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Constructivist Approach for Vocational Education

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***Abstract*— The constructivist approach to vocational education is in the stage of being developed nationally, with the presence of the Higher Education competency-based Curriculum Development book (2008, 2018)[1] [2]initiated by the Ministry of Research, Technology and Higher Education. Thus, the study of constructivist approach for vocational education is very necessary. Beginning with understanding the constructivist approach in general, then it is necessary to look at how to strengthen the belief of the teachers so that they are able to convey teaching material with a constructive approach, at various levels of technological diversity. After that what components must be prepared following the process of strengthening the confidence of the constructivist teachers. The deepening of a number of libraries shows that after the statement emphasizes the constructivist approach as the government's determination in education, it must be followed by (1) standard and assessment development, (2) curricula and instruction, (3) teacher training; and (4) teaching and learning environment.**

Keywords: constructivist approach, constructivist teachers

I. INTRODUCTION

In the pre-industrial revolution era, the behaviourism approach is very dominant, especially because skill learning refers to Pavlov and Skinner. But now there are major changes that are changing towards the Constructivism approach. This is evidenced by the existence of a Higher Education Competency-Based Curriculum Development Handbook. An alternative curriculum preparation (2008)1, which is further strengthened by the Guidebook for Higher Education Curriculum Development in the Industrial Age 4.0 (2018)6. Both books clearly emphasized the need for SCL (Student Centered Learning) as a substitute for TCL (Teacher Centered Learning), and with the method of teaching Discovery Learning (DL); Cooperative Learning (CL); Contextual Instruction (CI); Project Based Learning (PjBL); and Problem Based Learning and Inquiry (PBL).

In the present context, the educational results that were originally in the form of minimal skills mastery of knowledge, skills, and attitudes in accordance with the curriculum objectives of a study program, are replaced with one's competence to be able to carry out a set of intelligent actions, full of responsibilities as a condition for the community to carry out their tasks, and assignments in certain occupations.

Tracking the history of learning with the Constructivist approach began at least 20 years ago, especially in the field mathematical education for elementary schools. This model of learning comes from a number of experts who believe that students are given the opportunity to think so that they can engineer the scientific building they have. In vocational classes, constructivist approaches, especially with PBL teaching methods.

The questions raised here are: (1) how to strengthen the belief of the teacher (belief) so as to be able to deliver teaching material to students with a constructivist approach, at various levels of technological diversity. (2) What components must be prepared to follow the process of strengthening the beliefs of the constructivist teachers?

II. DEFINING CONSTRUCTIVIST APPROACH

Setting up the definition of constructivist approach requires emphases to be placed upon the students as a subject of the teaching of learning process. Another definition for constructivist approach was provided by Greenes (1995)5, who describes a dynamic and interactive conception of learning in which all is constructed, as a product of the cognitive acts of the individual. Soeharto (1998)7 define that constructivist approach are viewed as those which emphasize the active role of the learner in building understanding and making sense of instruction.

The picture of constructivist teacher, as stated by Brooks and Brooks (1993, 1997)2, reflects at least twelve characteristics, such as: First, constructivist teachers encourage and accept student autonomy and initiative. Teachers believe that autonomy and initiative prompt students 'pursue the connections among ideas and concepts. Second, teachers use raw data and primary sources, along with manipulative, interactive, and physical materials. Teachers present real world possibilities to help students generate the abstraction that bind together. Third, when framing tasks, constructivist teachers use cognitive terminology such as classify, analyse, predict, create, etc Using this terminology allows the students to make connections and comparisons to create new understanding. Fourth, constructivist teachers allow students responses to drive lessons, shift instructional strategist, and alter content. Students' knowledge, experiences, an interest are often focused on what are seen as urgent theme. Fifth, constructivist teachers inquire about students understanding of concepts before sharing their own understandings of these concepts. Students assume that teachers know more than they do. Sixth, constructivist teachers encourage students to engage in dialog; both with their teachers agree that a powerful way for students to change their conceptions is through social discourse

Next is characteristic of constructivist teachers, number seventh, is encourage student's inquiry by asking thoughtful, open-ended questions and encourage students to ask questions of each other. Eighth, constructivist teachers

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seek to elaborate of students' initial responses. Through elaboration, students often are capable of re-conceptualizing and assessing their own error. Ninth, constructivist teachers engage students in experiences that might be contradictory with their initial hypotheses and then encourage discussion. Lastly, constructivist teachers allow wait time after posing question. Students are not immediately prepared to respond to questions or other stimuli. Teachers wait time thus permits these students with the necessary time to process the world of alternative ways.

Table 1. The Following Table is the Differences Constructivist and Traditional Classroom

	Traditional	Constructivist
Curriculum	Curriculum is presented as part of whole, with emphasis on basic skill. Strict adherence to fixed curriculum is highly valued Curriculum activities rely heavily on textbooks and workbooks	Curriculum is presented as part of whole, with emphasis on big concepts. The student question is highly valued. Curriculum activities rely heavily on primary source of data and manipulative materials.
Teaching Learning	Students are viewed as blank slates onto which information is etched by the teacher. Teachers generally behave in didactic manner, disseminating information to students. Teachers seek the correct answer to validate student learning	Students are viewed as thinkers with emerging theories about the world. Teachers generally behave in interactive manner, mediating the environment of the students. Teachers seek the student points of view in order to understand students' present of conceptions for use in subsequent lessons.
Assessment	Assessment of student learning is view as separate from teaching and occurred almost entirely	Assessment of student learning is interwoven with teaching and occur through teachers' observations of student at work and through student exhibitions and portfolios

Wilson (1996)[9] describes a constructivist learning environment as a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities.

Driscoll (1994)[4] extends on the ideas that there are 5 conditions which should be incorporated within constructivist learning environment. First, such learning environments must provide authentic activities in which students are engaged. Second, learning environments must be provided wherein social negotiations ensured. Third, such learning environment must promote access to multiple modes of representation to allow learners to examine materials from multiple perspectives. Fourth, these learning environments must encourage an awareness of one's own thinking and learning processes. Fifth, these learning environments must emphasize students centered instruction wherein students are actively involved in determining their own learning needs and how these needs can be met (Driscoll, 1994)[4.]

III. RESEARCH METHOD

The research reads and discusses a number of entity research results based on constructivists, looks at the boundaries, implementation of learning procedures and mechanisms and characteristics of constructivist learning versions of the Brooks & Brooks, comparisons of constructivist classes and traditional classes. Furthermore, the researchers looked at the two Guidebooks published by the Ministry of Research and Technology, namely the Higher Education Competency Based Curriculum Development Handbook" An alternative curriculum preparation (2008)[1], which is further strengthened by the Third Edition (2018)[6] Higher Education Curriculum Guide Book. Furthermore, form the literature review above, it is continued with the provision of result and suggestion as a future reflection on the preparation of learning teachers using the re-constructivist approach. In the introduction section the researcher discusses constructivist, and in the result section and suggestions are discussed about how constructivist approach is based on learning.

IV. RESULTS AND DISCUSSION

The data which has been obtained was analysed using a determined method. The description of the data includes the mean, standard deviation, mode, median, and frequency distribution. After obtaining the score from these points, the score of each item was calculated so that the score of the evaluations components of Career Centre's role were measured.

4.1. How to strengthen the belief of the teacher (belief) so as to be able to deliver teaching material to students with a constructivist approach, at various levels of technological diversity.

Changes from the behaviorism approach to constructivism are not as easy as turning hands, but furthermore have to rearrange the idea that knowledge is not passively received, but is actively building up by learners. This belief formation feels lighter by looking at that no individual teacher has complete belief in behaviorism, and sees negation with belief constructivist. On the other hand, the change towards constructivist becomes heavy, because it needs to rearrange the structure of the course which is largely patterned towards the delivery of material towards the formation of data and drawing conclusions.

Chu, SKW; Reynolds, RB, Tavares NJ, Notari M. and Lee, CWJ (2017)[3] writing the 21st century requires individuals who have competence "such as language skills and critical thinking, while some other skills are more recently emergent, namely digital literacies. Twenty-first century skills comprise three main knowledge domains: (1) innovative thinking; (2) information, media and ICT (information, communication, and technology) skills collectively referred to as "digital literacies"; and (3) life and career skills. For this reason, Inquiry-Based Learning, Collaborative Learning, and Collaborative Teaching, Social media for Learning and Games for Learning or Gamification are needed. Still according to Chu et.al that a constructivist-based education curriculum should contain the 3 elements above which in detail have 12 components as follows: (1) formation of innovative thinking including core subject, critical thinking and problem solving, communication and collaboration, and creativity and innovation; (2) the formation of digital literacies requires sub-competencies as follows information literacy, media literacy, and information and communication technology literacy, (3) the formation of life and career skills requires sub-competencies as follows: flexibility and adaptability, initiative and self-direction, social and cross-cultural interactions, productivity and accountability, and leaderships and responsibility.

4.2. What components must be prepared to follow the process of strengthening the beliefs of the constructivist teachers? Chu, SKW; Reynolds, RB, Tavares NJ, Notari, M. and Lee, CWJ (2017)[3] said that in the future what needs to be prepared to meet mass constructivist learning requires four (4) major activities including: (1) standard and assessment development, (2) curricula and instruction, (3) teacher training, and (4) teaching and learning environment.

In the context of education in vocational level, vocational education the development of standards and assessments can be clearly carried out by the National Education Standards Agency (BNSP) with Eight National Standards of Education, including Graduates' Competency Standards, Content Standards, Process Standards, Assessment Standards, Educator Standards and Education Personnel/Staff, Management Standards, Financing Standards, and Infrastructure Standards. Whereas the assessment has been carried out by the National Madrasah School Accreditation Agency (BAN S/M), while still referring to the Eight National Standards of Education.

While the development of curricula and instruction has been on the track with the issuance of the Management Module Implementation of the 2013 Curriculum for Vocational High School level has been issued in 2018, and is equipped with Guidelines for Implementation of 2013 Content Curriculum 2013 and 2019.

Trilling, B; Fadel C. (2009)[8] in 21 century skills: Learning for Life in Our times mentions tasks and examples of professions related to them.

1) Routine work, with rule based, repetitive and procedural task description.
2) Work that is manual based, with the task description of environmental adaptability. Examples of the work: truck drivers, security guards, waiters, maids and janitors.
3) Work that requires complex thinking and communicating, with task description, with description tasks that are abstract problem solving, and mental flexibility. Examples of work here are scientist, attorneys, managers, doctors, designers, programmers. According to researchers teaching work is included in this item. Teaching work cannot be replaced by people or machines as a routine task, but more as a researcher, developer, designer, marketing and chain management.

Trilling, B; Fadel C. (2009)[8] in 21 century skills: Learning for Life in Our Times proposes three learning models, namely:

1) Critical thinking and problem-solving skills, by teaching how reason effectively, use systems are thinking, creating judgment and decision, and solving the problem.
2) Communication and collaborative skills, by teaching how to communicate clearly and learn cooperatively with friends, flexibility, willingness to be helpful, and learning to collaborate.
3) Creating skill and innovation skills, by thinking creatively, working creatively with other parties, and implementing innovation.

V. CONCLUSION AND SUGGESTIONS

The government has determined to implement a constructivist approach to learning in higher education, which is reflected in the contents of the Guidance Book on Higher Education Competency Based Curriculum Development: An alternative curriculum preparation (2008)1. Besides that, there is also a Guide to Higher Education Curriculum Development in the Industrial Age 4.0 (2018)6. It turns out that the constructivist approach is

more manifested in the beliefs of the educator, which initially must be changed first, at least more likely to intend to increase the percentage of belief which was originally dominated by the behaviorist approach towards constructivist.

After that, supporters of pro-constructivist policies must be taken to require four (4) major activities including: (1) standards and assessment development, (2) curricula and instruction, (3) teacher training, and (4) teaching and learning environment. It is recommended that the government needs to standardize how to plan, budget, implement and evaluate the implementation of constructivist education.

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REFERENCES

[1] *Buku Panduan Pengembangan Kurikulum Berbasis Kompetensi Pendidikan Tinggi: Sebuah alternatif penyusunan kurikulum*). (2008), Jakarta: INA. Direktorat Akademik, Direktorat Jenderal Pendidikan Tinggi

[2] Brooks J.G. & and Brooks, M.G. (1993). *In search of understanding: The case for constructivist classroom.* Alexandria: VA. Association for Supervision and Curriculum Development.

[3] Chu, SKW; Reynolds, RB, Tavares NJ, Notari, M, and Lee, CWJ. (2017). *21st Century Skills Development* through *Inquiry-Based Learning*. Singapura: Springer Science+Business Media from Theory to Practice.

[4] Driscol, M.F. (1994). *Psychology of learning for instruction (2nd ed),* Heights, MA: Allyn Bacon.

[5] Greenes, C. (1995). Mathematics learning and knowing: A cognitive process. Journal of Education, 1, 177.

[6] *Pedoman Implementasi Panduan Penyusunan Kurikulum Pendidikan Tinggi di Era 4.0* (2018). Jakarta: INA. Dirjenbelmawa.

[7] Soeharto (1998), S. *The effects of a constructivist learning environment on grade six students ac*hievement and attitude toward mathematics Indonesia primary school. (Un-published dissertation in College of Education, University of Houston).

[8] Trilling, B; Fadel C. (2009) in *21 century skills: Learning for Life in Our times.* San Fransisco, CA: Jossey-Bass: A Wiley Imprint

[9] Wilson, B.F. (1996).*Constructivist learning environments: Case studies in instructional design*. Englewood Cliffs, N.J: ETP.