

# The Development of Hybrid E-Learning Media for the Learning of Vocational Competency Basics in Vocational High Schools

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## Abstract

The objectives of the research are: (1) to produce hybrid-learning media for the Vocational Competency Basics in vocational high schools; (2) to investigate the feasibility of the developed hybrid-learning media for the Vocational Competency Basics in vocational high schools; and (3) to reveal the effectiveness of hybrid-learning media for the Vocational Competency Basics in vocational high schools.

This research used the Research and Development (R&D) method. Based on the model of development of the hybrid-learning (HEL) media for the Vocational Competency Basics, the following development procedures were arranged: planning, design, and development phases. In the development phase, on-going evaluation was carried out until a preliminary product was materialized. The result of HEL development underwent three experimentation phases. In the first experimentation, Alpha test, a media and material experts' validation, were executed. In the second experimentation, Beta tests, through individual experimentation and small group experimentation involving teacher and students (clients), were carried out up to the final phase revision. In the third experimentation, the product validation, also known as summative test, was obtained from extensive field experimentation to discover the effectiveness of the HEL media in a real teaching process using hybrid e-learning model.

The results of the research are as follows: 1) HEL is an online teaching media portal based on the Learning Management System (LMS) e-front learning, which is redesigned by integrating the online system and the face-to-face meeting in the classroom, in order to create an autonomous, active, effective, and efficient learning activities; 2) The HEL implementation as Vocational Competency Basics media using a Hybrid E-learning model has internal and external effectiveness that are able to improve the comprehension ability or the learning cognitive result of the students of vocational high schools. The implementation of the HEL media on the hybrid e-learning teaching model shows that: (1) students-teacher interaction happens synchronously and asynchronously, (2) mass-collaboration occurs, (3) students' active participation in the learning process is encouraged, (4) teacher-student feedback as well as fast and correct task completion happens, (5) students' exploration happens when sharing their opinion online, (6) the students' autonomy, self-development, talent-development, and skill-development are developed.

Thus, it can be concluded that HEL is feasible as a media for the hybrid e-learning teaching media based on the media and material experts' validation, and also based on the teacher and students' assessment. The client acceptance is mainly based on the learning cognitive result of the students. HEL media for the Vocational Competency Basics in a teaching process using hybrid e-learning model has internal and external effectiveness which is capable of increasing the learning cognitive result of the students. The application of the HEL media in the hybrid e-learning teaching model is relatively easy to be comprehended by both the teacher and the students, since it uses simple and familiar language suited to the characteristics of the students of vocational high schools. Vocational high school students can use HEL media comfortably, in a highly appealing fun way.

**Keywords:** Development of Hybrid E-learning media and the learning of Vocational Competency Basics.

## 1. Background

The learning implementation on vocational competency basics in Vocational High Schools nowadays tends to use conventional learning method using face-to-face setting in the classroom. The drawback of the classroom face-to-face conventional method is that it does not give students flexibility to study elsewhere but in the classroom, so that the students become less creative and less flexible. On the other hand, the classroom face-to-face conventional method has its upper hand; a teacher can understand the individual characteristic and learning improvement of the students. The full-time implementation of e-learning technology in the learning process without any face-to-face interaction between the teacher and the students can cause the teacher's minimum psychological approach in recognizing both the students' characteristics and the problems that they get during the learning process. The hybrid e-learning model is a learning model combining the conventional meeting or the face-to-face setting in the classroom with the management of e-learning environment whose objective is to provide the most effective and efficient learning/learning experiences. At present the hybrid e-learning model has not been implemented in the vocational high schools. One of the reasons is because there is no appropriate, feasible, and effective Learning Management System (LMS) for the hybrid e-learning model available yet. To

create a good quality hybrid e-learning media, certain procedures have to be undergone. The procedures cover design, development, management, and evaluation on the learning technology that will be applied to. Based on the findings of the preliminary field research, the followings can be revealed: 1) teacher has not yet created creative, dynamic, and autonomous learning atmospheres; 2) the students' learning autonomy is still low, and the students are still dependent on the material and the information passed on by the teacher in the learning activity in the class; 3) the hybrid e-learning learning model has not been applied by the vocational high school teachers, despite the fact that the ICT infrastructure in the school is quite adequate to support it; 4) teacher has not yet utilized the Learning Management System (LMS) in the learning process; 5) the average score of the Vocational Competency Basics subject is  $67 < 75$ , *which is still below the minimal learning completeness criteria for (Kriteria Ketuntasan Minimal/KKM) that has been decreed*; 6) e-learning has not been applied as it should be, and the teacher only uses power point (offline), because there are no supporting and appropriate media, yet. Those facts mentioned above become good reasons for the development of hybrid e-learning (HEL) media, especially in the Vocational Competency Basics subject in vocational high schools. The development of the hybrid e-learning media with regard to the integration of integrated pedagogical aspects becomes an effort to achieve an effective learning process as to improve the learning process which is full of meaning and as to increase the speed of comprehension and creativity, and thus, gaining optimum learning result.

## 2. Problem Statement

Based on the background of the problem mentioned above, the problem statements of this research are formulated as follows:

- 2.1 How is the procedure of the hybrid e-learning media development for the vocational competency basics learning?
- 2.2 How far is the feasibility of the hybrid e-learning media for the vocational competency basics learning?
- 2.3 How far is the effectiveness of the hybrid e-learning media for the vocational competency basics learning?

## 3. Theoretical Review

The hybrid e-learning media is a Learning Management System (LMS) based on e-front learning, whose function is to manage the learning organization of the hybrid e-learning model. Through e-front base LMS, the subject materials of vocational competency basics can facilitate the interaction between teacher and students as well as students and students. LMS supports various activities such as: administration, learning materials delivery, scoring (assignment, quizzes), tracking & monitoring, collaboration, and communication/interaction. Several advantages achieved by developing LMS using e-front are as follows: (1) there is a teacher - student interaction; (2) teacher can directly and indirectly monitor the students' learning process and how good the students' abilities are; (3) the availability of progress pages show students' activities during their study using hybrid e-learning from e-front; (4) there is a given facility, that is, the teacher can give material in the form of quizzes or exercises, which can be created directly in the e-front content; (5) teacher can give materials in the forms of offline document or documents written previously using Microsoft Word or other programs; (6) teacher can give information in the form of audio by recording the sound and then, distributing it to students joining the subject at a later date. Teacher can also directly score the students' learning progress; (7) e-front LMS can be used by several teachers and in several different subjects; (8) in each subject course, a chat and forum facilities are provided so that the students who are joining that subject can communicate with other students who are also joining the same subject, or else, it also facilitates the students so that they are able to communicate with the teacher who is delivering the subject (<http://www.efrontlearning.net/why-efront>).

According to Alan J. Handerson (2003: 130), the material delivery in e-learning is divided into three basic delivery methods namely: (1) Synchronous Learning, in which the teacher and the students are in the same class at the same time but at different places. The teacher can interact with the students and the student can also interact with other students; (2) Self-Directed Learning, in which the student accesses and learns the material by his/herself, without any interaction neither with the teacher nor with other students; (3) Asynchronous (Collaborative) Learning, which is an integration of those two previous methods. The teacher and the students are in the same class (virtual class), yet they are in different place and time. The students interact with both the teacher and other students. Therefore, a text-based or a multimedia-based Learning Management System (LMS) application is needed. The system and the material provided online can facilitate both the teacher and the students to proceed with the teaching/learning process anywhere and anytime, either asynchronously or synchronously.

To create an interesting and much requested hybrid e-learning media which enhances the teaching/learning quality, the following three requirements should be fulfilled: (1) Simple; a simple system will facilitate the students in applying the available technology and menu. The provided panel simplicity will make the students' learning time more efficient. (2) Personal; the instructor/teacher can interact with his/her students, as if he/she is communicating in the-front of the classroom. Using more personal approach and interaction, the students'

improvements are noted, and they get help to overcome their problems. (3)Fast; the service is supported by speed; quick response in addressing the students' complains and needs, so that the learning improvement can be executed as fast as possible either by the teacher or by the management (Hasbullah, 2006: 20).

Haughey (Rusman, 2011: 350) states that there are three possibilities in the development of the internet-based teaching/learning system, namely web course, web centric course, and web enhanced course. Based on those three aforementioned e-learning models, to get better and optimum results in vocational high school learning, a hybrid integration which is known as hybrid-learning should be executed. Peter Okidi Lating (2006) affirms that a hybrid-learning integrating the subjects in the school and the access for multimedia subject through internet from home or school is the most effective. According to Koohang, Riley, Smith, Schreurs (2009: 94), the constructivisme theory in e-learning based teaching/learning, encompasses three constructivism categories as follows: (1) learning activity design, 2) learning assessment, and 3) instructor role. Learning activity design encompasses collaboration, teamwork, perspective, real world examples, self reflection, several idea representations, and social negotiation. The learning assessment elements consist of instructor assessment, collaborative assessment, and self-assessment.

Martyn (2003) elaborates several important aspects in hybrid model learning, namely: a successfully environmental hybrid e-learning consists of one full face-to-face preliminary meeting, weekly online assignments accompanied with online communication (consultation), e-mail, and closed with one final examination in the form of face-to-face test or a written test in the classroom, helped by a supervisor. Thus, the students have more chances to develop him/herself and take responsibility for him/herself (Hooper, 1992: 21-38); (Saunders & Klemming, 2003: 74-86), increase social competency, improve the students' self confidence (Byers, 2001: 359-374), enhance the skill to get information and attain accomplishments (Kendall, 2001: 325-346). Moreover, teacher will appreciate each student's various learning styles and speeds (Piskurich, G. (Ed.), 2004), and support communication among the students themselves as well as between the students and the teacher.

The research result of Dziuban, C., Hartman, J., and Moskal, P. (2004: 5) states that: "blended courses have the potential to increase students' learning outcomes while lowering attrition rates in comparison with equivalent fully online courses". Furthermore, it is stated that: "Blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities"( Dziuban, C., Hartman, J., and Moskal, P. (2004: 3). Based on that result, it can be concluded that participation in hybrid or blended model learning demands the students to motivate themselves, to have effective management skills, and to interact in the classroom meeting. The combination of pedagogical methods are applied to create an active learning environment, so that the students have potential to learn more than when they are studying in a traditional class. Jared M. Carmen (2005) mentions five keys to successfully developing Blended learning or hybrid-learning, namely: (1) which is a synchronous direct teaching/learning or face-to-face (instructor-led instruction) either in the same time and the same place (classroom) or in the same time but different places (such as virtual classroom). To generate a suitable learning media product, a need analysis research is executed. To test the product effectiveness so that it can function well in public, a research to test its effectiveness needs to be carried out (Sugiyono, The development of hybrid e-learning media for the learning of the vocational competency basics in vocational high schools.

*Multimedia Based Instructional Design*: in multimedia-based instructional design, development procedure stages are proposed, which comprise analysis, design, development, and evaluation. Donald Kirkpatrick (Alessi & Trollip, 2001: 554-557) suggests four evaluation stages, namely evaluating the product user reaction, evaluating whether the students really learn the product content, evaluating attitudinal changes, evaluating the result and Return On Investment (ROI). Thus, the design of hybrid-learning media should be good, have a design unity and theme agreement in the web page, as well as fulfill both the aesthetic and the ease of navigation, so that the visitor can explore it easily. The design unity mentioned above is the font face, colors, navigation buttons (menu), menu placement, and banner. In his research, Peter Okidi Lating (2006), explains that the hybrid-learning model was first applied in a Serbia project in vocational high schools. Lessons in the form of multimedia can be accessed through the internet either at home or in school. The result of his research shows that there is a significant increase of the course learning outcomes which reaches 8.87%. The hybrid approach combines interactive learning and learning by doing. Moreover, it is said that although traditional classrooms are no longer feasible for students' learning activities, their presence is still preserved. The future learning patterns may involve not only the online system led by the class instructor, but also the hybrid or blended model that will emerge more often as the most effective learning strategy up to present time.

Relevant theories and research results proposed above show that there are similarity and difference with the product that is going to be developed in this research for dissertation. The former is that the media development using the hybrid approach combines interactive learning and learning by doing. The latter is that up to present the development of hybrid e-learning media has not involved important considerations as follows: (1) the integration of the user interface design with instructional design, (2) the development of the evaluation frame

works to improve the hybrid e-learning entire quality over the learning environment support, and (3) the choice of the hybrid e-learning software which is based on LMS e-front learning. The LMS e-front learning software is selected because it is very friendly, its language is simple, and its application suits the characteristics of the vocational high school students. The product development is created especially for Vocational Competency Basics learning that has not yet been applied in vocational high schools. Other than being observed from the product itself, the implementation of the product that will be developed will still maintain the advantage of the face-to-face meetings in the learning process. The combination between face-to-face meeting and the hybrid e-learning with the ratio of 50:50 is the most effective learning strategy. The advantage of the hybrid e-learning (HEL) product development, while paying attention to the integration of the integrated pedagogical aspect, is the integration of the interface e-learning element in the hybrid learning design. This integration is executed through constructivist, behaviorist, and cognitive learning theory approaches, to create an effective teaching/learning process. Therefore, in designing the e-learning development, one needs to comprehend how a person studies and to combine all knowledge when developing the system which is suitable to the expected learning outcomes. Hence it is hoped that the hybrid e-learning system can improve the students' comprehension ability as well as increase their learning outcomes.

#### 4. Method

This research employed a research and development approach, and it was intended to develop the hybrid e-learning media for Vocational Competency Basics learning in vocational high schools. The development model employed in this research was the result of the integration of multimedia development modeled by Alessi & Trollip (2001:407-561) and material development (Dick & Carey Model). This research and development had produced: (1) hybrid e-learning (HEL) media using LMS e-front as its base for Vocational Competency Basics learning, (2) tutorial book on how to use hybrid e-learning media for the teacher and the student, (3) Vocational Competency Basics learning instrument set.

The subjects for this research experimentation were chosen using purposive sampling technique. The subjects of the experimentation were the students in Grade X, majoring in Electronics Engineering, Audio Video Software Engineering Program. The subjects of the individual group experimentation and small group experimentation were 11 students in Adi Sumarmo Vocational High School of Colomadu. The extended group experimentations were carried out in State Vocational High School Number 2 of Surakarta, State Vocational High School 5 of Surakarta, and Vocational High School Muhammadiyah 3 of Surakarta. The total number of the subjects of the extended experimentation was 99 students for the experimental group and 95 students for the control group.

The data of the research were gathered through primary and supporting instruments. The former was the assessment sheet (questionnaire) for the hybrid-learning product. The questionnaires used were: (1) the questionnaire for the media experts encompassing three aspects namely the aspects of display design, interaction design, and information design; (2) the questionnaire for the material experts including two aspects, namely pedagogical and content correctness; (3) the questionnaire for students and teacher as a product users, in order to get the formative evaluation of the product that had been developed. The latter were in the forms of observation sheet, interview guide, and comprehension test or cognitive test. Their validity and reliability on this research and the development of the hybrid e-learning media development were reached in two ways: (1) logical theoretical validity and reliability, obtained by asking for the expert supervisors', material experts', and media experts' justification (criticism, suggestion, and revision) on the hints and instrument items that had been composed by the researchers. Those instruments were questionnaire, note sheet, observation guide, and interview guide; (2) empirical validity and reliability (through experimentation). Cognitive test questions (pre- and post-test) underwent validity and reliability test through questions hints analysis and empirical experimentation. The validity and reliability of the test items, both of the pre- and the post-test were determined using SPSS version 19 software program. The test items' distinguishing potency and level of difficulty were analyzed using the Excel 2010 program.

The data gathered in this research were: (1) the data of the need analysis of the hybrid e-learning media development made by the vocational competency basics teachers of vocational high schools; (2) the data of the need analysis of vocational competency basics material and the criteria of hybrid e-learning media; (3) the validation of the material experts' appraisal; (4) the validation of the media experts' appraisal; (5) the data of the teachers' evaluation upon applying the HEL product; (6) the appraisal data of the students' evaluation on the HEL product; and (7) the observation data on the product appeal obtained from the students' reaction and attitude during the experimentation of the HEL end product. The types of the compiled data were the quantitative data using scoring scale as the main data and the qualitative data in the form of suggestion embellishments and written inputs from the respondents as an additional data.

The design experimentations were done in three stages, namely: alpha test, beta test, and validity/evaluation or summative test. The non formal evaluation or the ongoing evaluation was done since the early development of the hybrid e-learning media. The data analysis technique used in the research was the interactive analysis model.

Both internal and external HEL product effectiveness tests used quantitative analysis technique employing parametric statistics. The HEL product internal effectiveness was measured from the students' cognitive learning results average, based on Gain (effectiveness degree) and the groups Gain gaps on the pre- and post-test of each experimental and control group. Statistical t-Test was employed to test the competence differences of the students' cognitive learning results of the control and experimental groups. The external effectiveness of HEL product was done using Anacova analysis with the help of SPSS version 19.00 program.

## 5. Result

The HEL development need aspect originating from the teachers of vocational competency basics shows that the vocational competency basics learning happening at present in the vocational high school is not yet ideal; it only gets 55% out of the sufficiency criteria percentage. From the human resource perspective of vocational competency basics teachers, the experimentation subjects already have experiences in using ICT in learning with the high category of 83.8%. This becomes the major asset in determining the success of the HEL media implementation in hybrid e-learning learning model, as it is also supported by good human resources preparedness in ICT mastering. Enthusiasm in the form of positive response that come out of teacher's motivation if the HEL product is implemented in the hybrid learning model is in the good category (76.6%). The means of the learning instruments that support HEL based learning is adequate (54.7%), meaning that that almost all vocational high school students have their personal laptop. However, the concern emerging out of the survey result shows that teachers have not ever done vocational competency basics learning process based on e-learning. It scores 3.8% which is in the "less" category, although in reality the online based learning facility can be implemented. The main problem is that there is no development connected with learning management system which supports the learning process in vocational high school; there is only web facility for administration and online announcement. There are many open sources of LMS, but there is neither socialization nor user's guide. Moreover, it is thought that the existing system is not suitable to the learning characteristics of vocational high school's students. Teacher's and students' opinions are alike, that is the presence of the media supporting the teaching/learning process with the hybrid model is the suitable model which has not yet been done in vocational high school ever. Respondents are quite optimistic that the hybrid e-learning media development can be executed well, because it is supported by sufficient teacher's knowledge and experience in the use of ICT in learning. Hence, the HEL development based on the integration of the principles of instructional, constructivist, and social constructivist aspects that are made in integrated way in designing the HEL media development drawn from the learning theory reinforcement is very appropriate for the students of vocational high schools.

The development activities show the quality of the assembly process of the parts that have already been created in the design product to be the early HEL product. They are the selection of LMS e-front learning software, the preparation of the text of the supporting material, illustration or animation, audio, and link. The HEL portal design based on e-front is on [www. Agusefendi.com](http://www.Agusefendi.com). The text assembly, upload of the material and test, upload of the users (user input), sign role (as a teacher or student), and other supporting material are appraised as suitable and feasible by the media experts. During the process and the creation, this early product is rated in an ongoing evaluation involving several parties who have ability in the field of web programming design. Among the parties involved are researchers who also act as developers, expert technicians in the fields of web design and computer engineering network, media experts (expert judgment), and material experts, who make sure that the product is feasible to be tested in the Alpha test.

Based on the summary of the pedagogical aspect assessment made by the material experts, it is found out that the clarity of the learning objective, the accuracy of the language choice, method choice, and material intensification get the average of 4.00, which was in the "good" category; the learning strategy gets the average of 4.1, also in the "good" category; learning motivation gets the average of 3.8, which is in the "good" category; and the information presentation averages 4.3, which is in the "very good" category. Based on the overall score of the pedagogical aspect assessment made by the material experts, the average of the total evaluation is 4.0 (good). The material experts consider this HEL media very constructive. The experts give a positive respond that this media is very suitable to be applied in vocational high schools. Based on the validation result elaboration from both the media and material experts, it can be concluded that there is no principle mistake, especially those related with the procedure of HEL development. It shows that observed from the point of view of development procedure, curriculum, and strategy that is used, the design of the product material of the HEL development is suitable, so that the HEL product is deemed feasible, acceptable, and in demand. Thus, the next stage is the field experimentation after the preliminary review as suggested to improve the quality of the HEL product that will be employed in the learning of vocational competency basics using the hybrid e-learning model.

The average pre-test score on the individual group experimentation is 65.0 and the post-test is 81.7, which shows that there is an average improvement with the Gain Score of 16.67. The same case happens in the small group experimentation; the average pre-test score is 54.4, and the post-test is 76.9, meaning that that there is a gain score of 22.5. The fact shows that the students who study vocational competency basics through HEL media

using hybrid e-learning learning model fulfills the standard of minimum criteria of completeness  $> 75$ . This means that on the individual group and small group experimentations the students have studied thoroughly and the required basic competency has already been reached. Thus, the procedure of the HEL product development program has taken place as the proposed planning design.

Based on the data analysis of the individual group experimentation mentioned previously, in general, it is found out that the results of the students' assessment on the individual group experimentation reveal that the display quality averages 4.1 which is in the "good" category and the material quality averages 4.3, which is rated as the "very good" category. Next, a small group experimentation is executed to get the client's acceptance affirmation on the HEL product. The data the result analysis of the small group experimentation shows the percentage of the students' evaluation on the display and material quality. The valuation which is comprised of 15 indicators shows that 33.3% is in the good category and 66.67% is in the very good category. Based on 12 indicators of the teachers' evaluation in using HEL material, it is found out that 25% of the teachers give a good score and 75% of them give a very good score. The overall average of the result of the teachers' evaluation in using hybrid e-learning learning model in small group is 4.6 or is in the very good category.

In brief, the students' interview description of the small group experimentation subjects states that the HEL media in the application of the hybrid learning model is very good and its application is relatively easy to understand. The language used in HEL is very familiar and it is suitable for students, especially those of vocational high schools. Asked about the HEL material presentation, generally the students state that it is easy to understand and they profess that they are not confused by it. Moreover, when asked about their learning experience using HEL product in the vocational competency basics learning using the hybrid model, all students who become the experimentation subjects say that they can use it, they feel comfortable, and it is enjoyable. Moreover, in their testimony, the students of vocational high schools Adisumarmo especially, wish that their school will apply HEL in the hybrid learning method, so that the learning activity will run effectively and efficiently to be developed for other subjects. Thus it can be concluded that generally the teacher's and students' assessment result of the HEL media on the individual and small group experimentations state that HEL product is very interesting and beneficial as an end product that facilitate the students to study vocational competency basics. The HEL product is a final product, ready to be implemented as vocational competency basics learning media using the hybrid e-learning model on the extended experimentation. It can be concluded from the result of the HEL media assessment on the individual group experimentation that students in general state that viewed from the display and material, HEL media product is feasible to be implemented in vocational competency basics learning media using hybrid e-learning model.

The extended experimentation result in State Vocational High School 2 of Surakarta reveals that overall, the teachers' evaluation on the material quality shows the average of 4.4, within the "very good" category. The students' evaluation on the display quality averages 4.1 (good) and on the material quality averages 4.3 (very good). The extended experimentation result in Vocational High School Muhammadiyah 3 of Surakarta reveals that overall, the teacher's evaluation on the material quality averages 4.02, which was in the "good" category. The students' evaluation on the display quality averages 4.2 (very good) and the material quality gets the total average of 4.3 (very good). The extended experimentation result in State Vocational High School 5 of Surakarta reveals that overall; the teacher's evaluation on the material quality shows the average of 4.69, within the "very good" category. The students' evaluation on the display quality shows the total average of 4.1 (good) and the total on the material quality averages 4.3 (very good). The summary of the teacher's evaluation result average on the activity and response of the students studying using HEL on all extended experimentation reveal the very good category elaborated as follows: (1) student - teacher interaction averages 89.82%; (2) student-student collaboration averages 91.78%, (3) active participation in learning activity averages 95%, (4) feedback request to friends or teacher averages 87.76%, (5) ability to finish the task quickly and accurately averages 77.67%, (6) effort in stating opinion averages 79.82%, (7) autonomously completing the task averages 97.94%, (8) competing with friends averages 85.71%, (9) having talent and skilled in learning activity averages 80.71%. Mean while, the students' response or attitude during the learning process using HEL shows a positive result, with the average of 82.77 % (very high category), while the students who give a negative response are 17.23% (very low category). The HEL product effectiveness in the hybrid e-learning learning model was obtained by reviewing the pre- and post-test scores. Heinich (1996: 57) explains that the failure to reach the proposed objective is an indication of the program discrepancy. Dengeng (1989: 173) explains that time is an efficiency indicators along with the personnel and the learning source. In relation with the personnel, HEL media application will reduce the teacher's assignment in learning activity. The time needed will be more efficient since the completion of the activity is determined by the students autonomously outside the learning hours. In relation with the learning source, the application of the HEL material source that is uploaded in the HEL portal can be used quickly by the studentss, anywhere and anytime, either in or outside their institution. Therefore, the vocational competency basics learning using HEL is claimed effective and efficient.

The HEL product effectiveness which is done internally in State Vocational High School 2 of Surakarta, reveals

that the cognitive learning result on the experimental group (Hybrid learning model using HEL) is better than the control group (conventional) with the Gain margin (degree of effectiveness) between the experimental group and control group of 18.53. In the significance test or the probability value test (2-tailed), of the post-test of the experimental and control groups, the value of t-count (11.326) is higher than that of t table (1.997) or the significance value (2-tailed) = 0.00 ( $< 0.05$ ). The null hypothesis is rejected, meaning that there is a significant difference between the comprehension test (post-test) of the vocational competency basics subject of the students instructed with HEL product with hybrid e-learning learning model and of the students instructed with conventional learning strategy. The conclusion is that the application of the HEL product in vocational competency basics learning with hybrid e-learning model in State Vocational High School 2 of Surakarta was effective, since the average result of the post-test in the experimental group tends to be higher, with the score of  $86.18 > 64.85$  (the control group's post-test average).

The HEL product effectiveness which is done internally in Vocational High School Muhammadiyah 3 of Surakarta reveals that the cognitive learning result on the experimental group (Hybrid learning model using HEL) is better than the control group (conventional) with the Gain margin (degree of effectiveness) between the experimental group and control group of 14.56. In the 2-tailed test, the significance is = 0.025 on the degree of freedom (df) n-1 or 58, the t-table is 2.002. In the significance test or the probability test (2-tailed) of the post-test of the experimental and control groups, the value of t-count (9.634) is bigger than the value of t-table (2.002) or the significance value (2-tailed) = 0.00 ( $< 0.05$ ). The null hypothesis is rejected, which means that there is a significant difference between the comprehension test (post-test) of the vocational competency basics subject of the students that are instructed with HEL product using hybrid e-learning learning model and of the students that are instructed with conventional learning strategy. The conclusion is that the application of the HEL product in vocational competency basics learning with hybrid e-learning model in Vocational High School Muhammadiyah 3 of Surakarta is effective, since the average result of the post-test in the experimental group tends to be higher, with the score of  $86.26 > 66.00$  (the control group's post-test average).

The HEL product effectiveness which is done internally in State Vocational High School 5 of Surakarta reveals that the cognitive learning result on the experimental group (Hybrid learning model using HEL) is better than the control group (conventional) with the Gain margin (degree of effectiveness) between the experimental group and control group of 19.96. The result of the difference test (t) between the pre-and post-test of the experimental group is bigger than that of the control group, although both groups show progress (t pre-test and post-test of each are significant) on alpha 0.05. However, this difference is strengthened by the t-value and the gain result of each group. The experimental group gain is  $35.44 > 15.48$  (the control group). It means that the application of HEL product on the experimental group in State Vocational High School 5 of Surakarta gives bigger contribution when compared with conventional learning. When the post-test average scores of experimental group and control group are compared, it is found out that the Mean of the experimental group in State Vocational High School 5 of Surakarta is  $85.74 > 62.74$  (the Mean of the control group). In the 2-tailed test, the significance is = 0.025. In the significance test or the probability test (2-tailed) of the post-test of the experimental and control groups, it is concluded that there is a significant difference between the comprehension test (post-test) of the vocational competency basics subject of the students that are instructed with HEL product using hybrid e-learning learning model and of the students that are instructed with conventional learning strategy. It means that the application of HEL product using the hybrid e-learning model on the experimental group in State Vocational High School 5 of Surakarta is effective. The finding is strengthened by the result of the post-test average on the experimental group, which tends to be higher, with the score of  $85.74 > 62.74$  (the control group's post-test average). It shows that the application of HEL product in vocational competency basics learning with hybrid e-learning model increases the students' cognitive ability when compared with the application of the present conventional strategy. Overall, the HEL product extended experimentation shows higher post-test average result when compared with conventional test. This means that the application of HEL in the vocational competency basics learning using the hybrid model gives better impact toward the students' cognitive learning result when it is compared with the application of common conventional strategy.

The effectiveness of HEL product externally is gained from ANACOVA analysis helped by SPSS 19. The experimental group gains significance value of  $0.82 > 0.05$ , which means that there is comprehension ability or cognitive learning differences; on the students who learns vocational competency basics leaning using HEL media through hybrid learning model. Different case happens on the control group who gets the significance of  $0.00 < 0.05$ , which means that there is no difference in the cognitive learning results of the students studying vocational competency basics using common conventional method. It is concluded that the application of HEL in the vocational competency basics learning is very effective in improving the students' cognitive learning results.

## 6. Discussion

The result of the experimentation of the HEL media implementation in the hybrid e-learning learning model shows that HEL media can improve the students' innovation, creativity, and thinking ability constructively. HEL

media gives full benefit to complete each other. It especially can maximize extensive learning for the students. The important aspect in the application of HEL in hybrid e-learning is creating flexibility to present the material, activity, and assessment which anticipates and accommodates different learning styles. It is found out from the direct observation that the application of the HEL media in the learning of vocational competency basics using hybrid e-learning model is more possible to make the students feel challenged to explore their intellects during the learning process. Moreover, the HEL media in hybrid e-learning is able to expose the students' cognitive ability during the learning process as in the scenario, situation, and learning experience. The HEL media in the hybrid e-learning model can develop the students' pedagogical ability, namely the combined strategy approach in learning values, cognitive, and skill of the students and makes them have proactive and autonomous learning experience, and encourages their complex thinking ability. The application of HEL media is used as learning management system based on structured LMS e-front learning which pedagogical objectives are designed intentionally to create space for the students in creating creativity and active learning activity instead of becoming passive recipients of information. The HEL media implementation in the hybrid model environment asks for the learning process to be centered on the students and done autonomously which facilitates learning through interactivity, and developing students' knowledge and comprehension professionally. Through HEL media in the hybrid e-learning learning model, a teacher acts as a facilitator, moderator, and model. The process is assumed as the cognitive and situational approach in learning, namely a process done together, especially in developing a set of different and situational information to be made into new information. More important finding is the role of teacher in using HEL as a facilitator to create and explicitly to attract the students' attention during the learning process, to build the students' knowledge in order to build the students' knowledge and comprehension. The application of HEL technological software based on LMS e-front in learning using the hybrid e-learning learning model can facilitate the students and teacher's levels of interaction, which directly affect the students' involvement in hybrid e-learning contents. The learning facility in the HEL content can increase students' learning interactivity. The higher the students' interactivity levels, the bigger their involvement with the presented content material. The finding of the research experimentation test shows that students participate actively and effectively, and do mass collaboration with their friends in various interactive experiences in transfer learning. This research finding is supported by Driscoll (2000:375), who states that "Constructivism has several roots in psychology and philosophy, some of them are the cognitive and development perspectives from Piaget, the interactional and cultural emphasis by Vygotsky and Bruner, contextual nature of learning, active learning from Dewey, epistemological discussion of von Glasersfeld, and scientific paradigm and revolution from Thomas Kuhn". It means that the constructivist on learning is a knowledge that is actively built by the students since they try to comprehend their experience and restructure it again to understand new information. That method has already been presented completely in the HEL product as a hybrid learning model. Thus, the integration of the learning strategy aspects done in integrated manner in hybrid e-learning development is very appropriate to create quality learning in vocational high schools.

## 7. Conclusion

Based on the research result and discussion, it can be concluded as follows:

7.1. The HEL media based on LMS e-front learning that is redesigned for hybrid e-learning learning model is able to create autonomous, active, effective, and efficient learning. The development of HEL media which is based on the principle of instructional, constructivist, and social constructivist aspects integration is very suitable for the need of vocational high schools, which combines virtual online program and face-to-face meeting, prioritizing face-to-face interaction, virtually as well as conventionally (face-to-face meeting in the class).

7.2. Based on media expert validation, material expert validation, and teacher's and students' assessment, the HEL media is suitable to be used in vocational competency basics learning using hybrid e-learning model. The client's acceptance is largely based on the learning result (cognitive score), the teacher and students' assessment, and the students' attitudinal respond upon employing HEL product in the vocational competency basics using hybrid e-learning for real.

7.3. The HEL media application in the hybrid e-learning learning model is relatively easy to comprehend by the teacher as well as the students. The language applied in the HEL media is simple, familiar, and appropriate for the students of vocational high schools. The vocational high school students can use it and feel comfortable with it. Moreover, it is fun and highly appealing.

7.4. The HEL media employment on the vocational competency basics learning using the Hybrid e-learning model has internal and external effectiveness which can increase the students' cognitive learning results. The implementation of HEL in hybrid e-learning model (1) facilitates students - teacher and among students' interactions when the vocational competency basics learning processes are done at the same time and place (synchronous), at the same time but different places (online chat), or in different places and times (asynchronous); (2) establishes mass collaboration between students and students, students and teacher, and equips peer-share knowledge through online; (3) compels the students to participate in the teaching/learning



activity actively; (4) gives teacher - student or student - student feedbacks; (5) gives the students ability to finish the task quickly and correctly; (6) explores the students to express opinion, done through online; (7) gives the students ability to complete the task autonomously; (8) makes students compete with other students; (9) makes the student develop him/herself according to his/her talent and skill in the learning process.'

7.6 The HEL product employment which is a combination of e-learning and face-to-face meeting in classroom can increase students' enthusiasm, innovation, creativity, and thinking ability constructively. Giving its full benefit to complete one another, it can maximize the learning intensification for the students. The important aspect in employing HEL media in hybrid e-learning is to create flexibility in providing material, activity, and assessment which accommodate and anticipate different learning styles. This challenges the students to explore their intellect in the learning process. Moreover, the HEL product in the Hybrid e-learning learning model can build the students pedagogical ability, namely the combination strategy approach in learning value, cognitive, and skill to the students in order to make them to have proactive and autonomous learning experience and to boost their complex thinking ability.

7.6 The employment of the HEL media as structured learning management system with the pedagogical purpose are deliberate and designed to create space for the students in creating active learning creativity and activity instead of becoming passive recipients of information. Hybrid e-learning media is centered more on the students, creating learning autonomy and facilitating the learning through interactivity to build the students' knowledge and comprehension professionally. This process is considered as learning' cognitive and situational approach, namely a process that is executed simultaneously especially in developing a string of different information and their situational learning to be used as new information. The factors which determine the success of the HEL media implementation in the teaching/learning of hybrid e-learning model are, among others: 1) the students are expected to be more active and creative and to have ability to explore materials which are relevant with the tasks given by the teacher in the internet sites; 2) the teacher has to change his/her attitude, form the subject matter oriented at the beginning to complete and comprehensive mastery oriented; 3) Responsibility and autonomy should be established.

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