

Conference Paper

Optimizing the Cognitive Abilities of Students Through Learning Methods and Web-Enhanced Course Media

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Abstract

The learning process focuses on results and only includes educational innovation in the pedagogical realm. The rapid development of technology allows educational actors to not only focus innovation on one criterion but on several important factors that can improve the development of students' knowledge and skills (Owusu & Larbi, 2018). Collaboration between the learning methods used by teachers and learning media, especially web-enhanced courses, is expected to improve students' cognitive abilities. This study used simple descriptive methods and linear regression to examine the optimization of students' cognitive abilities through a web-enhanced course. The data were obtained from questionnaires that were filled out by 45 teachers of SMK Pawytan Daha 1 Kediri. The web-enhanced course improved the students' level of understanding. From this research, it can be concluded that the world of education, especially teachers, should include learning methods and media to support the optimization of student' cognitive abilities.

Keywords: Learning Methods, Web-Enhanced Course, Student Cognitive

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1. Introduction

Technological developments, can not necessarily be used as an optimal learning medium. Many supporting factors of technological development that still need to be considered by educational actors, especially teachers, for the technology to support the optimization of learning in the class. It is known that the learning process always focuses on results and has educational innovation in the pedagogical realm only, so in the rapid development of technology allows educational actors in learning activities not only to focus innovation on one criterion but to pay attention to several important

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factors that can improve the development of knowledge and skills that students have in a learning environment that uses technology media (Owusu & Larbi, 2018).

Some supporting factors that are not part of the teacher's attention in learning activities, turned out to have an impact on the lack of optimal cognitive abilities possessed by students. These factors include the lack of teacher ability to communicate the material to students, lack of mastery of technology-based learning media, and still dominant conventional models in learning activities. The rapid development in digitization, making learning media also undergoes a transformation of change in a better direction, one of which is to use digital media in the form of the web in teaching-learning activities. Digital-based media that teachers can use is a web-enhanced course. This is because web-enhanced course media is only used as a supporting medium in delivering lesson materials and is not used as a substitute for teachers. In the web-enhanced course, some activities have the potential to encourage the ability in critical thinking of students, because in this medium it allows students to conduct group discussions and develop pedagogic competencies (Hayward, 2004).

There is no denying that the proper use of methods and media in learning activities is one of the strategic steps that teachers can use in conveying materials precisely and easily understood by students so that students can improve their ability to remember materials, understand concepts easily, apply concepts appropriately, analyze emerging problems, evaluate problems and find the right solutions (Anderson & Krathwohl, 2001; Watts and Hodgson, 2019). Besides, the association of usage between methods and learning media will increase students' interest and develop cognitive abilities, thus helping students in understanding the materials taught by teachers (Tammu, 2017).

2. Literature Review

2.1. Learning Methods

The method used by teachers in learning is an accumulation of all teaching concepts and learning concepts. The combination of teaching concepts and learning concepts used by teachers in the classroom, both face-to-face and online classes always involve some of the main elements of teaching-learning activities. Elements that are always involved in supporting the implementation of this learning method consist of students, learning objectives, materials to be delivered, learning support facilities, procedures and tools, and media that will be used in supporting learning (Dewi, 2018). Besides, learning methods are used to learn a process for easy understanding by learners, then can be

applied in the theory being studied (Reigeluch, 2015; Wahyuni, Hartana & Rachmadi, 2020).

2.2. Web-Enhanced Course

Effective learning activities are heavily influenced by the teacher's ability to choose the right learning media. One of them is to utilize the development of technology in the form of an internet network in learning. One of the technology-based media that can be used in supporting learning activities in the class is the web-enhanced course. In the use of enhanced course web media, teachers are required to be able to master and operate computers connected to the internet. This is because this media demands teachers to be able to search all forms of information by utilizing the internet and being able to convey in the classroom easily. Not only teachers are required to be able to master the use of the internet when teaching and learning activities take place, but also students (Alfath, Ellianawati & Sukisno, 2013). This web-enhanced course is used by teachers in supporting face-to-face learning so that the implementation of learning activities can be optimally conducted (Prawiradilaga, 2008; Safitri & Jaenudin, 2015).

2.3. Cognitive Student

A student's cognitive ability is an ability to think that consists of the ability to connect the theory studied, assess and learn, then continue by performing an analysis of a particular event or event (Susanto, 2011). This ability to think will always be followed by physical and neural development together, continuously, and gradually (Abdurrahman, 2012). Cognitive ability is one of the abilities that students must master during the teaching and learning activities. The very important role in mastery of this ability will help students in understanding the material quickly in learning activities, this is because the remembering and thinking activities that are characteristic of cognitive abilities will make a considerable contribution when teaching and learning activities take place. With their cognitive abilities, students have a very wide opportunity to develop all their potential and can be used to develop effective and psychomotor abilities both at school and outside of school (Mitasari, 2018). The purpose of the emphasis on mastery of this ability in learning is actually to encourage students' maturity in exploration and combine it with accurate analysis of the environment, so that with accurate animate ability, hopefully, they can live decently when they graduate from school (Wati & Handayani, 2020). Cognitive abilities in the concept of Taxonomy will start from the simplest ability of

students in the form of memorization to the most complicated ability that is to apply to the meter that can be in life. In the revised taxonomic cone, it appears that given the initial abilities emphasized in this cognitive aspect, after that it is only followed by the ability to understand concepts, apply concepts, perform analysis, explore and the last one is to create. In this level of creating, students are ready to make changes and create something new in the form of solutions and goods/services products (Anderson & Krathwohl, 2001; Watts and Hodgson, 2019).

3. Research Methods

This research uses simple descriptive and linear regression methods. The purpose of using this method is to obtain an overview of the use of the Web-Enhanced Course towards optimizing students' cognitive abilities. The data is obtained from questionnaire results that have been filled out by teachers using simple linear regression analysis techniques. The population used in this study is the teacher of SMK Pawytan Daha 1 Kediri. The population used in measuring the optimization of students' cognitive abilities through the Web-Enhanced Course amounted to 45 respondents, while the sampling technique used in total sampling so that the research sample was obtained is the same as the research population (Sugiyono, 2007). The data obtained in this study is quantitative data and qualitative data. Qualitative data in the form of criticisms and suggestions from validators and users for developed products. Meanwhile, the custodian data in the form of scores obtained from the validity score and the reality of the instrument on each item answers from the statement. The instrument can be said to be valid if $r_{hitung} > r_{tabel}$. Meanwhile, the instruments can be said to be reliable if the value is more than 0.6. While the linearity level of both variables is measured by the provision of sig value. $<$ criteria significance (0.05).

4. Results and Discussion

4.1. Results

The data of the research results is divided into two, namely the data before conducting the research and the data after conducting the research. The data before conducting the study includes the observation of problems and the calculation of validity and reality tests on research instruments that will be used by researchers to test whether there is a link between the methods and media used by teachers in learning to optimize

students' cognitive abilities. From field observations, some data shows that there still needs to be innovation and improvement of teachers' ability to choose and streamline appropriate methods and media at the time of learning, especially here is a technology-based learning medium. After obtaining data in the form of a description of the problem during field observation, it is necessary to create a research instrument that can cover the problem so that a solution is found. Data obtained from instrument trials will be conducted validity test and realization test, it is possible to know the accuracy and consistency of the instrument to be used as a measuring instrument of this research. The results of the validity and reality test with the number of instrument grains as many as 17 grains and 23 test respondents are as follows:

4.1.1. Instrument Validity Test

The instrument validity test results in Table 1 indicate that all items on the instrument have a positive validity value, this is seen from the value of $r_{hitung} > r_{tabel}$. r_{tabel} itself is obtained by paying attention between the size of df and the distribution of the value of r_{tabel} product moment. The df used in this validity test is 21, while the percentage level of significance used is 5% resulting in r_{tabel} of 0.433.

TABLE 1: Validation Statistic

No Item	r_{xy}	r_{tabel}	Keterangan	No Item	r_{xy}	r_{tabel}	Keterangan
1	0,464	0,433	Valid	11	0,898	0,433	Valid
2	0,714		Valid	12	0,772		Valid
3	0,604		Valid	13	0,576		Valid
4	0,821		Valid	14	0,751		Valid
5	0,866		Valid	15	0,879		Valid
6	0,916		Valid	16	0,914		Valid
7	0,682		Valid	17	0,703		Valid
8	0,802		Valid				
9	0,491		Valid				
10	0,807		Valid				

4.1.2. Instrument Reliability Test

The results of the reliability test in Table 2 show that all items on the instrument that have been tested have a degree of reliability or consistency. The decision of an instrument is said to be reliable or consistent if using Cronbach's Alpha then the value of Cronbach's

Alpha > 0.06. While the test results of the intrusion realization of this study have a value of Cronbach's Alpha value of 0.921 > 0.06.

TABLE 2: Reliability Statistics

Cronbach's Alpha	N of Items
.921	17

After conducting the validity test and instrument reliability test, the next step is to deploy the questionnaire to the respondent. The respondents in this study were all teachers who were in SMK Pawayatan Daha 1 Kediri which numbered 45 respondents. As for the results of a simple linear regression test used to see the optimization of the use of learning methods and web media enhanced course to cognitive students is to have a relationship between variables both individually and together. Statistical test results show that between the learning method variable and the web media enhanced course has a moderate degree of closeness of the relationship, this is indicated from the statistical test results stating that the value is $R = 0.503$. As for the value of coefficient determination (R^2) has a value of 0.253, meaning the variable learning method with web media enhanced course only has a contribution of 25.3% to the changes that occur in the cognitive variables of students, so many factors can affect the cognitive of students beyond the learning methods and web media enhanced courses that teachers use in teaching-learning activities. However, statistical tests for Fhitung showed quite satisfactory results, this was seen from sig results. The f_{hitung} is 0.02, meaning the value of Sig. $F < 0.05$. With these results, it can be said that the method of learning and the use of web media enhanced course if done together will affect the cognitive optimization of students.

TABLE 3: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	55.861	2	27.930	7.122	.002 ^b
Residual	164.717	42	3.922		
Total	220.578	44			

a. Dependent Variable: Y
 b. Predictors: (Constant), X_2, X_1

In addition to testing whether variable learning methods and the use of web-enhanced course media can affect students' cognitive optimization together, it will also look at how each free variable can affect partially bound variables.

TABLE 4: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
1 (Constant)	8.462	2.343		3.612	.000
X_1	.194	.113	.257	1.722	.006
X_2	.285	.128	.332	2.221	.002

a. Dependent Variable: Y

From the results of the analysis in Table 4, it appears that both learning method variables and web-enhanced course variables partially affect students' cognitive optimization, this is shown from sig results. t indicates a value smaller than 0.05. The results of correlation analysis, both partially and simultan, prove that learning methods and web media enhanced courses have a strong relationship with students' cognitive. That is, the development of students' cognitive abilities is influenced by the ability of teachers to use precisely between learning methods and web media enhanced courses in the class defense process. With the application of these learning methods and media, the teacher will be made easier in transferring his knowledge to students, while students will be made easy to understand the elusive material becomes easy to understand.

4.2. Discussion

The results of the above research indicate that learning is a complex activity in the world of education. Especially if talking about output in learning activities, it will not be separated from the methods used by teachers in teaching. The combination of the accumulation of teaching concepts and the concept of learning in learning activities will involve students, objectives, materials, and content according to the purpose of learning, facilities provided, procedures in learning as well as tools or media used (Dewi, 2018).

The application of the right learning methods is necessary by teachers to support the achievement of the transformation of science optimally and maximally. The use of appropriate learning methods tailored to students' needs and learning objectives in teaching and learning activities will assist teachers in minimizing errors in material delivery and can maximize understanding of student concepts (Nasution, 2018). In addition to the use of learning methods, teachers should also be able to choose the right media in supporting the success of learning activities. Thus, learning media is in principle inseparable in learning activities, because the use of media in learning is one of the efforts that teachers can make so that students easily understand the materials submitted so that the quality of students' understanding can be improved and learning

goals achieved optimally (Tafonao, 2018). The absence of media in teaching-learning activities can help teachers in representing the shortcomings of the material that has been conveyed, in addition to learning media can help teachers in real exemplifying the material that is being conveyed so that students can understand and conclude the material easily and precisely (Mediawati, 2011).

The role of media in learning not only focuses on making it easier for students to understand the material but can also motivate students to develop critical ways of thinking and acting realistically (Cook-Sather, 2002; Greetings, Akib & Daraba, 2018). The activities that can be done in the world of education in following the development of technology is by the use of technology-based learning media. The media used in learning does not have to be 100% using technology. One of the learning media that can support teacher activities in the delivery of materials is the web-enhanced course. In this web-enhanced course, teachers only use 25% technology, because this type of media use is only used as supporting material delivered by teachers. Web media enhanced course allows students to be more independent in teaching-learning activities, this self-reliance includes the search for supporting materials through online media while still getting mentoring from teachers, so that students' opportunities in developing and improving their skills will be higher (Priyambodo, Wiyasari & Sari, 2012). Collaboration between methods and enhanced course web media which is a technology-based media can be used by teachers in supporting the achievement of students' cognitive abilities optimally. Students' cognitive abilities can be achieved to the maximum when able to understand up to apply and create be it ideas, solutions, and products of materials and problems when learning is on.

5. Conclusion

Perpetrators in the world of education, especially teachers, should be able to upgrade their abilities in learning activities that include learning methods and media used to support the optimization of students' cognitive abilities as well as support the development of effective and psychomotor abilities of students. This is because the application of the right learning methods is necessary by teachers to support the achievement of the transformation of science optimally and maximally. With the results of research showing that the variables of learning methods and learning media both partially and simultaneously affect the cognitive optimization of students when viewed from the teacher side, it shows that the need for the ability of teachers in applying learning

methods and the selection of the right learning model at the time of learning activities teaching in the classroom.

References

- [1] Abdurrahman, M. (2012). *Pendidikan Bagi Anak Berkesulitan Belajar: Teori, Diagnosis, Dan Remediasinya*. Jakarta: Rinieka Cipta.
- [2] Alfath, S. N., Ellianawati and Sukisno, M. (2013). Pengembangan Media *Blended Learning Berbasis Web Enhanced Course* Pada Mata Kuliah Fisika Dasar 2 Jurusan Fisika UNNES. *Unnes Physics Education Journal*, vol. 2, issue 1, pp. 2-6.
- [3] Dewi, E. R. (2018). Metode Pembelajaran Modern Dan Konvensional Pada Sekolah Menengah Atas. *PEMBELAJAR: Jurnal Ilmu Pendidikan, Keguruan, dan Pembelajaran*, vol. 2, issue 1, pp. 44-52.
- [4] Hayward, L. M. (2004). Integrating Web-Enhanced Instruction into a Research Methods Course: Examination of Student Experiences and Perceived Learning. *Journal of Physical Therapy Education*, vol. 18, issue 2, pp. 54-65.
- [5] Mediawati, E. (2011). Pembelajaran Akuntansi Keuangan Melalui Media Komik Untuk Meningkatkan Prestasi Mahasiswa. *Jurnal Penelitian Pendidikan*, vol. 12, issue 1, pp. 68-76.
- [6] Mitasari, N. R. (2018). Model Pembelajaran Edutainment Terhadap Perkembangan Kognitif Siswa Sekolah Dasar. *Jurnal Cakrawala Pendas*, vol. 4, issue 1, pp 1-9
- [7] Nasution, M. K. (2018). Penggunaan Metode Pembelajaran Dalam Meningkatkan Hasil Belajar Siswa. *Studia Didaktika*, vol. 11, issue 1, pp. 9-16.
- [8] Owusu-Agyeman, Y. and Larbi-Siaw, O. (2018). Exploring the Factors that Enhance Student–Content Interaction in a Technology-Mediated Learning Environment. *Cogent Education*, vol. 5, issue 1, p. 1456780.
- [9] Priyambodo, E. P., Wiyasari, A. and Sari, R. L. P. (2012). Pengaruh Media Pembelajaran Interaktif Berbasis Web Terhadap Motivasi Belajar Mahasiswa. *Jurnal Kependidikan*, vol. 42, issue 2, pp. 99-109.
- [10] Salam, R., Akib, H. and Daraba, D. (2018). Utilization of Learning Media in Motivating Student Learning. Presented at *International Conference on Social Sciences (ICSS 2018)*, vol. 1, pp. 1100-1103. Jakarta:IPDN
- [11] Safitri, D. and Jaenudin, R. (2015). Pengaruh Media *Web Enhanced Course* Terhadap Hasil Belajar Peserta Didik Pada Mata Pelajaran Ekonomi Di MAN 1 Prabumulih. *Jurnal PROFIT Kajian Pendidikan Ekonomi dan Ilmu Ekonomi*, vol. 2, issue 2, pp. 152-158.

- [12] Sugiyono (2017). *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Bandung: Alfabeta.
- [13] Susanto, A. (2011). *Perkembangan Anak Usia Dini*. Jakarta: Kencana Prenada.
- [14] Tafonao, T. (2018). Peranan Media Pembelajaran Dalam Meningkatkan Minat Belajar Siswa. *Jurnal Komunikasi Pendidikan*, vol. 2, issue 2, pp. 103-114.
- [15] Tammu, R. M. (2018). Keterkaitan Metode Dan Media Bervariasi Dengan Minat Siswa Dalam Pembelajaran Biologi Tingkat SMP. *JP (Jurnal Pendidikan): Teori dan Praktik*, vol. 2, issue 2, pp. 134-142.
- [16] Wahyuni, A., Hartana, D. D. and Rachmadi, S. S. (2020). Metode Pembelajaran Yang Digunakan Oleh Guru Sekolah Dasar. *PENSA*, vol. 2, issue 1, pp. 23-27.
- [17] Wati, A. P. and Handayani, S. (2020). Web Enhanced Course, Solusi Bagi Peserta Didik dalam Pemahaman Materi Perkuliahan. *Jurnal Pendidikan Ekonomi*, vol. 13, issue 1, pp. 61-68.
- [18] Watts, L. and Hodgson, D. (2019). Social Justice and Social Work Practice. In *Social Justice Theory and Practice for Social Work*. Singapore: Springer, pp. 171-185.