AUTHENTIC ASSESSMENT COMPETENCE OF BUILDING CONSTRUCTION TEACHERS IN INDONESIAN VOCATIONAL SCHOOLS

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ABSTRACT

In the year 2020-2035 the number of productive citizen (15-60 years) of Indonesia will reach 70 percent over all citizens. It becomes a bonus when the citizen group possesses competence relevant to the era. Entering 21st century most important skills that a worker needs to acquire are: collaboration, creativity and problem-solving and character qualities like persistence, curiosity and initiative. In response to this issue, in 2013 Ministry of Education and Culture developed a new curriculum called "2013 Curriculum". It emphasises on authentic-learning and assessment that promote higher-order thinking skills: creative, innovative, and problem solving in real life. This research focuses on teachers' authentic assessment competence at the state vocational schools describing their understanding on the concepts and principles of authentic assessment and their ability in its planning and implementation. The findings show that teachers' understanding and their ability to plan and implement authentic assessment are inadequate and furher training on authentic assessment is recommended.

1.   INTRODUCTION

In the year 2020-2035 the Indonesian productive age (15-60 years) population is predicted to reach 70 percent (Indonesia National Planning Board, 2013). This is a demographic issue for Indonesia. The real problem is when this productive age group does not have relevant competence to the era as they may not generate incomes for themselves as well as for the community. Therefore, this productive group can be a national burden, and eventually brings negative implications: high number of unemployment, social unrest, and economic crisis. Otherwise, this national issue can turn to a demographic bonus when this population group has been equipped with required competence to be productive citizens.

Globally, entering the 21st century which is identified by digital technology application and automation that leads to innovation-driven economy, World Economic Forum 2013-2014 consistently states that workers need to possess different mix of skills than in the past. They need competences that are collaboration, creativity and problem-solving oriented and character qualities like persistence, curiosity and initiative. These skills have not fully accommodated in national curriculum (Schwab, 2013).

In response to those issues, Ministry of Education and Culture (MOEC) had revised all school curricula including vocational and technical education schools. The revision is considered a new curriculum popularly known as "2013 Curriculum". For vocational and technical education, basically, 2013 Curriculum is similar to the previous one (School-Based Curriculum - KTSP) that both are classified as "competence-based curricula". However, the later puts emphasis more on characters building and scientific teaching-learning approach that leads students to higher-order thinking skills (HOTS): curiosity, creativity, innovation, problem-solving, and leads to productive citizen.

To support 2013 curriculum implementation, MOEC has formulated standard of teaching and learning process under Ministry Regulation number 65 of 2013 and renewed by Regulation number 22 of 2016. These Regulations mandate that teaching and learning in didactical process and its learning outcomes assessment should be in the form of "*authentic learning*" and "*authentic assessment*". These teaching and evaluation approaches require teachers to relate their teaching material to the authentic real life including working world. Under these approaches, the school facilitates students to attain HOTS that leads them to be creative, innovative, productive, and problem solving orientated.

The minister regulations further explain that authentic learning and authentic assessment have to associate closely with graduate competence standard and subject matter content standard. Graduate competence standard provides conceptual framework on targeted learning objectives that have to be accomplished, while subject matter content standard provides conceptual framework on authentic learning activities and authentic assessment types. As graduate competence standard, targeted learning objectives also cover three development domains: attitude, knowledge, and skill. Each of the three competence domains has different phases to reach the ultimate degree of learning achievement. Attitude is gained through hierarchical phases: acceptance, executing, appreciating, characterising, implementing. Knowledge is achieved through remembering, understanding, applying, analysing, evaluating, and creating. Psychomotor skills are acquired through observing, questioning, experiencing, reasoning,

presenting, and creating. To achieve ultimate learning outcomes, teachers are advised to use scientific approach of teaching that includes e.g., discovery or inquiry learning approach.

This study is only focused on authentic assessment. MOEC (2016) explains that authentic assessment measures student readiness, learning process, and learning outcomes as a whole. It describes student capacity, style, and learning achievement that leads to instructional effects for knowledge and skill, while attitude as nurturance effects. Results of authentic assessment will be used for remedial programme for students who have not yet mastered the standard of competence, and enrichment programme for those who have mastered the standard.

Authentic assessment is considered a new concept and practice for most teachers in Indonesia. Therefore, the mandate for teachers to implement authentic assessment is not an easy task. MOEC has nationally conducted seminars and workshops attended by educational personnel, teachers, and relevant stakeholders. In-house trainings have also been conducted in most vocational schools. Up to now, there is no a study yet done in Yogyakarta Special Region to know whether Building Construction Technique teachers have ability to implement the authentic assessment successfully.

This article is developed on the basis of the research findings with three foci: (1) teachers' understanding level about conceptual principles of authentic assessment; (2) teachers' ability level to plan authentic assessment; and (3) teachers' ability level to implement authentic assessment in Building Construction Technique Programme (BCTP) of State Vocational High School in Indonesia.

2. REVIEW OF LITERATURE

2.1 Conceptual principles of authentic assessment

Wiggins (1993: 209) describes authentic assessment essentially as task and procedures in which students are engaged in applying skills and knowledge to solve real-world problems. In the perspective of employers, Schell (2000: 7) claims that they look for workers who are "thinker" as well as "problem solvers". The implication is that teachers must engage students in more demanding school activities designed to promote the development of higher order thinking and problem solving. Parnell 1995 in Schell (2000: 7) explains that advanced thinking skills occur best when it starts in school and continues throughout life. Accordingly, future generations need to be prepared to function as thinkers, problem solvers, and lifelong learners. It is believed that today's fact-based curriculum requires a level of "learning transfer "that extends far beyond what could reasonably be expected of most students. To do this assessment properly, Scott (2000: 48) advises that teachers have to make every effort to develop meaningful, authentic learning, and assessment tasks that target the knowledge, skills, and attitudes necessary for learning and life.

Since vocational education, included Building Construction Study Programme, is conceptually determined by both educational philosophy and pragmatic framework, Papic and Bjekic (2005: 11-12) explains that there are nine philosophical principles in Vocational Education and Training (VET) that are highly related to assessment. The nine principles are: (1) development of the lifelong learning society; (2) integration of assessment into teaching and learning process; (3) expanded framework of opportunities for students to express and obtain highest level of achievements; (4) continuous process that defines assessment as a "continuous"

and "current" process; (5) transparency on the assessment criteria applied, methods and context, and explicitness of expectations; (6) responsibility for learning from institution to students to accept; (7) equity in measuring contents or level of students' achievement regardless of their economy and social status; (8) quality that sets the minimum standard for the criteria on outcomes' realisation leads to the establishment of certain standards; and (9) flexibility assessment strategy that provides feedback to students on their learning achievements.

O'Malley and Pierce in Callisson (1998: 2) have listed the following six specific characteristics that should be considered in authentic assessment. First, *Constructed Response:* student constructs responses to the situation and new multiple resources are explored in order to create a product. Second, *Higher-Order Thinking Needs:* responses are made to open-ended questions and require skills in analysis, evaluation, and creation. Third, *Authenticity*: tasks are meaningful and engaging activities that relevant to a real-world context. Four, *Integrative*: tasks call for a combination of skills and content open to assessment. Fifth, *Process and Product*: procedures and strategies for deriving potential responses and exploring multiple solutions to complex problems. Six, *Depth in Place of Breadth*: performance assessments build over time with varied activities to reflect growth, maturity, and depth, leading to mastery of strategies and processes for solving problems in specific areas with the assumption that these skills will transfer to solving other problems.

Simon and Greg (1993: 2) claimed that authentic assessments are derived from observing actual performance or relatively high-fidelity simulations of an actual performance and in real daily context. They explained that assessment is aimed at stimulating students to think, to react to new situations, to review and revise work, to evaluate their own and others' work, and to communicate results in verbal and visual ways. Furthermore, they asserted that authentic assessment can improve student participation in class and student input in the evaluation process.

More detail, Anderson 1998 in Letina (2015:138.) presents specifically comparison of philosophical beliefs and theoretical assumptions of authentic and traditional or authentic assessment in the following table.

Table 1: Comparison on belief and assumption between traditional and authentic assessment

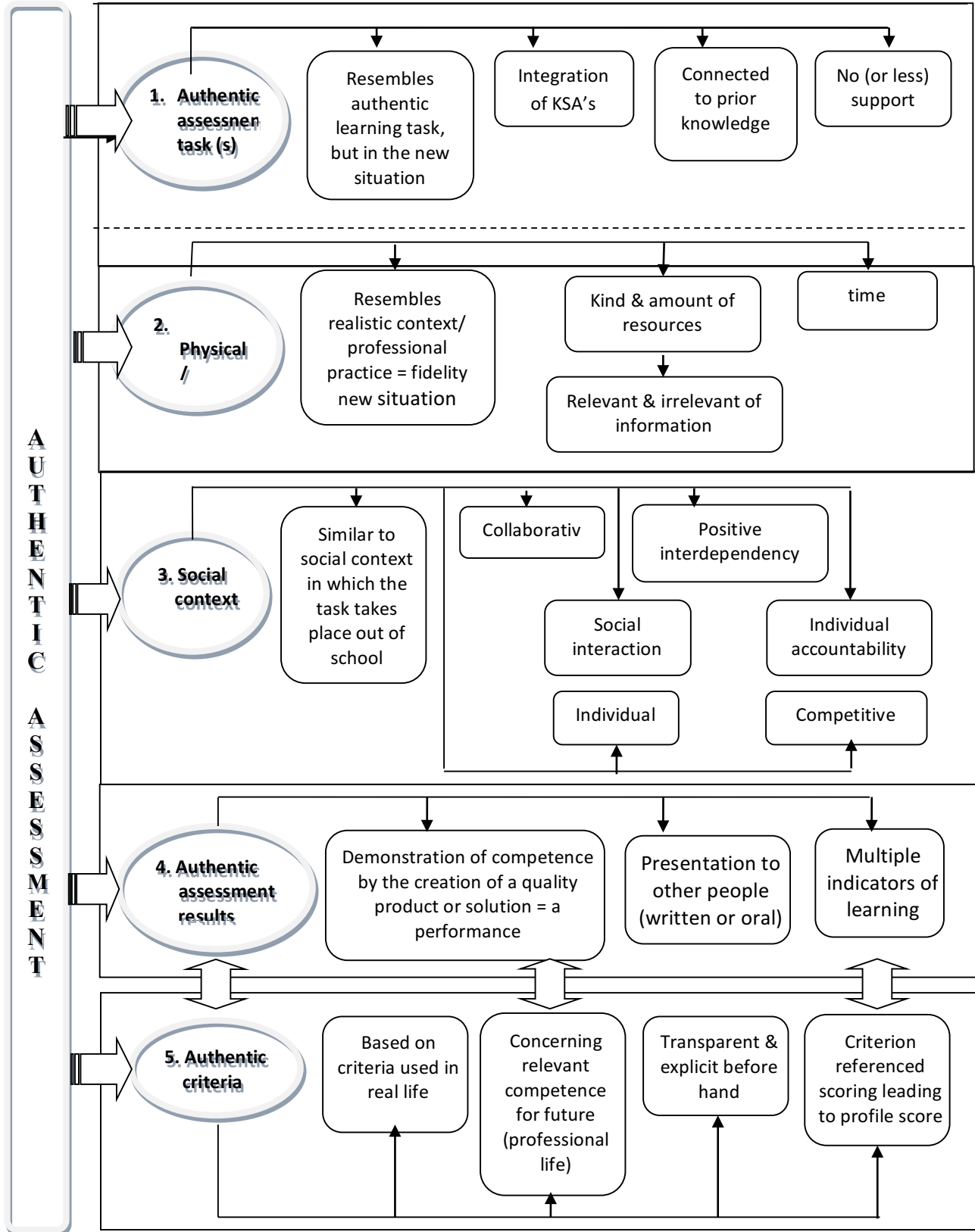| Traditional Assessment	Authentic Assessment
1. Assumes knowledge has a single consensual meaning.	1. Assumes knowledge has multiple meanings.
2. Treats learning as a passive process (emphasis on learning something, rather to do something)	2. Treats learning as an active process (emphasis on learning how to do something).
3. Separates the learning process from the final product (evaluate only the final product).	3. Emphasises the learning process and product (taking into account what, why and how students learn).
4. Focus the use of pieces of information (using lower levels of reviews)	4. Focus is on research, i.e. developing the ability to solve real problems.
5. Focus to document and monitor student learning and to classify them by their scores	5. Focus to facilitate student learning process to accomplish their learning outcomes/task.
6. Students' cognitive, affective and conative abilities are separate (emphasis on the cognitive dimension).	6. Recognises a connection between students' cognitive, affective and conative abilities
7. Embraces hierarchical model of power and control (students do not participate in decision-making).	7. Embraces a shared model of power and control (students participate in decision-making).
8. Perceives learning as an individual enterprise (student should independently solve a given task).	8. Perceives learning as a collaborative process (teacher and student are classmates).

The description above shows that authentic assessment has more benefits than traditional one, however numbers of experts in education see this statement is still a hypothesis (Hartmann, 2018). Proponent experts promote the implementation of authentic assessment. They claimed there is a need of paradigm shift from traditional assessment to authentic one (Atlas 1995, Koplin and Hui 2011).

2.2   Planning of authentic assessment

Today, the challenge is how to develop authentic assessment properly so that it benefits both teacher and students in teaching-learning process. Gulikers et al. (2004: 69) reminds us that what students perceive as authentic is not necessarily the same as what teachers view. If these perceptions do indeed differ, then it causes a problem. Even though teachers do their best to develop authentic assessment, this may all be for nothing if the students do not perceive them as such. Gulikers et al (2004: 69) suggests three important requirements in developing authentic assessment: (1) authentic assessment should be aligned to authentic instruction; (2) authentic assessment requires students to demonstrate relevant competence through a significant, meaningful, and worthwhile accomplishment; (3) authenticity is subjective, which makes student perceptions important to be accommodated in planning process.

Regarding construct of authentic assessment Gulikers et al. (2004, 67) offered 5 dimensions. They are: (1) Authentic task, that is relevant to problems faced by students in their daily life; (2) Physical context, students need to demonstrate given task both in or out of class; (3) Social contexts, students accomplish given task through social process in their life, e.g., collaboration, competitiveness, and communication; (4) Authentic results, results of assessment are real products with indicators; (5) Use number of indicators that show realistic results, expressing results explicitly, based-on professional competence in real situation. Figure 1 illustrates five dimensions of authentic assessment (Gulikers 2004, 73).

Furthermore, Wiggins (1990) cited by Aitken and Pungor (2005: 1) describes that authentic assessment is designed to: (1) make students successful learners with acquired knowledge; (2) provide students with a full range of skills; (3) demonstrate whether the student can generate full and valid answers in relation to the task or challenge at hand; (4). provide reliability by offering suitable and standardised criteria for scoring such tasks; (5) give students the chance to 'rehearse' critical thinking in achieving success in their future adult and professional lives; and (6) allow for assessment that meets the needs of the learners by giving authenticity and usefulness to results while allowing students greater potential for improving their learning and teachers more flexibility in instruction.

Figure 1: Five dimensions of authentic assessment

Fook and Shindu (2010: 159) provide some suggestions in planning of authentic assessment: (1) teacher has to stress the importance of good planning to provide valid, reliable and useful information concerning student achievement; (2) a clear guideline is needed to guide students to do their assignments; (3) information on types of assignments, individual, pair work or group work, grading system, and guidelines of conducting their assignments should be provided to students; (4) providing prompt feedback so that the focus is not on assessment of learning but more importantly, assessment for learning; (5) encourage students to make appointments with the teacher to discuss and review their work in progress; (6) equip the students with the relevant tools for managing and monitoring their own learning in order to become autonomous life-long learners.

MOEC (2016) states that the assessment of student learning outcomes of BCTP covers three competencies: attitude, knowledge, and psychomotor skills. Techniques and instruments used to measure each competence above need to be matched with the predetermined learning objectives, teaching-learning approach selected, and contextual reel world of work. These components should be accommodated in the lesson plan.

2.3. Implementation of authentic assessment

Teachers' ability in implementing authentic learning and authentic assessment is vital requirement in vocational teaching and learning process to yield worker candidates who are "thinkers" and "problem solvers" as recently needed by employers (Schell, 2000, p. 7). Authentic assessment needs to be done continuously and integrated with teaching learning process. Therefore, authentic assessment has to be relevant not only to intended theoretical learning competence, but also to model of teaching and learning activities that have been implemented.

The assessment of three competencies (attitude, knowledge, and psychomotor skills) should be treated proportionally so that each student can determine his/her position relevant to the standard competence. MOEC (2016) categorizes attitude competence into two: individual and social competencies. Techniques and instruments used to measure competence of attitude are observation, self-assessment, peer-assessment, and journal. Observation is assessment technique that is done continuously either directly or indirectly referring to a rubric and numbers of behavior observed. Self-assessment is an assessment that asks student to express his/her strengths or weaknesses in conjunction with his/her competence achievement using self evaluation sheet. Peer-assessment is an assessment that each student assesses others with reference to his/her competence achievement using peer assessment sheet. Journal is a teacher's note or description on a student behavior in or out of class on the basis of strengths and weaknesses of the student's attitude.

Competence of knowledge is assessed by written test, oral test, and assignment. Written test can be in the forms of multiple choices, fill in the blank, true-false, matching, and essay. Essay test should be equipped with scoring guidance or rubric. Oral test is administered based on guided question list. Assignment as an assessment may be in the form of home work and/or project to be done individualy or in group relevant to the assignment characteristics.

Competence of skill is assessed through students' performance in practical test, project, and portfolio. Instrument used can be in the forms of check list, rating scale with rubric. Project is an assessment that assigns students to plan, implement, and report in written or even oral presentation in a certain period of time. Portfolio is an assessment aims to measure all student works in a certain field or topic that reflects student's interest, development, achievement, and/or creativity in a certain period of time. Student's work in this portfolio may be in the form real action on student's interest to his/her environment.

To be objective, the implementation of assessment should base on developed rubrics illustrated in the lesson plan. Rodney (1996) explained rubrics are tools which designed to assist in the process of clarifying, communicating, and assessing expectations. Rubrics function as grading tools which contain specific information about what is expected of students based on defined criteria. One thing to be noted when uses a rubric that the verbs and conditions used need to represent real world of life aspects. The verbs that be categorised as lower order thinking skills (e.g., remember, understanding and observing) may be possibly used in authentic assessment.

Analysis of assessment results on student learning outcomes need to be used for remedial programme, enrichment programme, also for counselling programme as well as for teaching-learning process improvement.

3. RESEARCH METHOD

This study is a survey to measure BCTP teachers' competence about authentic assessment, and aims to discover: (1) teachers' understanding level about conceptual principles of authentic assessment; (2) teachers' ability to plan authentic assessment; and (3) teachers' ability to implement authentic assessment.

The population of the study was teachers in BCTP of State Vocational Senior High School (SMKN) in Yogyakarta Special Region (DIY), Indonesia that involves six schools, namely: SMKN 2 Yogyakarta, SMKN 3 Yogyakarta, SMKN 2 Depok, SMKN 1 Seyegan, SMKN 2 Pengasih, and SMKN 2 Wonosari. The sample was taken by quota random sampling technique and three teachers were assigned as respondents who have been nationally trained on the 2013 curriculum implementation including authentic assessment. Data collection techniques were questionnaires (closed and open ones) and documentation. There were three questionnaires developed in this study. The first questionnaire was to measure teachers' understanding level about conceptual principles of authentic assessment that consist of attitude (individual and social), knowledge, and psychomotor or skills domains. Second and third questionnaires were to measure teachers' ability to plan and to implement authentic assessment relevant to conceptual principles stipulated in 2013 Curriculum. Documentation was basically derived from teachers' lesson plans, and analysed to ensure if teachers' response to questionnaire corresponds to their description in their lesson plans.

To measure the three objectives described above, some statistical calculation need to be done, e.g., mean ideal and standard deviation ideal based on weighting scores referring to normal curve distribution with 6 section areas. Based on four scales (0, 1, 2, and 3) used in the instruments, Ideal Mean (Mi) = ½ (0+3) = 1.5 and Ideal Standard of Deviation (SDi) = 1/6 (3-0)

= 0.5. Table 1 below shows categorising criteria for the level of teachers' competence in authentic assessment.

Table 1: Categorising criteria for teacher's competence in authentic assessment

Criteria	Interval Score	Category
$X \geq (M_i + 1.5\ SD_i)$	$X \geq 2.25$	fully adequate*3)
$M_i \leq X < (M_i + 1.5\ SD_i)$	$1.50 \leq X < 2.25$	adequate*2)
$(M_i - 1.5\ SD_i) \leq X < M_i$	$0.75 \leq X < 1.50$	less adequate*1)
$X < (M_i - 1.5\ SD_i)$	$X < 0.75$	not adequate at all*0)

Notes for Teachers' Ability to Plan and to Implement of Authentic Assessment:
*3) have planned/implemented all intended authentic assessment relevant to 2013 curriculum without difficulty.
*2) have planned/implemented mostly intended authentic assessment relevant to 2013 curriculum with minor difficulty
*1) have planned/implemented few intended authentic assessment principles relevant to 2013 curriculum with **major** difficulty
*0) have not planned/implemented at all authentic assessment relevant to 2013 curriculum due to limited ability.

4. RESEARCH RESULTS

4.1 Teachers' understanding on concept and principles of authentic assessment

Teachers' level of understanding was measured by 19 closed questions within a questionnaire that covered three competence domains (attitude, knowledge, and skills) of student learning outcomes as stipulated in 2013 Curriculum. In detail, the 19 questions consisted of eight questions in attitude (four individual and four social), eight questions in knowledge, and three questions in skill competence. Analysis results from closed questionnaire were cross-checked with analysis results from open questionnaire and teachers' lesson plans. The following descriptions present data analysis results from closed questionnaire for each domain of competence.

4.2 Teachers' understanding of how to measure individual attitude competence

Four closed questions in the questionnaire are used to measure teachers' level of understanding of how to use properly the four main tools of authentic assessment to measure students' behavioral changes related to individual attitude competence (observation, student-self assessment, peer- assessment, and journal). Each question has four answer scales: 0 = inadequate at all; 1 = a little bit adequate; 2 = quite adequate; 3 = fully adequate. Collected data from the questionnaire are analysed using descriptive quantitative technique. The results are presented in Table 2 below.

Table 2. Teacher's level of understanding of authentic assessment for individual attitude

No.	Teachers' level of understanding of using authentic assessment tools:	X
1.	Observation based on numbers of behavior indicators.	1.97
2.	Student-self assessment to identify his/her strengths and weaknesses to master competence taught.	1.85
3.	Peer assessment to measure competence achievement taught.	1.94
4.	Journal as a teacher's note in and out of class.	1.79
	Mean score (X) of teachers' understanding level	1.89

Table 2 shows that the score distribution of teachers' understanding level of how to use the four main tools of authentic assessment to measure students' behavioral changes related to individual attitude competence ranging from a minimum score of 1.79 to a maximum score of 1.97 with a mean score of 1.89 in 0-3 scale or 63% of understanding. Referring to categorising criteria in Table 1, BCTP teachers' level of understanding of tools used in authentic assessment for individual attitude competence is "adequate" (falls between M_i and $M_i + 1.5 SD_i$).

4.3 Teachers' understanding of how to measure social attitude competence

Similar to four questions for individual competence, these questions were asked to sample teachers whether they use four main tools properly in authentic assessment to measure students' achievement in behavioral changes related for social attitude competence. Table 3 below shows the results of data analysis.

Table 3: Teachers' understanding of authentic assessment tools for social attitude

Teachers' understanding level to use the following authentic assessment tools:	X
1. Observation based on numbers of behavioral change indicators.	2.03
2. Student-self assessment to identify students strength and weaknesses to master competence taught.	1.97
3. Peer assessment to measure the level of competence achievement.	1.97
4. Journal assessment as a teacher's note in and out of class.	1,79
Mean score (X) of teachers' understanding level	1.94

Table 3 shows that the score distribution of teachers' understanding level of authentic assessment to measure social attitude competence ranging from a minimum score of 1.79 to a maximum score of 2.03 with a mean score of 1.94 in 0-3 scale or 65% of understanding. With reference to categorising criteria in Table 1, BCTP teachers' level of understanding of the tools used in authentic assessment for social attitude competence is "adequate" (falls between M_i and $M_i + 1.5 SD_i$).

However, document analysis of the sample teachers' lesson plans indicate that: (1) only 20% of teachers had described authentic assessment in their lesson plans; (2) 30% of teachers had not yet described their attitude assessments into four main types: observation and its behavioral indicators, self assessment in his/her strengths and weaknesses to achieve the desired competence, peer assessment to measure competence taught, and journal as a teacher's note in and out of class.

4.4 Teachers' understanding of how to measure knowledge competence

Eight closed questions in the questionnaire are used to measure teachers' understanding level of using properly eight types of tools in authentic assessment to assess students' achievement in knowledge competence. The assessment tools are: (1) multiple choice; (2) fill in the blank; (3) true and false; (4) matching in a pair; (5) essay; (6) oral test; (7) individual task; and (8) group task. Collected data have been analysed, and the results are presented in Table 4.

Table 4: Teachers' Level of Understanding of Authentic Assessment in Knowledge Competence

Teachers' understanding level to use the following authentic assessment tools:	X
1. Multiple choice.	2.21
2. Fill-in the blank.	2.18
3. True-false	2.18
4. Matching-in a pair.	2.12
5. Essay.	2.21
6. Oral test.	2.21
7. Individual task	2.21
8. Group task.	2.18
Mean score (X) of teachers' understanding level	2.20

Table 4 displays the score distribution of teachers' understanding level for the tools used in authentic assessment to measure knowledge competence ranging from a minimum score of 2.12 to a maximum score of 2.21 with a mean score of 2.20 in 0-3 scale or 73% of understanding. Referring to categorising criteria in Table 1, BCTP teachers' level of understanding of tools used in authentic assessment for knowledge competence is "adequate" (falls between M_i and $M_i + 1.5 SD_i$). This mean score (2.20) is close to $Mi+1.5SDi$ (2.25), in other word teachers' understanding level for the tools used in authentic assessment to measure knowledge competence is close to "fully adequate".

4.5   Teachers' understanding of how to measure skill competence

Three closed questions in the questionnaire were developed to measure teachers' level of understanding of using properly three types of tools in authentic assessment to assess students' achievement in skill competence. The assessment tools are: (1) practical test; (2) project assignment; and (3) portfolio. The questionnaire data have been collected and analysed, and the results are presented in Table 5 below.

Table 5: Teachers' Level of Understanding of Authentic Assessment in skill competence

Teachers' understanding level to use the following authentic assessment tools:	X
1. Practical test.	2.30
2. Project assignment	2.06
3. Portfolio.	2.21
Mean score (X) of teachers' understanding level	2.19

Table 5 displays the score distribution of teachers' understanding level for skill competence, ranging from a minimum score of 2.06 to a maximum score of 2.30 with a mean score of 2.19 in 0-3 scale or 73% of understanding. Referring to categorising criteria in Table 1, BCTP teachers' level of understanding of using tools in authentic assessment for knowledge competence is "adequate" (falls between M_i and $M_i + 1.5 SD_i$).

Table 2 to Table 5 above shows that all teachers' level of understanding of conceptual principles of authentic assessment for attitude, knowledge, and skill competence are "adequate". However, data analysis from open questionnaire reveals that 74% teachers acknowledge had not yet fully understood the conceptual principles of authentic assessment. In addition, data analysis from lesson plan documents reveal that only 20% assessment types is categorised as authentic assessment, the rest (80%) are not. This can be identified by: (1) almost all (90%) assessments written in lesson plans represent lower order thinking skills (remembering, understanding, and applying) and not yet represents higher order thinking skills (analysing, evaluating, and creating); (2) almost a half (45%) assessments for skills do not involve performance test; (3) about 30% assessments for attitude competence do not use observation approach; (4) more than a half (55%) the assessments are not accompanied by assessment rubric. Therefore, as a conclusion, BCTP teachers' level of understanding of conceptual principal of authentic assessment is 'less adequate'.

4.6 Teachers' ability to plan authentic assessment

Four inventory closed questions were developed in the questionnaire to measure teachers' ability to plan authentic assessment. These questions ask how far teachers have the ability to plan authentic assessment for attitude, knowledge, and skill competence. Each question has four degrees of alternative answers referred to as descriptive-inventory scales (3-0), which means: 3 = have planned all intended authentic assessment relevant to 2013 curriculum without difficulty; 2 = have planned mostly intended authentic assessment relevant to 2013 curriculum with minor difficulty; 1 = have planned few intended authentic assessment relevant to 2013 curriculum with major difficulty; (0) = have not planned at all authentic assessment relevant to 2013 curriculum due to limited ability to write it. The data have been collected and analysed, and the results are presented in Table 6 below.

Table 6: Teachers' Ability to Plan Authentic Assessment

Teachers' ability to plan authentic assessment for:	X
1. Attitude according to 2013 Curriculum	1.73
2. Knowledge according to 2013 Curriculum	1.94
3. Skill according to 2013 Curriculum.	1.94
4. Integrated Attitude, Knowledge, and Skill.	1.67
Mean score of teachers' ability to plan authentic assessment	1.83

Table 6 displays score distribution of teachers' ability to plan authentic assessment ranging from a minimum score of 1.67 to a maximum score of 1.94 with a mean score of 1.83 in 0-3 scale or 61% of ability. Referring to categorising criteria in Table 1, the BTSP teachers' ability to plan authentic assessment is in the category 2: "have planned mostly intended authentic assessment relevant to 2013 curriculum with minor difficulty" (falls between M_i and $M_i + 1.5$ SD_i).

Meanwhile, analysis results on teachers' lesson plans show an unexpected reality. Even though almost all teachers (95%) had written/developed student assessment in their lesson plans,

essentially only 20% of those assessments represent authentic assessment. The other teachers did not yet fulfill authentic assessment characteristics: (1) almost all (90%) assessment written in lesson plans do not yet represent higher order thinking skills; (2) almost half (45%) assessments for skills are not done through performance test; (3) about 30% assessments for attitude competence are carried out without observation; (4) more than a half (55%) the assessments are administered without assessment rubric. These findings are contradictory with the finding drawn from closed-questionnaire data analysis.

Although the data analysis from close questionnaire indicates that BTCP teachers' ability to plan authentic assessment is classified with minor difficulty, the data analysis from lesson plan shows the reverse, that is, BTCP teachers' ability to plan authentic assessment is classified with major difficulty.

4.8   Teachers' ability to implement authentic assessment

Fifteen inventory closed questions stated in the questionnaire are intended to measure teachers' ability to implement authentic assessment. These questions ask how far teachers had implemented authentic assessment for attitude, knowledge, and skill competence. The questions asked in this questionnaire is similar to the one used to measure teachers' ability to plan. Each question has four description inventory scale (3-0), in which 3 means "have implemented all planned authentic assessment relevant to 2013 curriculum without difficulty"; 2 means "have implemented mostly planned authentic assessment relevant to 2013 curriculum with minor difficulty"; 1 = means "have implemented few planned authentic assessment relevant to 2013 curriculum with mayor difficulty"; and (0) means "have not implemented at all authentic assessment relevant to 2013 curriculum due to the insufficient ability to implement". The data have been collected and analysed, and the results are presented in Table 7.

Table 7: Teachers' Ability to Implement Authentic Assessment

	Teachers' ability to implement authentic assessment for:	X
1.	Attitude, knowledge, and skill competence	1.79
2.	Attitude by observation	1.94
3.	Attitude by student-self assessment	1.73
	Attitude by peer assessment	1.67
5.	Attitude by journal	1.63
6.	Knowledge by individual assignment	2.03
7.	Knowledge by daily test	2.12
8.	Skills through performance appraisal	1.91
9.	Skills through practical assignment	2.06
10.	Skills project task.	1.82
11.	Skills through portfolio	1.79
12.	Skills by rubric	1.47
13.	Use authentic assessment results for remedial	1.94
14.	Use authentic assessment results for enrichment	1.94
15.	Use authentic assessment results to improve teaching and learning process.	1.88
	Mean score of teachers' ability to implement authentic assessment	1.84

Table 7 displays score distribution of teachers' ability to implement authentic assessment ranging from a minimum score of 1.47 to a maximum score of 2.12 with a mean score of 1.84 in 0-3 scale or 61% of ability. Referring to categorising criteria in Table 1, BTSP teachers' ability to implement authentic assessment is in the category: "have implemented mostly intended authentic assessment relevant to 2013 curriculum with minor difficulty" (falls between M_i and $M_i + 1.5 SD_i$).

Data analysis from teachers' lesson plan, in term of coverage reveals that: (1) still 30% teachers had not yet described their assessment for attitude competence and 25% for knowledge and skill competence; (2) still 40% teachers selected assessment techniques that were not relevant to core competence taught; and (3) still 45% teachers choose assessment tools that were not relevant to the real indicators existing in real work places.

With reference to Figure 1 of Gulikers et al (2004) on Five Dimentions of Authentic Assessment, and in term of content, data analysis of lesson plans indicate that the written assessments have not demonstrated any essential characteristics of authentic assessment. Those characteristics are particularly related to students' assignments: (1) learning tasks assigned to students do not represent problem solving in the students' community real life; (2) the assignments do not facilitate students to demonstrate their skills in and out of class; (3) the learning activities do not promote social process reflecting the students' real life, such as teamwork, and competitive atmosphere; (4) the learning process does not yield authentic products that represent students' real life, future professional demand, demonstrate valid skills, and presentation of students' works to public orally or in written; and (5) no criteria for learning achievement that represent professional competence or requirements.

Similar to teachers' ability to plan, in facts, the conclusion drawn from the lesson plan data description is that BCTP teachers' ability to implement authentic assessment is in the category "have implemented authentic assessment principles relevant to 2013 curriculum with "major" difficulty.

5. DISCUSSION

The data analysis from closed questionnaire concludes that the level of teachers' understanding of concept, principles, techniques and procedure in authentic assessment is adequate. And the level of teachers' competence in planning and implementing authentic assessment is not so much different. They administer the authentic assessment with minor difficulties. However, the results of data analysis from the open questionnaire show the reverse.

The teachers' responses from the open questionnaires indicate that some did not sufficiently describe authentic assessment for the three levels of competence, namely: attitude, knowledge, and skills. The lesson plans did not either elaborate properly or appropriately the characteristics that really represent authentic assessment. Obviously the teachers have not acquired adequate understanding of authentic assessment, and skills in its planning and implementation. This is likely due to the facts that lesson plan is a national policy (externally driven) while knowledge of authentic assessment is an internal process in individual teacher (internally driven) that needs gradual professional supports. MOEC and its subordinate offices

including schools should be aware of this reality that professional development programmes for teachers such as workshops and IHT must be provided sustainably.

The authentic assessment has been endorsed since the previous national curriculum known as KTSP (school-based level curriculum). But this did not encourage teachers and stakeholders to follow up with significant actions so that authentic assessment was not considered a big issue. To make it worse, the authentic assessment itself is not a simple thing to do. Chapter 2 elaborates the concept and principles of authentic assessment that teachers must engage students in more demanding school activities designed to promote the development of higher order thinking skills, creativity, and innovation to solve real life problem relevant to their future career. For this purpose, conventional tools such as paper and pencil would not be enough. A variety of evaluation instruments (tests/assignments, project, and portfolio) needs to be developed to suit to vocational education mission.

The implementation of authentic assessment is the consequence of a paradigm shift in philosophy from conventional assessment to the innovative model of assessment to meet the needs for the perspective of stakeholders (business and industry) as well as for vocational students themselves. This innovation assessment philosophy could be a good solution to unite two contrary vocational philosophies promoted by Charles Prosser and John Dewey. Raynold (2007: 73) explains that Prosser promoted the philosophy of "social efficiency" or "instrumentalist" that valued a view of appropriate "fit" between certain types of students and certain types of education. The academically inclined students were best suited for the classic academic curriculum while those who were not, were best suited for the vocational curriculum and thus vocational education was best separated from academic education. Contradictory, John Dewey promoted the philosophical stance known as "Democratic Humanism" that vocational education was needed for all students rather than for certain students, and its objective was to teach subjects through vocations rather than teach a vocation. Dewey supported the integration of the academic and vocational curricula to affirm the dignity of work, stress problem solving, expand students' views of the world, and create a deep understanding of the role of work in students' lives. Students should be facilitated with opportunities to think from themselves and articulate their thoughts.

The authentic assessment is generally different in principles from the current established system. Many teachers are reluctant to change the current established system as this innovative model means that they have to learn and train themselves to catch up with the innovation. And this also means additional burden to their daily work. Letina (2015) mentioned that a reason why authentic assessment implementation has not been success could be insufficiently developed teachers competences for its application. In addition, Stiggins (1997) points out that the lack of competences for the application of alternative (authentic) assessment is the reason why most teachers feel uncomfortable with its use. The implementation of authentic assessment would also distract the teachers' status quo. Many still believe, however, that the conventional system has produced successful graduates in the real life and professional career.

With reference to Tuckman theory in Wilson (2010): "Development sequence in small groups", the modification system of evaluation would imply that the teachers of the state vocational schools in Yogyakarta are in the transitional period: S*torming, Accommodating, Norming, and Performing.* Storming (S) refers to the state in which teachers have to face with the conflicting values relating to the introduction of authentic assessment that they have to leave

their old practice in using evaluation instruments to the new ones with the new principles. Accommodating (A) refers to the teachers' willingness to learn, understand, and eventually accommodate the principles of authentic assessment. Norming (N) refers to the normal situation in which teachers accept, and apply the principles of authentic assessment appropriately with comfort. Performing (P) refers to the phase of implementation that teachers are capable of performing learning principles with authentic assessment to produce desired outputs with acquired competence as required by business and industry and professional career development.

How much time does each stage end and moves on others (S, A, N, and P) depends on the intensity of teachers' professional support by the government and relevant institutions. The more intensive the professional support, the faster teachers complete the transitional period till they are capable of working effectively and efficiently on authentic assessment. The government in this case refers to MOEC and its subordinate offices and personnel, while the relevant institutions would include universities, Institution of Quality Assurance of Education, and Centers for the Development and Empowerment of Educators and Education Personnel.

On the basis of analysis results, the training content for teachers' professional development programme on the principles of authentic assessment (Tables 3 and 5), that require level of understanding (grade below Mean = X) would cover: (1) peer evaluation, and (2) journal for attitude domain; and projects for skills domain. Meanwhile, the content for planning skills development of authentic assessment (Table 6) would cover (1) assessment for attitude, and (2) combination of assessment of attitude, knowledge, and skills. To upgrade teachers' competence in implementing authentic assessment (Table 7), it would cover (1) student self evaluation; (2) students peer evaluation; (3) journal; (4) portfolio; and (6) rubric-based evaluation.

6.   IMPLICATION

The challenge that teachers have to face are understood and perceived authenticity at the work place. This is the point that teachers could start designing learning activity and authentic assessment. For this purpose, teachers should ensure if their perception of authenticity corresponds to the students'. That is very important to carefully examine the experiences of the users of the authentic assessments, before designing authentic assessments.

Schell (2000: 14) stated that "teachers who place high value on learning in authentic contexts usually organise their instructional day very differently". Teachers will devote less time to describing contents, however they should spend more time on enabling students to experience the use of the information in real or realistic settings. It is not easy task. In this case, the key issue is to design learning strategy that involves students' activities in the community or setting in such a way that capture students' imaginations.

At policy level, the implementation of authentic assessment demands commitments of the government and stakeholders to develop strategic programmes such as the followings. First, MOEC select some vocational schools as pilot projects to implement authentic learning and assessment. And these schools would be the center of professional development involving teachers from other vocational schools. Second, the teachers are not only given the opportunity to learn at the pilot schools but also in the real area of business and industry. Being exposed to

the work place, teachers are expected to gain understanding and relevant knowledge so that they know how to design and implement authentic learning and assessment best suited to the real world. Third, stakeholders support is necessary, especially from Chamber of Commerce and Industry in Indonesia. The schools and the industries facilitate *teaching factory* programme as has been launched by MOEC to provide relevant training and experience for the vocational school teachers to design and implement valid authentic learning and assessment. The government then should prepare a rewarding system for stakeholders especially those within the Chamber of Commerce and Industry that have facilitated support or committed to Memorandum of Understanding with vocational schools, e.g. in the form of tax reduction or block grant.

7.   CONCLUSION AND RECOMMENDATIONS

7.1   Conclusion

In line with the three earlier stated objectives, conclusion can be drawn as follows. First, the BCTP teachers' level of understanding of the concept and principles of authentic assessment is in category of "inadequate". Second, the teachers' level of competence in planning authentic assessment appropriately is in category of "less adequate" that is, they have made plan but with difficulty. Third, the teachers' skills at implementing authentic assessment is in the category of "less adequate" in that, they have implemented the authentic assessment but with difficulty.

7.2   Recommendations

In order that the vocational school teachers are capable of planning and implementing authentic assessment accordingly, this study proposes the following suggestions. First, the vocational school teachers should have experience in and direct observation on the spot on how authentic assessment must be planned and implemented. This experience and observation on the spot are accessible from apprenticeship programmes at the pilot schools that have implemented authentic assessment correctly. Second, MOEC supports and facilitates the vocational schools that have implemented accordingly to the concept and principles of authentic assessment. Third, the government develop a reward system for the stakeholders especially commerce and industry that participate in the school quality improvement programmes as in curriculum development, student/teacher apprenticeship, and teaching factory. Reward can be given in the form of tax reduction or block grant. Further study may need to be conducted by including qualitative data collection techniques, such as observation and interview to triangulate the research findings.

References

Aitken & Pungur (1996). *Authentic Assessment*. Retrieved on 30.11.2017 from www.ntu.edu.vn/Portals/96/.../ authentic%20assessment%202.pdf
Atlas, D. (2001). *Authentic Assessment: A Practical Application.* Montana: Department of Education, Montana State University – Bozeman.
Callison, D. (1998). *Authentic Assessment.* Retrieved on December 8th from http: www.ala.org/aasl/sites/ala. org.aasl/.../SLMQ
Custer, R. L. (2000). *Authentic Assessment –Basic Definition and Perspectives.* Ohio, Columbus: ERIC Clearinghouse.

Dewey, J. (1916, EBook 2008). *Education and Democracy*. Gutenberg: The Project Gutenberg EBook

Fook, C.Y. & Shindu, G.K. (2010). *Authentic Assessment and Pedagogical Strategies in Higher Education in Journal of Social Sciences,* Vol. 6, Issue 2, pp. 153-161.

Grey, A. (2016). *The 10 skills you need to thrive in the Fourth Industrial Revolution*, Formative Content from World Economic Forum, Switzerland. Retrieved on September 17th 2017 from: https://www.weforum.org/reports.

Gulikers, J.T.M. et al. (2004). "*A Five-Dimensional Framework for Authentic Assessment" Educational Technology Research and Development, Vol.52. No.3, pp. 67-86.*

Jaedun, A. (2014) *Kesiapan Guru SMK Programme Keahlian Teknik Bangunan Di Daerah Istimewa Yogyakarta dalam Melaksanakan Penilaian Pembelajaran Berdasarkan Kurikulum 2013.* Yogyakarta: Unpublished Research Report, Universitas Negeri Yogyakara.

Koplin, M. K. & Hui, C. F. (2011). *The Implementation of Authentic Activities for Learning: A Case Study in Finance Education* in e-Journal of Business Education & Scholarship of Teaching, 5 (1), 59-72.

Letina, A. (2015). *Application of Traditional and Alternative Assessment in Science and Social Studies Teaching* in Croatian Journal of Education Vol.17; Sp.Ed.No.1/2015: pages: 137-152. Zagreb: University of Zagreb.

MOEC. (2013). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 65 Tahun 2013 tentang Proses Pendidikan Dasar dan Menengah.* Jakarta: the Indonesian Ministry of Education and Culture.

MOEC. (2014). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 60/2013 tentang Kurikulum 2013 SMK/MAK.* Jakarta: the Indonesian Ministry of Education and Culture.

MOEC. (2016). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 22 Tahun 2016 tentang Proses Pendidikan Dasar dan Menengah.* Jakarta: the Indonesian Ministry of Education and Culture.

National Development Planning Agency (Bappenas) (2013). *Proyeksi Penduduk Indonesia 2010-2035*. Jakarta: Subdirektorat Statistik Demografi.

Newmann, F.M. et al. (2007). *Authentic Instruction and Assessment.* Iowa: Iowa Department of Education.

Papic, Z. M. & Bjekic, D. (2005). *Assessment in Secondary Vocational Education and Training Handbook.* Belgrade, Serbia: Programme Implementation Unit, Kosovke devojke bb.

Prosser, C. A., & Ouigley, T. A. (1950). *Vocational Education in a Democracy*. Chicago: American Tech. Society

Reynaldo, L. M. (2007). *An Evolving Set of Values-Based Principles for Career and Technical Education* in Journal of Career and Technical Education, Vol. 23, No. 1, Fall, 2007 – Page 84.

Rodney, L. C. (1998). *A Rubrics: An Authentic Assessment Tools for Technical Education in the Technology teacher.* December/January 1996.

Schell, J. W. (2000). *Think about Authentic Learning and Then Authentic Assessment.* Ohio, Columbus: ERIC Clearinghouse.

Schwab, K. (2013). *The Global Competitiveness Report 2013–2014 in World Economic Forum 2013*. Switzerland: Printed and bound by SRO-Kundig.

Scott, J. (2007: 48). *Authentic Assessment Tools*. Ohio, Columbus: ERIC Clearinghouse.

Shepard, L.A. et al. (1995). *Effect of Introducing Classroom Performance Assessments on Student Learning.* Los Angeles:

Simon, K. & Gregg, S. (1993). *Alternative Assessment--Can Real-World Skills Be Tested? Policy Briefs.* California: Center for Research on Evaluation, Standards, and Student Testing (CRESST), University of California.

Wiggins, G. P. (1993). *Assessing student performance: Exploring the purpose and limits of testing*. San Francisco: Jossey-Bass.

Wilson, C. (2010). *Development Sequence in Small Groups.* Retrieved on November 10th 2017 from http: www. coachingcultureatwork.com