product design, general subjects, basic vocational projects, expertise concentration projects, PKK, and P5BK K3LH in implementing the BMC-based teaching and learning factory model with a block system.

Another obstacle is the difficulty in changing school management to industrial management so that teachers and students must be able to understand learning in an industrial setting. In addition, a small number of teachers are still resistant to the step-by-step implementation of the BMC-based teaching and learning factory model and a need for more understanding of implementing the BMC-based teaching and learning factory model. Teachers' efforts as facilitators and assessors still need to be improved, especially in creating an industrial atmosphere where students are directed to actual learning conditions, like production activities in an industry. There still needs to be more clarification as to whether the implementation of the BMC-based teaching and learning factory model is supported by a school production unit in procuring projects that must be done in the implementation program of the BMC-based teaching and learning factory model.

In observations made by researchers on the ability to develop entrepreneurial character, the application of BMC, and the digital market, there is a significant difference, namely having an average with high criteria. These results are evidenced by the achievement of aspects and indicators of the entrepreneurial character of students, which include achievement motivation, future orientation, business leadership, business networks, and responsiveness and creativity to change combined with the application of stages in the implementation of the BMC-based teaching and learning factory model. The process of developing students' entrepreneurial character has gone well. For teachers of fashion and entrepreneurship skill packages, it is necessary to understand the concepts, aspects, and assessment indicators of entrepreneurial character achievement following the objectives of implementing the BMC-based teaching and learning factory model (Zancul et al., 2020).

This research has produced a learning model to improve the competence of creative craft product design expertise in the concentration of leather and imitation product design through implementing the BMC-based teaching and learning factory model. Improving the competency process of creative craft students through the implementation of the BMC-based teaching and learning factory model, with the development of the second step regarding project negotiations, in addition to model identification, model adjustment, materials, and supporting tools, size adjustments must be made for drawing techniques, either by taking the appropriate project size or taking measurements. Learners should provide information on the project's usefulness related to comfort, beauty, and personality.

Developing hard skills, namely the fifth step, is to carry out quality control, with sub-steps including checking the project's suitability when handing over the final project results to the customer. The development of these sub-steps follows the demands of the SOP in the creative craft concentration of leather and imitation product design.

CONCLUSION

Based on observations, the planning and implementation of learning outcomes evaluation has been running quite well. However, it needs sharpness in formulating aspects and indicators of competency achievement in general courses, basic vocational projects, concentration of expertise projects, Entrepreneurship Creativity Projects (PKK), Project Strengthening Student Profiles Pancasila Work Culture, Safety, and Security in the Workplace (P5BK K3LH). The completion time has yet to be calculated based on industry-standard time efficiency. Implementation of tasks is carried out separately from each subject. It is necessary to utilize the learning process time in an integrated, collaborative manner to achieve the expected competencies. Attitude assessment is more directed at the attitude of work culture, security, safety, and security in the workplace (K3LH). Learning infrastructure facilities follow industry standards but are only used conventionally and conditionally for learning, and their use has yet to be optimized, efficient, and effective. Teachers and education personnel have been certified according to their educational background.

The preparation for the implementation of learning has been carried out quite well and completely but still needs improvement to facilitate the implementation of this model. Based on the results of observations covering the process of changing school management to industrial management, communication training activities in the workplace, project negotiations, and project analysis training have been running with good enough criteria. However, it is very necessary for teachers of general subjects, basic vocational projects, concentration of expertise projects, Entrepreneurial Creativity Projects (PKK), and Project Strengthening Student Profiles Pancasila Work Culture, Safety, and Security in the Workplace (P5BK K3LH)

In order to better understand the process, the stages and steps of implementing the BMC-based teaching and learning factory model have been socialized and implemented through workshops, seminars, and other discussions. The school principal and school management, subject teachers in the Expertise Concentration of leather and imitation creative craft product design, including general subjects, basic vocational projects, skill concentration projects, Creative Entrepreneurship Projects (PKK), and the Strengthening Student Profile Pancasila Work Culture, Safety, and Security in the Workplace (P5BK K3LH) Project, strongly support the implementation of this model.

Implementing the BMC-based teaching and learning factory model by changing school management to industrial management makes students feel more challenged and motivated to learn seriously in this changing atmosphere. Students are required to work on several orders and implement the BMC-based teaching and learning factory model, which starts from project negotiations, analyzing projects, expressing willingness and interest in working on projects, carrying out projects, carrying out quality control, applying work culture and HSE, to submitting the final project results to consumers.

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