Teacher Development Potential (Creativity and Innovation) Education Management in Engineering Training, Coaching and Writing Works through Scientific Knowledge Intensive Knowledge Based on Web Research in the Industrial Revolution and Society

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Abstract

This research is an empowerment of the potential of vocational school teachers in the form of scientific writing to function as a vehicle for communication and dissemination of works and ideas for teachers or others. The problems are: (1) the making of scientific papers of any type is partly, vocational teachers do not understand much and are unable to write good scientific works, are still done traditionally, whereas writing web-based scientific papers/research is urgently needed in the revolutionary era and society now and in the future. (2). Until now, *SMK* (Vocational High Schools) have not strengthened the ability to respond to the needs of the world of work, business, industry with innovation and digital-based interdisciplinary curriculum, education in *SMK* should be as a reference for innovation, and most responsive to the development of knowledge and technology according to the needs of industry and civil society. is the ability to change midset action in writing scientific papers, which are designed through implementation, and empowering the potential of vocational school teachers in the methods of editing, inquiry, compiling the results of scientific papers and others relevant to the development of the era of the industrial revolution and the Society. Research methods include holding workshops. training scenarios using in class systems on the job training and presentation of results on the job, at the end of the workshop, motivating and creativity, a web-based scientific / research writing contest was held using the science and technology media built through vocational teachers. The results of the study include: (1) The realization of birth of human resources (teachers) in vocational schools, especially in Bandung in writing web-based scientific research and digitizing in Management of Multicultural Education with Strengthening Education and National Identity in an integrated manner in line with the development of the Industrial Revolutionary Era and society.

Keywords: teacher potential empowerment, scientific work, website

1. Introduction

Analysis of the implementation of education in Vocational Schools in measuring the accountability of productive teacher performance is still static in several aspects. Mental revolution needs to be balanced through training to address the era of globalization which has the character of the industrial revolution 4.0, wherein this era new literacy is needed by using a thorough analysis of data and making conclusions to be related to communication skills, collaboration, critical thinking, creative and innovative (Jill, Danil, Jasman, Martin, & Powell, 1999). The role and professional teacher becomes very strategic in preparing quality human resources (HR), the development of sustainable teacher professionalism can also be done through the following matters. (1) Personal development, which includes functional education and training, such as courses, training, upgrading and other forms of education and training. (2) Attending workshops or workgroup meetings or teacher work meetings or in-house training for teacher professional development activities. Teacher professionalism is marked by improving the quality of self through writing scientific papers. One of the institutions/organizations that need guidance, assistance and training (creativity, motivation) of teachers who have the professional competence to be developed is the Vocational High School (*SMK*) in the City of Bandung

From the results of searches through surveys, mass media, documentation conducted in October 2018 shows:

Firstly, there is still a scarcity of teachers who are willing, able, and used to carry out scientific writing activities. Marquardt & Engel identified 16 competencies compiled based on the areas of attitude, skills, and knowledge that are believed to have a high contribution to achieving success in cross-cultural order in writing scientific papers. Suggested competency attitudes are (1) respecting the values and practices of other cultures, (2) patience and tolerance, (3) commitment to HR principles, (4) many initiatives, persevering, and (5) having a sense of humor. The competencies are then classified into 4 groups, namely technical, business, interpersonal, and intellectual competencies.

Secondly, the lack of understanding and ability of teachers in making scientific work is (1) Lack of knowledge about the concept of scientific work, substance, and systematics. (2) Not yet developed the culture of writing in schools. (3) Seminar and workshop activities that are often followed by teachers are the development of innovative learning and *PTK* (Classroom Action Research) not directed to the development of published scientific papers (4) Lack of writing practice and the difficulty of confusion in thinking, this factor often occurs so that writing seems chaotic and unclear logic flow used. (5) Lack of awareness of teachers towards government regulation Number 16 of 2009 governing the Teacher's Functional Position and Credit Score; (6) The lack of cooperation between developers of *PLPG* (Teacher Professional Education and Training) organizers and school agencies to assist post-certified teachers in *PKB* (Sustainable Professional Development), especially in making scientific works ; (5) Constrained by weak understanding and knowledge of research; (6) in the ability to write scientific papers teachers certified teachers do not yet fully have an understanding of the concept of scientific work, (7) in the development of professionalism of teachers continues to encounter obstacles, including problems of time, funding, age, school infrastructure, motivation, policy leadership, and internet access network (Rowe, 1986), (Buzan, 1986), (Yunianto, 2007), (Claxton, 2006).

Thirdly, from thousands of teachers only dozens have shown this ability, willingness, and writing habits. Most teachers still find it hard and difficult to write, for example, technical guidance programs for writing scientific papers for teachers should be a vehicle for teachers to recycle frames of reference and frames of experimentation with research concepts. In line with the needs of the revolutionary and society era 5.0 in educational services that are characterized by vocational schools, they require professional teacher figures that are teachers who can work autonomously (free but according to independent expertise up to date, rich in science and technology, writing current scientific papers to devote themselves to users services (state and society) with responsibility for their professional abilities as research-based professionals (Sumardjoko, 2017), (Kemendiknas, 2010).

2. Formulation of the Problem

Problems in the Science and Technology Implementation Program namely the Revitalization of the Industrial Revolution 4.0 and the growth of society 5.0 have changed the face of the world where information technology has become the basis in human life. Everything becomes borderless with unlimited use of computing power and data because it is influenced by the development of the internet and massive digital technology as the backbone of human and machine movement and connectivity. The quality of vocational high school (*SMK*) graduates as a service organization is currently undergoing several changes. Not only due to the rapid development of science, technology, art, but also because of changes in community expectations of the role of graduates from vocational schools that are slightly absorbed in the industry in pioneering the future of the nation and state (Collins & Quillian, 1969). The demands of the Vocational School are not only limited to the ability to produce graduates who are measured academically, but also the entire program must be able to prove the quality of education is supported by existing accountability, quality control, quality improvement and quality satisfaction are key issues for the education sector in the future (Collins & Quillian, 1969), (Craft, 2005), (Ellis & Barrs, 2008).

The role of universities in collaboration with vocational schools is very important, especially in the development of knowledge and technology. The demand for quality learning processes is increasingly higher along with the development and changing times. How to create a more contextual and scientific learning process to shape the character of students with the spirit of scientists and the demands of producing quality graduates. The urgency in this research is the challenges faced by the government and universities, namely how to prepare and map the workforce in the teaching profession of the education graduates in the face of the industrial revolution 4.0 and society 5.0. Situation analysis in writing skills for teachers is very important because it is a profession's demand. For career development and to keep learning, teachers must meet the requirements to write scientific papers. This requirement is often a barrier to the promotion of the teacher's level given the low ability and interest in writing among teachers. In addition to being a requirement for career development, writing is also a means for self-development of a teacher, the teacher has a lot of potentials that he has to develop optimally by writing (Yunianto, 2007).

This is supported by the many conditions of teachers who strengthen the opportunities for developing writing skills, namely: (1) teachers always interact with science that can be material for writing; (2) the teacher always interacts with students when learning activities in the classroom that can be used as a source of writing, (3) the teacher often interacts with the dynamic world of education and policy, always demanding critical thinking, issuing innovative ideas; (4) many writing contest opportunities, organized by the Education office; (5) the mass media provides many educational rubrics that make it possible for teachers to express their innovative ideas; (6) many writing opportunities exist before the eyes of the teachers, but these opportunities have not been widely exploited by teachers complaints about writing among teachers are of course without cause (Ferrari, Cachia, & Punie, 2009)-(Hattie, 2009). In general, several obstacles can be found that make the level of writing participation among teachers low. The low interest in reading and writing, writing activities are not separated from reading activities. During this time the teacher is more preoccupied with teaching activities in the classroom so that 15 reading obligations for her development become unfulfilled, the limited availability of reading material that can be written material lack of self-confidence and lack of experience to write, low motivation to write. The availability of teachers/instructors, teacher competence is also in doubt. Many Productive Teachers are not up-to-date in the development of technology used in their expertise programs so that it affects the teaching-learning process which also influences the competency of students' graduates to be absorbed in the industry today. The complaints above also occur in vocational teachers in the City / Regency of Bandung.

Based on these conditions, it is necessary to carry out teacher coaching in the form of Teacher Potential Empowerment (Creativity and Innovation) in Training Techniques, Fostering the Writing of Scientific Papers through Understanding of Intensive Web-Based Knowledge / Research in the Revolutionary Era of Society 5.0, bearing in mind the type that is needed by teachers to utilize these opportunities. At least regular training for teachers/instructors who teach in the field of vocational education from the business world and the world of industry to cultivate entrepreneurship in vocational schools. Certificates held productive Teachers in the learning system can not be applied morally maximum should be able to guarantee that teacher competence is by applicable educational management standards among professionals (Nesbit & Adesope, 2006).

3. Research Purposes

In general, the objectives of this study are: 1) Providing support, strengthening, and mentoring the implementation of priority programs in the implementation of cooperation in making the Progran / Draft / Strategic Plan registered in the Local Curriculum for Training / continuous learning and comprehensive expertise of productive teachers is useful to keep teachers up to date with world developments business and industry, academic development, career development and personal development in accordance with the program area of expertise (Leven & Long, 1981); 2) Providing solutions to priority problems including analyzing the use of a millennial community of teachers to be up to date on the development and development of science and technology capable of revolutionizing Disruption 4.0, so that dissatisfaction driven by the spread of digital technology and the dynamics of information sharing characterized by social media can be resolved (Kaufman & Beghetto, 2009); 3) Improve thinking, reading and writing skills or other skills that are needed (soft skills and hard skills) that is analyzing programs in changing skills to change the mindset needed by the labor market that has entered an era of knowledge based society (economy) that is open (digital) and relies on free competition, arousing teacher performance in the utilization of results documented work results, improve professionalism especially vocational teachers in professional activities of teacher competence with understanding of web-based knowledge / research (Kampylis, Panagiotis; Berki, 2014).

In detail these objectives include the following: 1) Analyzing the effect of training and coaching and guidance, mentoring through workshops, about learning scientific writing techniques for vocational teachers, which are then applied to the making (textbooks, books, modules, CAR, final project, thesis / dissertation, journals, articles , papers and scientific writing) so as to improve understanding of the function of educational values, to the importance of workshops in innovation and the technique of writing Scientific work as a teacher has a function of values integrated in a kaffah; 2) Analyze the extent of the response, motivation, creation and follow-up of the results of the workshop on the techniques of writing scientific papers on the vocational teachers, after being applied so as to foster interest that has values, philosophies, theories, and practice of writing scientific papers so that vocational teachers can able to make scientific papers properly and correctly and can develop their potential in their duties as a professional teacher; 3) Analyze the extent to which vocational teachers are able to: identify, select and formulate topics and titles, compile the outline, gather material, write scientific and edit, improve the ability to search for references in various media and others (Michalko, 2001); 4) Evaluating the effect of implementation in coaching, training, making and implementing the results of the activities of writing scientific work workshops with personality development, towards fostering teacher intellectuality in educational services, in enhancing creativity, PBM innovation, mastering

methodology and service design in other communities, and mastering practical ways and tips on successful writing of scientific papers that are good and right, planned in several stages including for all participants about providing training material in engineering, making scientific papers in the form of articles / journals provided by the project implementation team and given by experts in scientific writing. competent in their fields. Managing data, information and knowledge culture associated with cultivating, techniques for writing scientific papers in an organization; (2) What are the types of knowledge in organizational culture management; (3) How is the history of development in the management of knowledge culture related to information and knowledge in writing scientific papers; (4) How important is the framework of knowledge in the culture management system for building a web-based scientific writing system for vocational teachers in the world of education.

4. Research Methods

The method of approach through intensive and integrated training with learning methods, learning techniques are implemented in the classroom with an axiomatic approach, and methods are procedural, and the techniques are operational, through stages and strengthening research methodology, as basic knowledge in the framework of writing works scientifically.

Field observations, implementation of teacher empowerment activities through training in writing Scientific Works), starting with teachers in vocational schools so that the needs and problems of participants (vocational teachers) can be identified.

Recruitment of participants after field observations, new recruitment of participants is held, together with the Principal of Vocational Schools to ensure participants who need the training, so that it takes several days expected by 50 participants to fulfill the quota. Implementation of the training in the form of workshops.

The implementation of the training activities including the provision of material by experts, held a pretest to find out the level of understanding of participants, only after the pre-test, training in writing scientific papers and in April the implementation of teacher empowerment activities through training in writing scientific papers, starting with Post-test and proceed with the Implementation material (direct practice) to make scientific papers articles/journals / *PTK* (Classroom Action Research) starting with the writing systematology and methodology.

Training on writing scientific papers also trains participants to create research instruments to collect raw data on a Likert scale, as well as various other instruments to support the collection of raw data, such as structured interviews, in-depth observations, and commentary.

Training in the method of writing scientific papers, training participants to be able to process raw data using the SPSS and Excel programs, so that what has been felt difficult by the participants in preparing scientific papers, in addition to knowledge, especially those choosing with quantitative methods, can become valuable solution for participants, but when used for action research it can be useful for processing field data.

Empowerment of vocational school teachers is provided through intensive scientific writing training to the educational scientific journals of the participants to be able to draft writing. Empowerment of training provided is implemented directly, both at the beginning of the training through pre-test and post-test at the end of the training so that it can be as a formative and summative evaluation to find out the extent of participants' understanding of the training of writing scientific papers.

A phenomenological approach was adopted for this study, as researchers wanted to gain personal insights about participants' life experiences. The purpose of phenomenology is to understand human experience (Dowling, 2007). This research has explored the experiences of students who have limitations undergoing general vocational training.

The solution to solve the problems faced is 1) Implementation of training (workshops) in one of the vocational schools in the city of Bandung under the auspices of the local education office with an agenda according to the theme of the activity; 2) Conduct training on scientific article writing and supporting skills. The planned activities include holding workshops, training scenarios using the in class on the job training system (practice in local PGRI containers) and presenting results on the job at the end of the workshop, providing motivation and creativity with a web-based scientific writing / research writing competition using science and technology media that are built through vocational teachers are the focus of training and coaching; 3) The targets of this activity are state and private vocational school teachers in the City / District of Bandung, with a participatory approach through: (1) Lectures and questions and answers; demonstration; (3) Exercise / Practice or intensive tutorial with details of the specified training schedule; (4) service-form workshops: (1) Research-based Scientific Work Guidelines Formulation; (2) Training on Writing Ilmia's work by using Web media; (3) Consultation Services for Writing Scientific Papers, (4) inviting as key note speakers / experts writing scientific papers from LLdikdi / Kemenristek / other relevant institutions; 4) Therefore, the

training material includes the following three things: (1) Making scientific papers and their systematics; (2) The rules of writing scientific articles in accordance with the rules of Indonesian language are good and right; (3) Strategy to find sources of reference in accordance with the rules of scientific writing; (4) Practice writing scientific papers. This activity is carried out in the form of informative explanations related to the methodology and technical editorial reporting delivered in the form of discussion. Also, this activity becomes a means of discussion.

5. Results and Discussion

The depiction of vocational teachers viewed from the aspects of potential, service, educational background, and training, rank, academic position and other existence during their duties, the development of learning and the development of educators' competencies and phenomena that illustrate the relationship between the factual conditions that develop in society with the results of evaluations research in coaching, training, manufacturing and assisting in writing scientific papers can compensate according to the needs of the era of digitalization, the industrial revolution and the future 5.0 according to the vision, mission of each school.

Profile of Vocational Teachers in Strategic Vision and Mission of their profession, has shown readiness to make changes, improvements, fostering and quality of education, teaching and PBM in their school environment internally and externally, as well as accuracy and accuracy of decision making towards management and service functions education in schools in improving their competence and profession, especially related to academic development in the field of writing scientific papers.

Empowering Teacher Potential (creativity and innovation) in Training Techniques, Guiding the Writing of Scientific Papers through Understanding of Intensive Web-Based Knowledge / Research in the Revolutionary Era of the Society 5.0 in improving the competency and profession of public and private vocational school teachers have been used in harmony with personal development, academic, and his career so that it can affect the change in mindset, making a need in the task, life, life, to the development and education services (Michalko, 2001),(Sternberg, 2012).

The results of the implementation of the workshop of the teachers have been able to apply to the making of various kinds of scientific work to improve understanding of the function of educational values, to the importance of these innovative activities and the technique of writing Scientific work as a teacher has an integrated value function.

Analysis of Internal, External factors; in compiling a planning strategy, a systematic framework, can create activities in writing scientific papers to develop knowledge, increase motivation, creation, response giving birth to a more up to date theoretical framework, relevant to the development of competence science and technology, developing the ability of vocational teachers especially in compiling the work scientific writing, in the field of pedagogic and professional can already be improved (Education, 2012).

Can discover new aspects/concepts of techniques and methods/creativity/innovation in writing scientific papers, to improve the activities of developing science, technology, arts and skills for teachers (*SMK*) in the effectiveness and quality of teachers to be published through the Journal National / Internasional / accredited / reputable

The solution for teachers who have difficulty in starting to write a scientific work is to take training in the form of workshops that are carried out and begin by following the acceptance of material from scientific writing techniques experts, following the practice of directly looking for research problems to serve as titles research, as well as formative evaluation, participants can start writing a scientific work, especially articles/journals / CAR.

The evaluation of scientific writing training activities is as follows: (1). The implementation of training activities in addition to increasing the ability and willingness of teachers to write good and true scientific work, is also a need that has been eagerly awaited by *SMK* teachers; (2) Scientific writing training activities have received positive responses from teachers, for that as an evaluation, its implementation needs to be developed in the future at the location of groups of teachers who are in schools that need this training; (3) The contribution of this research activity as a scientific work is expected to produce several propositions that can be used as a reference for researchers specifically who study the Teacher's Empowerment Potential (Creativity and Innovation) in Training Techniques, Guiding the Writing of Scientific Papers through the Understanding of Intensive Knowledge-Based Web / Research in the Revolutionary Era of Society 5.0. (Nilsson, 2010).

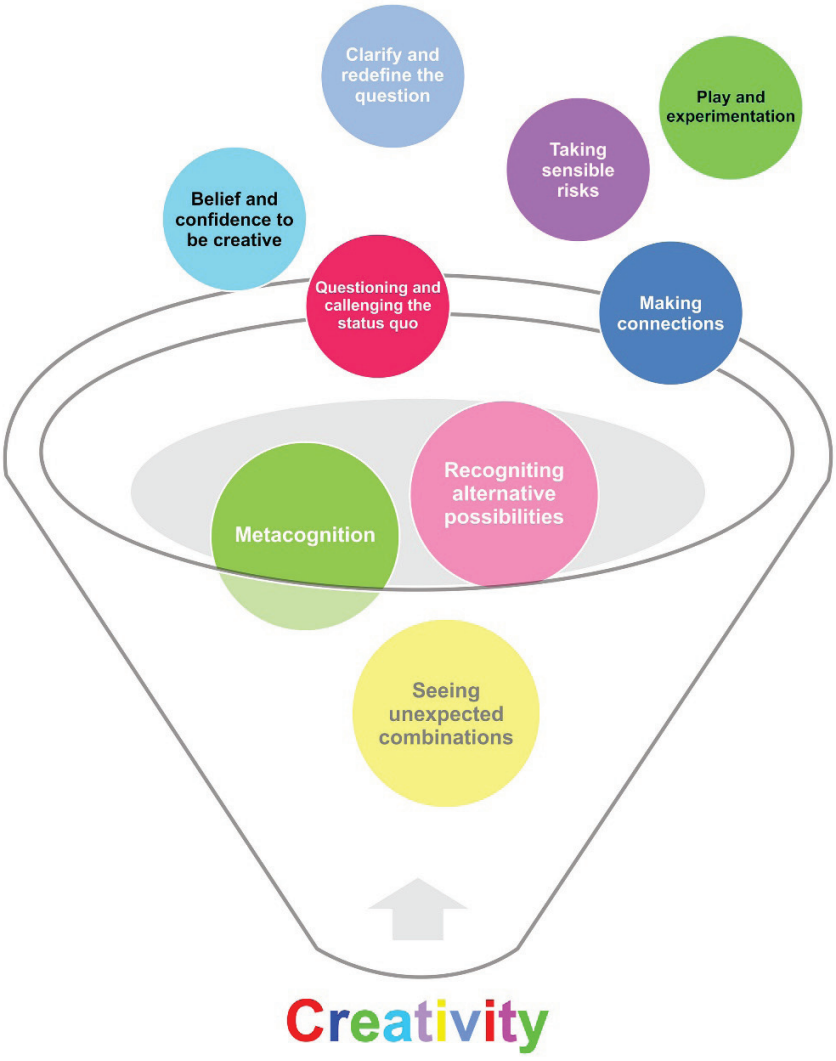

Figure 1. A creativity orientation (Ferrari et al., 2009)

6. Conclusion

The results of research in training and coaching in writing research-based scientific papers/websites serve as benchmarks for determining the "levels" of teacher competence that have an impact on graduate recipients being able to find out whether graduates are by field needs (the real conditions of the industrial revolution and society 5.0). For researchers can be used as a reference, the discovery of theories/concepts / other aspects that can develop education and teaching, policy, evaluation in its implementation in the field of study and learning in the professional duties of lecturers in higher education, especially in the field of Education / Management education which is very relevant in the development of school resource management, organization, personnel, leadership, HR policy, strategic management, and seminar development proposal for Thesis and Decentralization, Paradigm and Management Education, Assessment of Research Methods or Community Service and educational statistics in the National and Regional / Regional Education Development Plan as well as being an inspiration can be further developed by other researchers.

It is hoped that the acquisition of teachers' skills in making scientific works is helped to find out to what extent particularly the level of understanding of vocational school teachers in Bandung on the method of writing scientific papers by industry and community needs. Thus teachers in principle need guidance and training so that they are

skilled and confident in the demands of the times. And in essence human memory is limited, so there needs to be encouragement and stimulation from outside to remember again. The implementation of this training should be used as a means of self-development to improve the professionalism of educators in facing the challenges of world development in the future. It is expected to further improve themselves in providing materials and methods that are suitable for teachers who are the target of conducting research, namely: (1) The realization of human resources (teachers) of *SMK* in writing web-based scientific/ research and digitalization in multicultural education management and national identity; (2) The realization of research-based and digital learning by strengthening education and national identity in the era of the Industrial Revolution and Society 5.0 today (Srivastava, de Boer, & Pijl, 2015).

Research in empowering teacher potential is practically expected to be an input for those involved in the world of education, especially in vocational schools or in other educational environments. The teacher and lecturer educators, the results serve as one of the enrichment guidelines for implementing more innovative educational quality development; references in making scientific papers in various strategies and dysfunctions, competency development and development of science and technology, social, community and other educational stakeholders, a strong and responsible willingness and skills to make scientific papers, increasing knowledge increasing their income as a consequence of promotion. As overview of science and technology in this study are: 1) Improving the ability of HR comprehensively to create performance optimization through developing rewards; strengthen partnership networks with regional governments, related institutions, business, and industry; Increase cooperation with other universities; 2) Encourage and facilitate to develop innovations in various scientific disciplines and their application in the field/community to improve the community's economy; 3) Encourage to be able to compete in getting the economy of the local community at local, national and international levels; 4) Develop soft or hard information systems found in the teacher or facilitate; 5) Empowering and developing networking with various institutions and universities in abroad; 6) Publish the results of program activities; Strengthening the synergy of Tridharma PT which includes education, research, and Community Service; 7) Priority for the Development of the Strategic Plan (Renstra) of Education in its implementation based on the principles of overall quality development through management modernization, productivity improvement, efficiency, effectiveness, and accountability found in the community and stakeholders in need; 8) Creating a climate in schools by providing an environment that supports innovation can be very powerful, the teacher seeks rather than valid original thoughts and ideas. Having learning rather than performance orientation helps to create an environment where creativity is encouraged; 9) Making connections: mind mapping is a flexible and powerful tool for representing information and nurturing creative and critical thinking. Originally popularized and developed (Buzan, 1986), mind maps are designed to 'utilize various cortical skills' by using keywords, colors, images, numbers, logic, rhythm and spatial awareness. A mind map is a diagram that organizes information visually. They usually consist of a central concept, which is expressed in keywords or short phrases. Related ideas branch off from this, spreading throughout the paper, which is usually in a landscape format to provide optimal space for ideas to be written. Each main branch that emerges from a central theme can then develop further into related sub-sections.

Semantic network model theories (Collins & Quillian, 1969) help explain why mind maps are effective. Each student has their unique understanding of any subject at any given time based on their connections and connections. The act of constructing a mind map creatively requires students to think hard about what they are learning and build new connections. Students will find it easier to remember information by building representations of their understanding. It is not possible to create mind maps without the active involvement and thinking through mapped constructions. Building a large amount of information on a page also encourages creativity. Learners can make connections between topics, which they might not see when learning solid blocks of text. Mind maps can be used in several ways including taking notes. The act of creating a mind map requires a lot of information and concepts, which connect it. This can help develop understanding and help memorize information. It makes the recording process active rather than passive. At the end of the unit, a teacher may ask students, individually or collaboratively, to make a mind map of what they understand about a topic that has been discussed. By using keywords, students can enter large amounts of information onto one page, enabling them to get an overview of a topic and plan information strategically. Clarify, analyze and defend back problems or questions. This helps learners to uncover new perspectives, to build higher-level thoughts and to develop understanding, analysis, synthesis, and evaluation. Making connections. This supports the development of holistic and disciplinary understanding through connecting ideas from different topics or different subjects.

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