

## **Analysis of the Necessity for Heutagogical Approach Through 4Cs Skills as Innovation for Vocational Lectures in the Education 4.0**

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**Abstract:** This study aims to: (1) analyze the level of need for the heutagogical approach through 4Cs on aspects of creativity; (2) analyze the level of needs of the heutagogical approach through 4Cs in the communication aspect; (3) analyze the level of needs of the heutagogical approach through 4Cs in aspects of critical thinking; and (4) analyze the level of need for the heutagogical approach through 4Cs in the collaboration aspect. This study uses a qualitative method. Data collection techniques with interviews, literature review, documentation, and observation. Informants included lecturers, students, and stakeholders at the State University of Malang and used a sampling technique namely purposive sample. Data analysis techniques used are data reduction, data interpretation, and triangulation. Conclusions from this study indicate that: (1) the level of need for aspects of creativity includes the ability to: develop ideas (83.6%), express creative ideas (81.2%), adapt to new environments (88.2%), and creative independence (88.4%); (2) the level of need for communication aspect includes the ability to convey information (79.8%), express ideas (82.2%), accept opinions (84.2%), master various communication techniques (78.1%); (3) the level of need for Critical Thinking aspects including the ability to: evaluate (90.1%), identify problems (89.2%), solve problems (92.2%), distinguish facts from assessment (82.8%); and (4) the level of need for the Collaboration aspect includes the ability to: cooperate (89.6%), full responsibility (84.2%), respect differences (82.2%), discuss (87.6%).

### **1 INTRODUCTION**

In the 21st century, education is becoming increasingly important to guarantee human resources who have learning and innovation skills. Also, in the 21st century, it encourages skills in using information technology and media, and can work, and survive by using life skills. (Fitzgerald *et al.*, 2016; Tekerek and Karakaya, 2018; Skorton, 2019). At present, the phenomenon of degradation in capability of college graduates continues to increase. Some experts state that more than 75% of college graduates have not worked by their fields of expertise (Irdianto and Putra, 2016; Mukhadis *et al.*, 2018). This prompted many developed countries to accelerate the improvement of the capabilities and integrity of education actors. No exception in countries in Southeast Asia. Some countries such as Malaysia, Thailand, Singapore, Brunei, including Indonesia,

continue to develop innovations and conduct in-depth studies on alternatives to improving the quality of education, especially vocational education (Karlsson, Nilsson and Nilsson, 2018; Hashim *et al.*, 2019; Kintu, Kitainge and Ferej, 2019). Vocational education is one of the main 'weapons' and is at the very front when a country experiences an educational revolution (Lang *et al.*, 2017; Forster and Bol, 2018; Mesfin and Niekerk, 2019).

As an impact, in the 4.0 Industrial Revolution. This, vocational education is required to continue to skyrocket and capture every innovation in the learning process (Jantan *et al.*, 2018; Zaharah *et al.*, 2018; Vu and Le, 2019). Facing the challenges in the digitalization era, vocational education is required to continue to follow the revolutionary cycle. Some experts stated that the era of education that was influenced by the 4.0 industrial revolution was called Education 4.0 (Jantan *et al.*, 2018; Zaharah *et al.*,

2018; Murtikusuma *et al.*, 2019; Vu and Le, 2019). Education 4.0 is an education characterized by the use of digital technology in the learning process or known as a cyber system. The quality of educators in this case lecturers must be by the performance of lecturers needed in the industrial era 4.0. Vocational education is an important means of transforming and improving society, so it must have a global connection because global activities have an impact on education (Lang *et al.*, 2017; Jossberger *et al.*, 2018; Placklé *et al.*, 2018; Dang, Wang and Kang, 2019).

One form of cutting-edge learning innovation to build students' revolts thinking is the heutagogy approach. In the field of heutagogy education, the concept was first created by Stewart from Southern Cross University. The study is a study of learning that is self-determined by self-learning (Oliver, 2016; Green and Schlairet, 2017; Stoszkowski and Collins, 2018; Stoszkowski *et al.*, 2018). This idea is an extension of the reinterpretation of the andragogical approach. Heutagogi press points are devoted to the improvement of learning how to learn, double loop learning, the opportunity to learn thoroughly, and focus on developing skills (Jones, 2016; Praherdhiono, Adi and Prihatmoko, 2018; Stoszkowski *et al.*, 2018).

The heutagogical approach to vocational education emphasizes the human nature of human resources, self-worth, ability, and recognizes natural systems that interface the environment and learning activities as opposed to teaching. Heutagogi discussed issues of human adaptation in order to enter the new millennium (Green and Schlairet, 2017; McCarthy, Stoszkowski and Robert, 2018; Mulrennan, 2018; Stoszkowski and Collins, 2018). This model challenges ways of thinking more than processes rather than content, allowing learning to better understand their world than the world of the teacher, forcing teachers to move into the world of learners, and allowing teachers to see beyond their own disciplines and favorite theories (Brien, 2018; Marcut and Chisiu, 2018).

In vocational education, teaching strategies must be designed to meet specific requirements using flexible teaching methods that accommodate various approaches. Vocational education (technical education) helps develop individuals of science and technology knowledge in a broad field of work that requires technical and professional competencies and specific work skills (Placklé *et al.*, 2018; Smirnova *et al.*, 2019; Thunqvist, Tønder and Reegård, 2019). If important parties improve technical education in all its forms, then there is a need to understand the teaching and learning methods that make it work well. It is characteristic of the demands of 21st-century skills or termed 4C (Communication, Collaboration,

Critical Thinking and Problem Solving, and Creativity and Innovation) (Ivanov, 2016; Melo, 2018; Robi, Hobri and Dafik, 2018).

In this 4C skill, lecturers are encouraged to be able to map their students' thinking skills. The ability to think in vocational education includes knowledge of perception and creation (Ericson, Parker and Engelman, 2016; Chidiac and Ajaka, 2018; Handajani, Pratiwi and Mardiyana, 2018). An ability to think is an ability to use the mind to search for meaning and understanding of something exploring ideas, making decisions, thinking about solutions with the best consideration and revising problems in previous thought processes. As an agent of change, students must be able to show their identity in intellectual, moral and elegant ways (Santos *et al.*, 2018; Zaharah *et al.*, 2018). Therefore, in the 21st century, the learning process carried out in higher education must be truly considered, in order to produce competent graduates.

## 2 METHOD

In this study, the method used is a qualitative method. Data collection is done by interviews, literature review, documentation, and observation. Research instruments used were questionnaires, interview guidelines, and observation guidelines. The research subjects included lecturers, students, and stakeholders at Malang State University. The informants in this study included 30 vocational lecturers, 100 vocational students, and vocational field stakeholders. The sampling technique used is purposive sample. Data analysis techniques used are data reduction, data interpretation, and triangulation. Schematically, the research stages are shown in Figure 1.

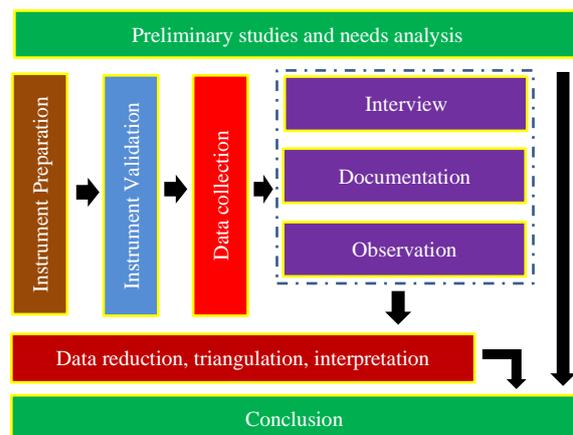


Figure 1: Research stage scheme

In the instrument validation process, carried out by two expert teams. The first expert is a vocational material expert. The second expert is linguists and literature experts. Both experts have a high level of professionalism.

### 3 RESULT

In this study revealed several significant findings. The findings cover aspects needed in carrying out the heutagogy approach through 4Cs skills. These aspects include aspects of creativity, communication aspects, Critical Thinking aspects, and Collaboration aspects. In the aspect of creativity, the level of need for needed abilities is shown in Figure 2.

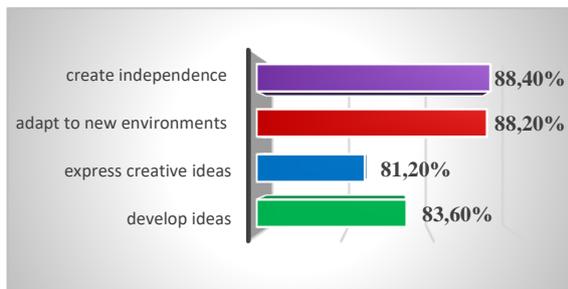


Figure 2: Level of Creativity Aspect capability requirements

In Figure 2, it can be seen that the level of need for aspects of creativity includes four needs. The percentage level of capability needs in each component includes developing ideas (83.6%), expressing creative ideas (81.2%), adapting to the new environment (88.2%), and creating environment (88.4%). Furthermore, the level of need for capabilities needed in the communication aspect is shown in Figure 3.

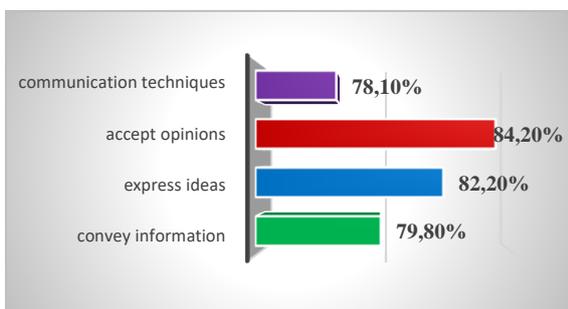


Figure 3: level of capability requirements for Communication Aspects

In Figure 3, it can be seen that the level of needs in the communication aspect includes four needs.

Percentage of level of ability needs in each component includes ability: convey information (79.8%), specific ideas (82.2%), accept opinions (84.2%), master various communication techniques (78.1%). Furthermore, the level of capability needed in the Critical Thinking aspect is shown in Figure 4.

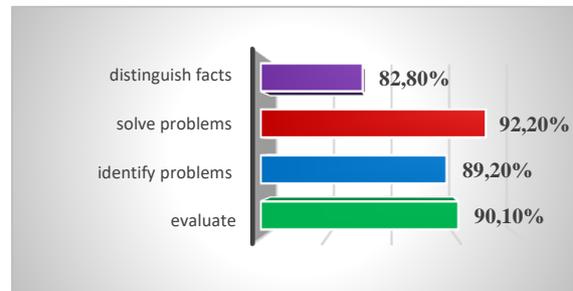


Figure 4: the level of capability needs of the Critical Thinking aspect

In Figure 4, it can be seen that the level of need for Critical Thinking aspects includes four needs. The percentage level of ability needed in each component included the ability: evaluating (90.1%), identifying problems (89.2%), solving problems (92.2%), distinguishing facts from assessment (82.8%). Furthermore, the level of capability requirements needed in the Collaboration aspect is shown in Figure 5.

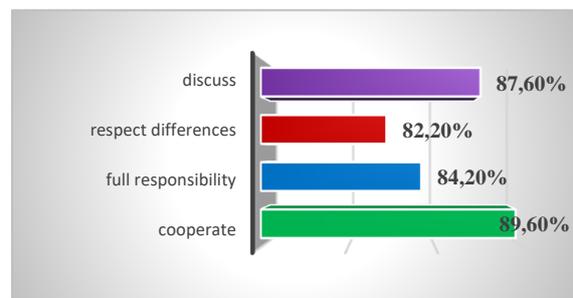


Figure 5: level of need for Collaboration Aspect capabilities

In Figure 5, it can be seen that the level of need for the Collaboration aspect includes four needs. The percentage level of ability needs in each component includes the ability: collaboration (89.6%), full responsibility (84.2%), respect for differences (82.2%), discussion (87.6%).

### 3 DISCUSSION

In this study several important analyzes were found. The analysis in this study was discussed based

on the findings that have been obtained. The discussion covers three things. These are (1) creativity and communication in the concept of the heutagogical approach; (2) Critical Thinking and Collaboration as characteristics of the heutagogical approach; and (3) the need for 4Cs skills on the heutagogical approach.

### **3.1 Creativity and Communication in the Concept of the Heutagogical Approach**

This study reveals that the aspects of creativity and aspects of communication are vital needs in the part of the heutagogy approach. In the aspect of creativity, there are four main needs. These needs include the ability to develop ideas, the ability to express creative ideas, the ability to adapt to new environments, and the ability to create independently.

In the concept of the heutagogy approach, the level of creativity is a major factor in the development of activities in the classroom (Richardson, McGowan and Styger, 2017; Brien, 2018; Mulrennan, 2018). By its role, a lecturer has full ability to manage his class. Various situations and conditions in the class must be able to be controlled by a lecturer through creative steps. The ability of a lecturer to develop ideas is needed to stimulate students (Irdianto and Putra, 2016; Putra, Irdianto and Mukhadis, 2016; A. B. R. N. Putra *et al.*, 2018). By the concept of the heutagogical approach, that human beings essentially have an idealistic spirit of learning. Some experts suggest that people want to learn and have a natural tendency to do it throughout life (Bacca, Baldiris and Girona, 2018; Karlsson, Nilsson and Nilsson, 2018; Placklé *et al.*, 2018; Mesfin and Niekerk, 2019). That will create a positive cycle in the learning process in the classroom.

At present, the main control of the class is determined by the ability of a lecturer to initiate a learning transaction. Creative ideas must be able to harmonize the needs of students in learning a material, especially material in the field of vocational (Dang, Wang and Kang, 2019; Haris *et al.*, 2019). In this era of education, 4.0 learning has unlimited scope. Also, students have full authority over the knowledge they want to learn (Murtikusuma *et al.*, 2019; Vu and Le, 2019; Zambon *et al.*, 2019). If it is interpreted more deeply, it is by the main concept of heutagogy. The heutagogical approach offers how people learn, be creative, have high self-efficacy, can apply competencies in life situations, and be able to work with others (Thakur, 2017; Mulrennan, 2018; Stoszowski *et al.*, 2018; Narayan, Cochrane and Herrington, 2019). The class situation that is not

always perfect is a challenge that must be solved by a lecturer. Lecturers are required to be able to control and manage uncontrolled phenomena in the learning process. This is directly proportional to the basic concept of the heutagogical approach. The heutagogical approach emphasizes the human nature of human resources, self-worth, ability, and recognizes systems between the environment and learning activities as opposed to teaching (Green and Schlairet, 2017; Brien, 2018; McCarthy, Stoszowski and Robert, 2018).

An important aspect found in this research is the communication aspect. In this aspect, there are four main needs elements. These needs include the ability to convey information, the ability to deliver ideas, the ability to accept opinions, and the ability to master various communication techniques. The four elements are by the characteristics of the education era 4.0 which requires lecturers to have top-level interaction skills (Richardson, McGowan and Styger, 2017; Thakur, 2017; Mulrennan, 2018).

Direct interaction with students when in class, forcing a lecturer to master the ability to convey information well. Submission of information should be packaged through representative and communicative language. That is because in the field of vocational learning, the information conveyed must be scientific and supported by relevant sources (Karlsson, Nilsson and Nilsson, 2018; Mesfin and Niekerk, 2019; Smirnova *et al.*, 2019). Moreover, in the 21st century, there is a lot of garbage information whose truth cannot be assessed. Some experts say that the ability to convey information is an absolute ability to develop a heutagogical approach (Malek, 2017; Marcut and Chisui, 2018; Stoszowski *et al.*, 2018; Narayan, Cochrane and Herrington, 2019). Heutagogy places students truly responsible for what is learned and when they learn. In addition, the heutagiogi approach also provides a framework for learning that places responsible adults to be more advanced (McCarthy, Stoszowski and Robert, 2018; Mulrennan, 2018; Narayan, Cochrane and Herrington, 2019).

The ability of a lecturer to express creative ideas will make the classroom atmosphere livelier and more positive. Information and stimulation of the problems presented to students need to be filtered so that it becomes a problem that requires creative solutions (Fırat, Kılınç and Yüzer, 2018; Chan, 2019; Elyakim *et al.*, 2019). In the heutagogical approach, students consider the problems and actions produced and the learning outcomes. Furthermore, they reflect on the problem solving process and how it affects their own beliefs and actions (Malek, 2017; Thakur, 2017; McCarthy, Stoszowski and Robert, 2018).

The impact of this is that students will be able to respond and follow up with their lecturers through smart thoughts. The implication is that in the heutagogical approach, a lecturer must be able to accept every opinion and opinion from his students (Mulrennan, 2018; Praherdhiono, Adi and Prihatmoko, 2018; Stoszkowski and Collins, 2018). Based on that, then various interactive communication techniques must be mastered by a good lecturer. Some experts stated that the education era 4.0 was an era that won an educator with a good level of communication (Mudin *et al.*, 2018; Murtikusuma *et al.*, 2019; Vu and Le, 2019).

### **3.2 Critical Thinking and Collaboration as Characteristics of the Heutagogical Approach**

Another thing revealed in this study is that the characteristics of the heutagogical approach are strongly influenced by Critical Thinking aspects and collaboration aspects. In the aspect of critical thinking, four main elements are found. These elements include the ability to evaluate, the ability to identify problems, the ability to solve problems well, and the ability to provide facts from assessment.

Vocational education cannot be separated from the influence of the needs of the industrial world and the business world. In the era of education 4.0 a lecturer must often carry out analysis and evaluation of learning (Jose and Ramakrishna, 2018; Ślusarczyk, 2018; Mukri and Anwar, 2019). The evaluation in question is always trying to synchronize every transaction carried out in class with every step of the development of the industrial world and the business world. By the characteristics of the heutagogical approach that puts independence above everything. By the concept, if students can reproduce knowledge and skills in unfamiliar situations, this is called double-looping. This ability is a reflection of the student's competence. Without competence there is no ability. Through a double-looping process, students will become aware of a learning approach where they are adaptable so that they become more competent (MayTruong, 2016; Fırat, Kılınc and Yüzer, 2018; Mcguinness and Fulton, 2019; Ramírez, 2019).

Some experts explain that in the vocational field there are often problems that are relatively complicated to solve (Lang *et al.*, 2017; Bacca, Baldiris and Girona, 2018; Dang, Wang and Kang, 2019; Kintu, Kitainge, and Ferej, 2019). Moreover, in this era of education 4.0, problems that often arise are often caused by a person's inability to interpret the phenomenon at hand (Mahmood and Hussin, 2018; Mukri and Anwar, 2019; Zabidin, Belayutham and

Ibrahim, 2019). Therefore, it is very important for a lecturer to master the ability to identify problems that will be presented to his students through a heutagogical approach. The heutagogical approach can be seen as a development from pedagogy to andragogy. Smart students only need a little control from their lecturers, and of course, they will become more independent in learning. On the other hand, students who are less intelligent will need more guidance from their lecturers (A. B. N. R. Putra *et al.*, 2018; Mukhadis *et al.*, 2018).

A lecturer must be able to provide an easy bridge that helps students solve problems given in class. Often students ask the problems they face to their lecturers. In this context, a lecturer is tested for his ability to solve problems correctly (Owston, York and Malhotra, 2018; Simarmata *et al.*, 2018; Montgomery *et al.*, 2019). The learning process in the field of vocational education is indeed formed from unique phenomena that exist in life. The main thing that must be seen from this is that each must try to overcome the problems faced. The first is to consider various problems that occur in general as a consequence of social change in society. Second, the decomposition of the subjective meanings of individual changes in the field of education (Anggariana *et al.*, 2017; Bahçivan, 2017; Yakar and Turgut, 2017).

The next aspect that reinforces the characteristics of the heutagogy approach is the aspect of collaboration. In this study, there were four main focus points for the needs of the heutagogy approach. The needs of these capabilities include the ability to cooperate, the ability to be fully responsible, the ability to appreciate opinions, and the ability to interact interactively.

Vocational education has a linear nature of technological and industrial developments. Not only in the era of education 4.0, the pace of industrial revolution 4.0 has dragged every thought into being able to cooperate in meeting the demands of progress (Cirp *et al.*, 2018; Jantan *et al.*, 2018; Zaharah *et al.*, 2018; Idris, 2019). Based on the principle of the heutagogical approach, a lecturer must be able to cooperate with everything that is able to make his competence develop. Lecturers must also be able to collaborate with their students in a complex manner to develop a new innovation. A lecturer must be strong in creating new innovations and accepted by society (Santos *et al.*, 2018; Rahman *et al.*, 2019). Through a collaborative process, lecturers must compete to create ideas that will be developed for technological progress.

The concept of heutagogy in the field of vocational education has a meaning that offers certain principles and practices that can be considered as

responses to developments in higher education (Green and Schlairet, 2017; Praherdhiono, Adi and Prihatmoko, 2018; Stoszkowski and Collins, 2018). The heutagogic learning environment facilitates the development of capable learners and emphasizes both student competency development and the development of learners' abilities and capacities for learning. The main concept in heutagogy is double-loop learning and self-reflection. In double-loop learning, students consider the problem and the results of actions and results, in addition to reflecting on the problem-solving process and how it affects the learner's own beliefs and actions (McCarthy, Stoszkowski and Robert, 2018; Stoszkowski *et al.*, 2018). Double loop learning occurs when students question and test one's values and assumptions as a center for improving learning in learning.

### **3.3 The Need for 4Cs Skill in the Heutagogical Approach**

Education plays an important role in preparing generations who can compete in the age of globalization accompanied by rapid advances in modern technology. In this era of education 4.0, vocational education must also be immediately changed or transformed from traditional learning into modern education. That is because to ensure students have the knowledge, learning and innovation skills, the skills to use technology to find information, and to survive by using skills for life skills (Lang *et al.*, 2017; Newton *et al.*, 2018; Woessmann, 2019). Universities should be able to equip students with the various competencies above so that they can compete in the education era 4.0. Students are directed to think critically so that they can identify problems, process problems, and conclude problems that exist so that they gain a deeper understanding of the surrounding environment. It is by the characteristics and principles of the heutagogical approach. (Richardson, McGowan, and Styger, 2017; Stoszkowski and Collins, 2018; Narayan, Cochrane and Herrington, 2019).

The reality now is that the thinking ability of lecturers is not in line with expectations and needs to be improved. The development of 4Cs skills (creativity, communication, Critical Thinking, and Collaboration) is an absolute skill that must be mastered by all lecturers in the field of vocational (Chidiac and Ajaka, 2018; Robi, Hobri and Dafik, 2018; Zulkarnaen *et al.*, 2019). Also, the focus of problem-solving is relatively low, indicating that solving problems requires high-level thinking skills. Thinking ability is one of the capabilities that need to be developed to face the challenges of the 21st

century. Some experts identify 21st century capabilities including creative and innovative (creativity and innovation), critical thinking and problem solving (critical thinking and problem solving), communication (communication), and collaboration (Hu *et al.*, 2018; Chai, Koh and Teo, 2019; Kim, Raza and Seidman, 2019). One effort to improve this ability is through the learning process through the heutagogical approach.

The lecturer should be able to encourage the learning process in the classroom focused on the ability of 4Cs namely (1) creativity and innovation, students can find innovative solutions and solve creatively; (2) critical thinking and problem solving, students solve mathematical challenges and are able to make arguments; (3) communication, skilled students communicate verbally and in writing; and (4) collaboration, students can work efficiently in diverse teams (Fitzgerald *et al.*, 2016; Henritius, Löfström and Hannula, 2019; Khlaisang and Songkram, 2019). The right learning process can encourage students to develop these abilities while increasing higher-order thinking skills. Also, lecturers have a role to play in learning activities that can facilitate students to improve higher-order thinking skills (Bacca, Baldiris and Girona, 2018; Haris *et al.*, 2019; Kintu, Kitaiinge and Ferej, 2019; Lin, 2019).

The development of high-level thinking skills can be improved through the provision of open-ended problems. Also, the acceleration of 4Cs skills by a lecturer will be able to encourage the use of a complex heutagogical approach (Hu *et al.*, 2018; Tekerek and Karakaya, 2018; Broton, 2019). Through problems that refer to problems in everyday life, students are given the opportunity to contribute, be creative in solving problems using their knowledge and experience. The use of open problems is a matter that is very much considered in learning. The use of open questions in the form of descriptions can provide a space for students to develop strategies and student communication skills (Li, Ren and Wang, 2018; Cohen *et al.*, 2019; Wenting and Lijuan, 2019). Students must be required to have arguments that support problem solving and can communicate the thought process in solving problems. The ability of students to argue, solve problems, construct explanations and be able to hypothesize and understand complex things can improve higher-order thinking skills (Tekerek and Karakaya, 2018; Broton, 2019; Henritius, Löfström and Hannula, 2019). As a result, classroom learning transactions through the heutagogical approach can be systematic with schematic and explorative.

## 4 CONCLUSION

Aspects of creativity and communication aspects strongly influence the concept of the heutagogical approach. Both of these aspects each contain four elements of need. The need for aspects of creativity includes the ability to develop ideas, the ability to express creative ideas, the ability to adapt to new environments, and the ability to create independently. The need for communication aspects includes the ability to convey information, the ability to deliver ideas, the ability to accept opinions, and the ability to master various communication techniques. Furthermore, approaching heutagogy has characteristics that are influenced by critical thinking and collaboration. In the aspect of critical thinking includes the ability to evaluate, the ability to identify problems, the ability to solve problems well, and the ability to provide facts from assessment. The aspects of collaboration include the ability to cooperate, the ability to be fully responsible, the ability to appreciate opinions, and the ability to interact interactively.

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