Re: Poslato sa sajta

21 messages

TEM Journal <temjournal@gmail.com> Fri, Jun 25, 2021 at 5:20 PM
To: binarprahani@unesa.ac.id

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We have received your manuscript and forwarded it to reviewers.
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On Thu, Jun 24, 2021 at 9:29 AM <binarprahani@unesa.ac.id> wrote:

> Form details below.
>
> First Name: Binar Kurnia
> Last Name: Prahani
> Email: binarprahani@unesa.ac.id
> Comments: Dear Prof. dr Camil Sukic
> Editor in Chief of TEM Journal
>
> We have conducted grant research series from the President Director of the Educational Fund Management Institution of the Ministry of Finance of the Republic of Indonesia who has supported Productive Innovative Research (RISPRO) funding [KEP-16 / LPDP / 2020 dated March 18, 2020]; under the title "Development Blended Web Mobile Learning (BWML) Model"
>
> With research members as follows:
> Dr. Binar Kurnia Prahani; Prof. Dr. Budi Jatmiko, Universitas Negeri Surabaya, Indonesia
> Dr. Bambang Hariadi, Dr. M.J. Dewiyani Sunarto, Tri Sagirani, M.Sc., Tan Amelia, M.Sc., Julianto Lemantara, M.Sc., Universitas Dinamika, Indonesia
>
> We hope to be able to publish on TEM Journal, as an output of our grant research series. For the time of publication of our article, we fully give it to the TEM Journal editors. We also are ready to pay publication fees and all rules at TEM Journal. Thank you very much for your attention and help.
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All emails need to be from institutional domain.
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We request this due to the safety and the true identity of the author.

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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Fri, Jun 25, 2021 at 10:12 PM
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Dear Editor of TEM Journal

Our article "Development Blended Web Mobile Learning Model on Covid-19 Pandemic"
We confirm that:
1. The submitted manuscript is genuine, not regarded elsewhere, and previously unpublished.
2. All the authors mentioned in this paper agree that the paper will be published in this journal with the stated order of the authors.

We hope to be able to publish in TEM Journal. Thank you very much for your attention and help.

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Dr. Binar Kurnia Prahani
Corresponding Author
Universitas Negeri Surabaya

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Considering the fact that you have used your published papers to achieve continuity of your scientific research, the genuineness of the paper is acceptable.
We are sending you originality report of the text.
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You have many authors in the paper. Reduce the number of authors up to 6.

The references in the text cannot be concentrated in one place (**not more than two or three**), but they need to be deployed in the text in those places where you have used them.
When there are several consecutive citations then write: [1], [2], **Not ([1]-[2], [1-2], [1, 2]**).

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You need to reduce this number up to 30-35.
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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Sun, Sep 19, 2021 at 12:27 AM
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Dear Editor of TEM Journal

Thank you very much for all your suggestions.
We have revised all suggestions from the editor.
Hopefully, our paper can be published in 2021.

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Greater referentiality is achieved if you cite papers from TEM Journal (from TEM Journal published in the previous two years 2020 or 2021**) into another journal.**
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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Sat, Oct 2, 2021 at 4:32 PM
To: TEM Journal <temjournal@gmail.com>

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TEM Journal <temjournal@gmail.com> Wed, Oct 20, 2021 at 9:31 PM
To: Binar Kurnia Prahani <binarprahani@unesa.ac.id>

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References should be presented in **a full form** in the same way as they are presented in Google Scholar (APA style).
Rearrange references in APA style, for example:

> [1] Amin, D. I., & Ikhsan, J. (2021). Improving Higher Order Thinking Skills via Semi Second Life. *European Journal of Educational Research*, *10*(1), 261-274.

Not:

> [1] Amin, D.I., and Ikhsan, J., Improving higher order thinking skills via semi second life. European Journal of Educational Research, 10, 1, 261-274 (2021).

Check other references you have used.

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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Mon, Oct 25, 2021 at 7:30 AM
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TEM Journal <temjournal@gmail.com> Tue, Oct 26, 2021 at 6:42 PM
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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Sun, Oct 31, 2021 at 11:34 AM
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TEM Journal <temjournal@gmail.com> Thu, Nov 4, 2021 at 5:11 PM
To: Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Dear Binar Kurnia Prahani,

Your paper "Development Blended Web Mobile Learning Model on COVID-19 Pandemic" **has been accepted** to be published and printed in Tem Journal Vol.10, No.4, (in last week of November, 2021).
Please sign copyright agreement form, and send a scanned copy back to us.
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Binar Kurnia Prahani <binarprahani@unesa.ac.id> Sat, Nov 13, 2021 at 12:25 AM
To: TEM Journal <temjournal@gmail.com>

Dear Editor of TEM Journal

In advance, we apologize for the slight delay in making payments due to conditions in our area. Today, we have managed to pay according to the bill given by the editor (proof of payment attached). We have confirmed on the camera-ready paper that everything is ok. Thank you for the excellent cooperation by the editors.

For further information, does the TEM Journal accept the topic of Bibliometrics using VOSViewer regarding Educational Leadership? We have a manuscript at the end of the month ready to submit. I hope the good work will continue.

Thank you very much for the positive response which we really appreciate.

Best Regards,

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Universitas Negeri Surabaya

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Development Blended Web Mobile Learning Model on COVID-19 Pandemic

Binar Kurnia Prahani[1], Budi Jatmiko[2], Bambang Hariadi[3], Dewiyani Sunarto[4], Tri Sagirani[5], Tan Amelia[6]

[1]*Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia (binarprahani@unesa.ac.id)*
[2]*Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia (budijatmiko@unesa.ac.id)*
[3]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (bambang@dinamika.ac.id)*
[4]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (dewiyani@dinamika.ac.id)*
[5]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (tris@dinamika.ac.id)*
[6]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (meli@dinamika.ac.id)*

Abstract **– Education Design Research (EDR) focuses on producing a Blended Web Mobile Learning (BWML) to increase the students' HOTs of senior high school. The BWML model in each phase is supported by using the MoLearn application (web and mobile version). The results indicate that the BWML model is proven to be valid, practical and effective in improving HOTs of senior high school students. Research implication such as: (1) The BWML model can be used as an alternative to digital-based learning, (2) The BWML model can be a reference for developing a hybrid learning model in COVID-19 pandemic, (3) For research in developed countries, the results of this research can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it.**

Keywords **–BWML, ~~H~~higher order thinking skills, ~~L~~learning model, MoLearn.~~**

1. Introduction

COVID-19 pandemic has caused a lot of chaos in the world.

DOI: 10.18421/TEMxx-xx
https://doi.org/10.18421/TEMxx-xx

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya
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Received: -----.
Accepted: -----.
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In addition, COVID-19 has had an effect in various lines of life, including education. The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills. The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have [1], [2]. Recent research results in the last three years indicate the importance of HOTs has been studied in several countries [3], [4], [5]. In addition, research also varies with HOTs including assessment [6], [7], [8], curriculum [9], media [10], and learning [11], [12]. The results of these studies confirm that HOTs need to be trained and owned by students [13], [14], [15].

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

Alternative solutions that already exist for improving student's HOTs are the Problem Based Learning (PBL) model [16], [17], [18] and blended learning [19], [20], [21]. The main advantages of PBL and blended learning are contextual problems and IoTS-based, making it easy to train and improve the HOTs. However, in general there is no one that integrates PBL and blended learning models based on digital media to improve student's HOTs.

Commented [P2]: Vague. Consider revising.

Commented [P1]: Vague. Consider revising.

Therefore, the researchers developed the BWML model.

The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be accessed in web and mobile version (see Figure 2. and 3.). The BWML is specially designed to improve the student's HOTs of senior high school. The BWML model is developed using EDR (education design research) which is supported by empirical studies and learning theories, including social construction theory, cognitive theory, dual coding theory, behavioural learning theory, digital literacy and multi representation.

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors) that have been validated, which have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practical~~ly~~ observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version. The development is carried out in two core stages (details in Figure 1.) adapted from [22], [23], namely: (1) preliminary study and development of the BWML model; (2) limited and large-scale trial of the BWML model.

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2. Research ~~M~~method

I. PRELIMINARY STUDY AND DEVELOPMENT OF BWML MODEL

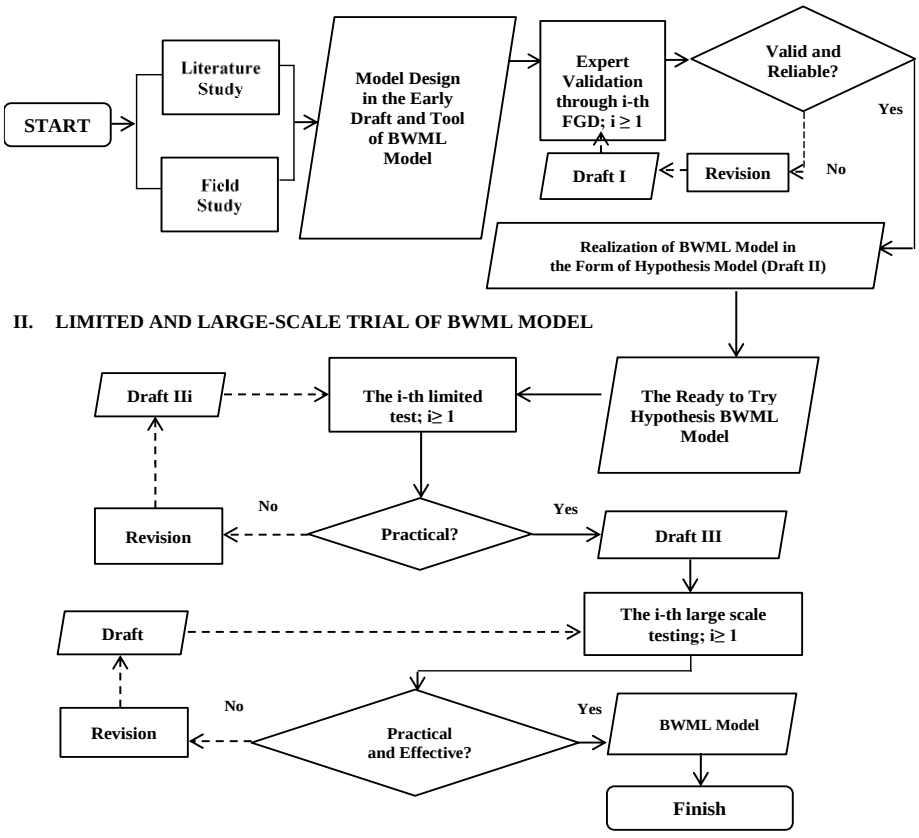

Figure 1. The EDR stages of the BWML model

Effectiveness data analysis using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [22], [23]. The syntax of the BWML model, such as:

Commented [P4]: Vague. Consider revising.

- Phase I; Orientation based on IoTs and Big Data, focus on C4 and C5
- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
- Phase IV; Presenting, focus on C4, C5, and C6
- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [22], [23].

3. Results and ~~D~~discussions

3.1 BWML ~~M~~model ~~V~~validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school. These results are used as a reference for continuing the second and third stages of the BWML model development.

3.2 BWML ~~M~~model ~~P~~practically

Observers are optimized to see the practicality of the BWML model which syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2. and Figure 3.

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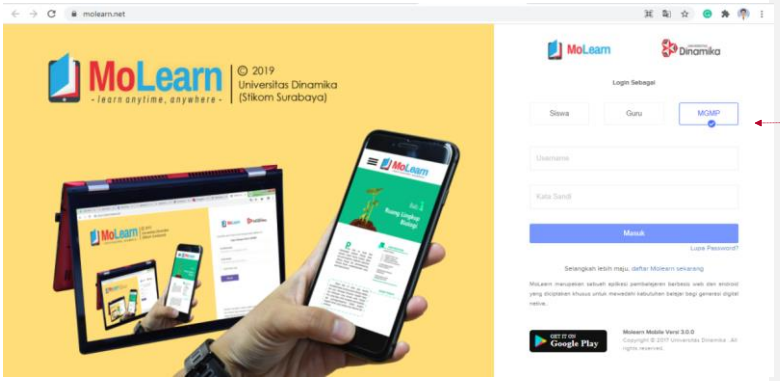
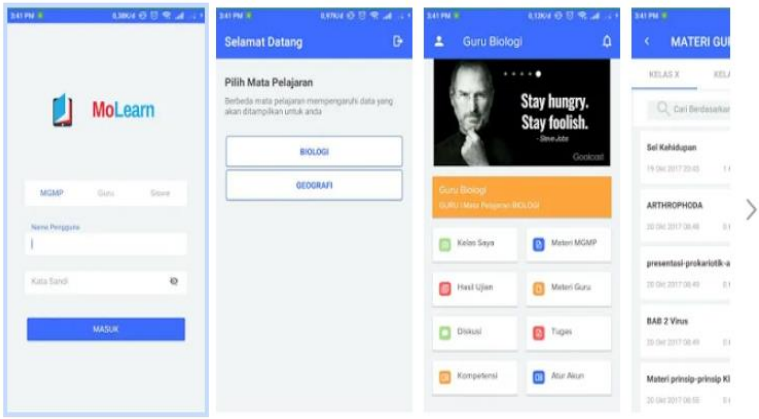


(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



(Source: https://play.google.com/store/apps/details?id=edu.stikom.molearn&hl=in)

Figure 3. MoLearn in mobile version (Intellectual Property Rights by Authors)

Each class has three observers to follow and assess the BWML model implementation. Each observer uses a valid and reliable instrument to observe the implementation of the BWML model. The results of the BWML model practicality in increasing student HOTs are presented in Table 1.

Table 1. BWML ~~M~~model ~~P~~practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
	State Senior High School II	Good	Valid	Reliable

3.3 BWML ~~M~~model ~~E~~effectiveness

The students were given a pre-test; the learning was then carried out with a post-test. The analysis results are presented in Table 2. Table 2. shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain	Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	Moderate	Significant
	State Senior High School II	35	Significant	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	Low	Significant
	State Senior High School II	32	Significant	Low	

α = 5%

3.4 Research ~~I~~implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the COVID-19 pandemic [24], [25], [26]. Including the need for innovation in education during the COVID-19 pandemic [27], [28], [29].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that the BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like in developed countries.
- For researchers in developing countries, the results of this study can be used as motivation and generally used in improving the quality of learning, especially in increasing the students' HOTs of senior high school.

4. Conclusion

The focus of the BWML model is to increase the students' HOTs of senior high school. The BWML model in each phase is carried out and supported by using the MoLearn application. The results of this study indicate that the BWML model is proven to be valid, practical and effective in improving the students' HOTs of senior high school. The limitations of this research are still applied to Biology and Geography subjects. Further research can be carried out: (1) the BWML model can be developed in other subjects; (2) the BWML model can be developed for elementary, junior high school and Higher Education levels; (3) The BWML model can be customized to be fully online based.

5. Acknowledgments

The author's gratitude goes to to the Ministry of

Finance of the Republic of Indonesia who has supported funding [KEP-16 / LPDP / 2020 dated March 18, 2020].

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[1] Amin, D. I., & Ikhsan, J. (2021). Improving Higher Order Thinking Skills via Semi Second Life. *European Journal of Educational Research*, *10*(1), 261-274.

[2] Habiddin, H., & Page, E. M. (2020). Probing Students' Higher Order Thinking Skills Using Pictorial Style Questions. *Macedonian Journal Chemistry and Chemical Engineering*, *39*(2), 251-263.

[3] Vallejo, A. J. A. (2019). The Higher Order Thinking Skills of Students on Visayan Poems. *Universal Journal of Educational Research*, *7*(8), 1679-1689.

[4] Utomo, A. P., Narulita, E., & Shimizu, K. (2018). Diversification of Reasoning Science Test Items of TIMSS Grade 8 Based on Higher Order Thinking Skills: A Case Study of Indonesian Students. *Journal Baltic of Science Education*, *17*(1), 152-161.

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[10] Sutarto, Indrawati, Prihatin, J., & Dwi, P. A. (2018). Geometrical Optics Process Image-Based Worksheets for Enhancing Students' Higher-Order Thinking Skills and Self-Regulated Learning. *Jurnal Pendidikan IPA Indonesia*, *7*(4), 376-382.

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Development Blended Web Mobile Learning Model on Covid-19 Pandemic

Binar Kurnia Prahani[1], Budi Jatmiko[1], Bambang Hariadi[2], Dewiyani Sunarto[2], Tri Sagirani[2], Tan Amelia[2]

[1]*Universitas Negeri Surabaya, Indonesia*
[2]*Universitas Dinamika, Indonesia*

***Abstract* – Education Design Research (EDR) focuses on producing a Blended Web Mobile Learning (BWML) to increase the students' HOTs of senior high school. The BWML model in each phase is supported by using the MoLearn application (web and mobile version). The results indicate that the BWML model is proven to be valid, practical and effective in improving HOTs of senior high school students. Research implication such as: (1) The BWML model can be used as an alternative to digital-based learning, (2) The BWML model can be a reference for developing a hybrid learning model in Covid-19 pandemic, (3) For research in developed countries, the results of this research can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it.**

***Keywords* – Higher order thinking skills, BWML, Learning model, MoLearn.**

1. Introduction

Covid-19 pandemic has caused a lot of chaos in the world.

DOI: 10.18421/TEMxx-xx
https://doi.org/10.18421/TEMxx-xx

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya
Email: binarprahani@unesa.ac.id

Received: -----.
Accepted: -----.
Published: -----.

In addition, Covid-19 has had an effect in various lines of life, including education. The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills. The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have. Recent research results in the last five years indicate the importance of HOTs has been studied in several countries [1],[2],[3],[4],[5]. In addition, research also varies with HOTs in the 2017-2021 period including assessment [6],[7],[8], curriculum [9], media [10], and learning [11][12][13][14][15]. The results of these studies confirm that HOTs need to be trained and owned by students.

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

Alternative solutions that already exist for improving student's HOTs are the Problem Based Learning (PBL) model [16],[17],[18] and blended learning [19],[20],[21]. The main advantages of PBL and blended learning are contextual problems and IoTS-based, making it easy to train and improve HOTs. However, in general there is no one that integrates PBL and blended learning models based on digital media to improve student's HOTs. Therefore, the researchers developed the BWML model.

The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be accessed in web and mobile version (see Figure 2 and 3). BWML is specially designed to improve the

student's HOTs of senior high school. The BWML model is developed using EDR (education design research) which is supported by empirical studies and learning theories, including social construction theory, cognitive theory, dual coding theory, behavioral learning theory, digital literacy and multi representation.

2. Research Method

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors) that have been validated, which have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practically observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version The development is carried out in two core stages (details in Figure 1) adapted from [22],[23], namely: (1) preliminary study and development of BWML model; (2) limited and large-scale trial of BWML model.

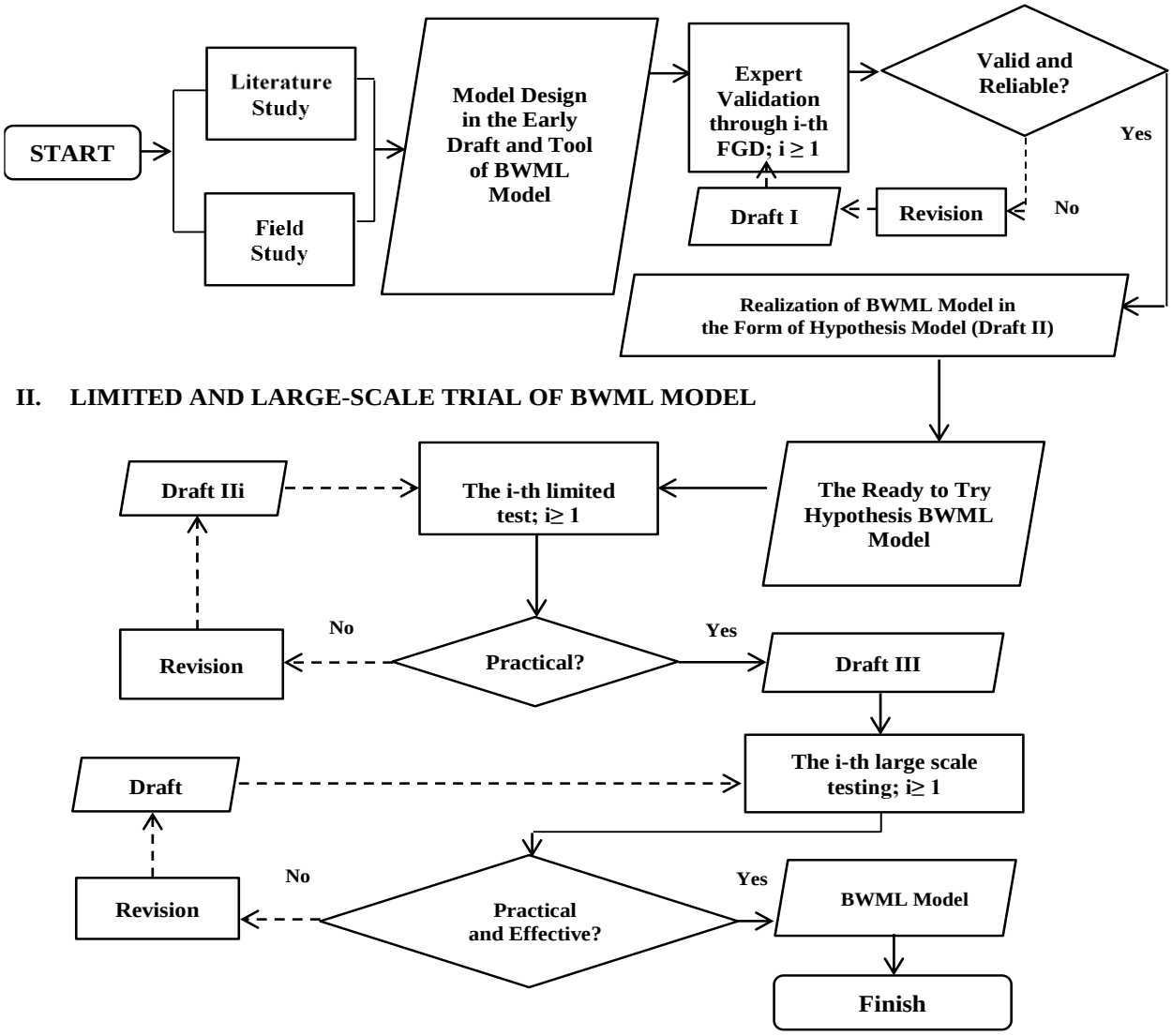


Figure 1 The EDR stages of BWML model adapted from [22],[25]

Effectiveness data analysis using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [24],[25]. The syntax of BWML model, such as:

- Phase I; Orientation based on IoTs and Big Data, focus on C4 and C5
- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
- Phase IV; Presenting, focus on C4, C5, and C6
- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on

phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [24],[25].

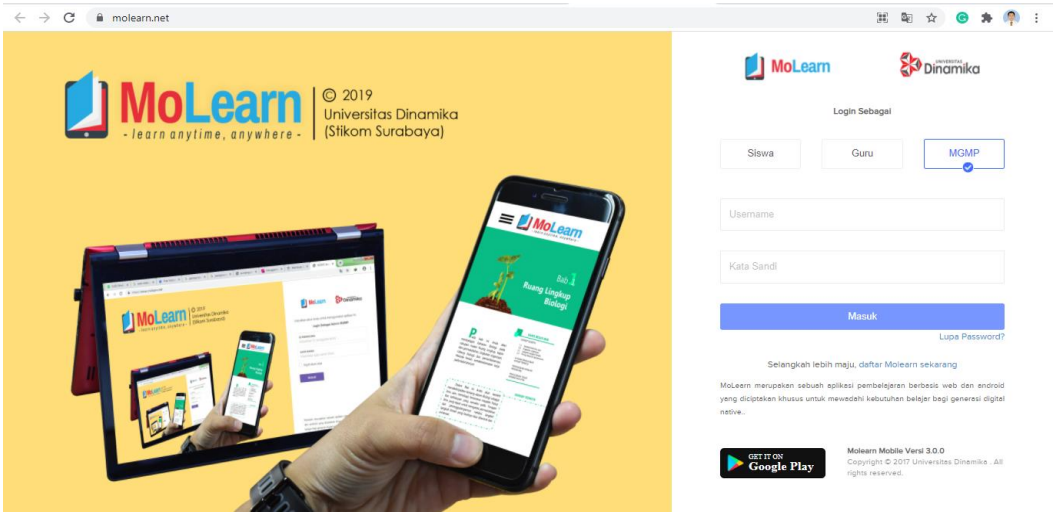
3. Results and Discussions

3.1 BWML Model Validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school. These results are used as a reference for continuing the second and third stages of the BWML model development.

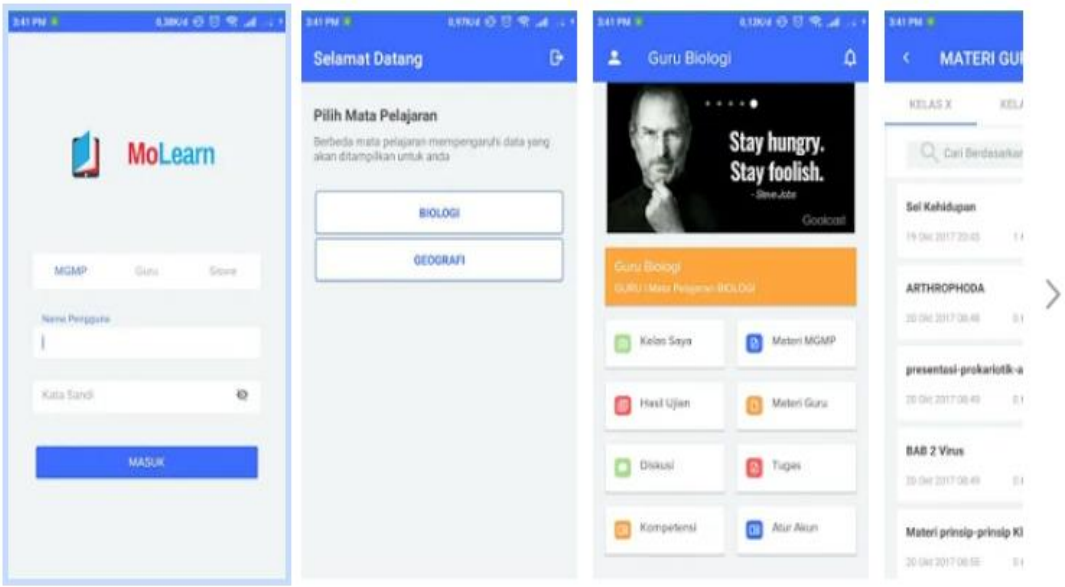
3.2 BWML Model Practically

Observers are optimized to see the practicality of the BWML model which syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2 and 3.



(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



(Source: https://play.google.com/store/apps/details?id=edu.stikom.molearn&hl=in)

Figure 3. MoLearn in mobile version (Intellectual Property Rights by Authors)

Each class has three observers to follow and assess the BWML model implementation. Each observer uses a valid and reliable instrument to observe the implementation of BWML model. The results of BWML model practicality in increasing student HOTs are presented in Table 1.

Table 1. BWML Model Practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
	State Senior High School II	Good	Valid	Reliable

3.3 BWML Model Effectiveness

The students were given a pre-test; the learning was then carried out a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain		Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	0.60	Moderate	Significant
	State Senior High School II	35	Significant	0.33	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	0.26	Low	Significant
	State Senior High School II	32	Significant	0.18	Low	

$\alpha = 5\%$

3.4 Research Implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the Covid-19 pandemic [26],[27],[28],[29],[30]. Including the need for innovation in education during the Covid-19 pandemic [31],[32],[33],[34].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like developed countries.
- For researchers in developing countries, the results of this study can be used as motivation and generally used in improving the quality of learning, especially in increasing the students' HOTs of senior high school.

4. Conclusion

The focus of the BWML model is to increase the students' HOTs of senior high school. The BWML model in each phase is carried out and supported by using the MoLearn application. The results of this study indicate that the BWML model is proven to be valid, practical and effective in improving the students' HOTs of senior high school. The limitations of this research are still applied to Biology and Geography subjects. Further research can be carried out: (1) the BWML model can be developed in other subjects; (2) the BWML model can be developed for elementary, junior high school and Higher Education levels; (3) The BWML model can be customized to be fully online based.

5. Acknowledgments

The author's gratitude goes to to the Ministry of Finance of the Republic of Indonesia who has supported funding [KEP-16 / LPDP / 2020 dated March 18, 2020].

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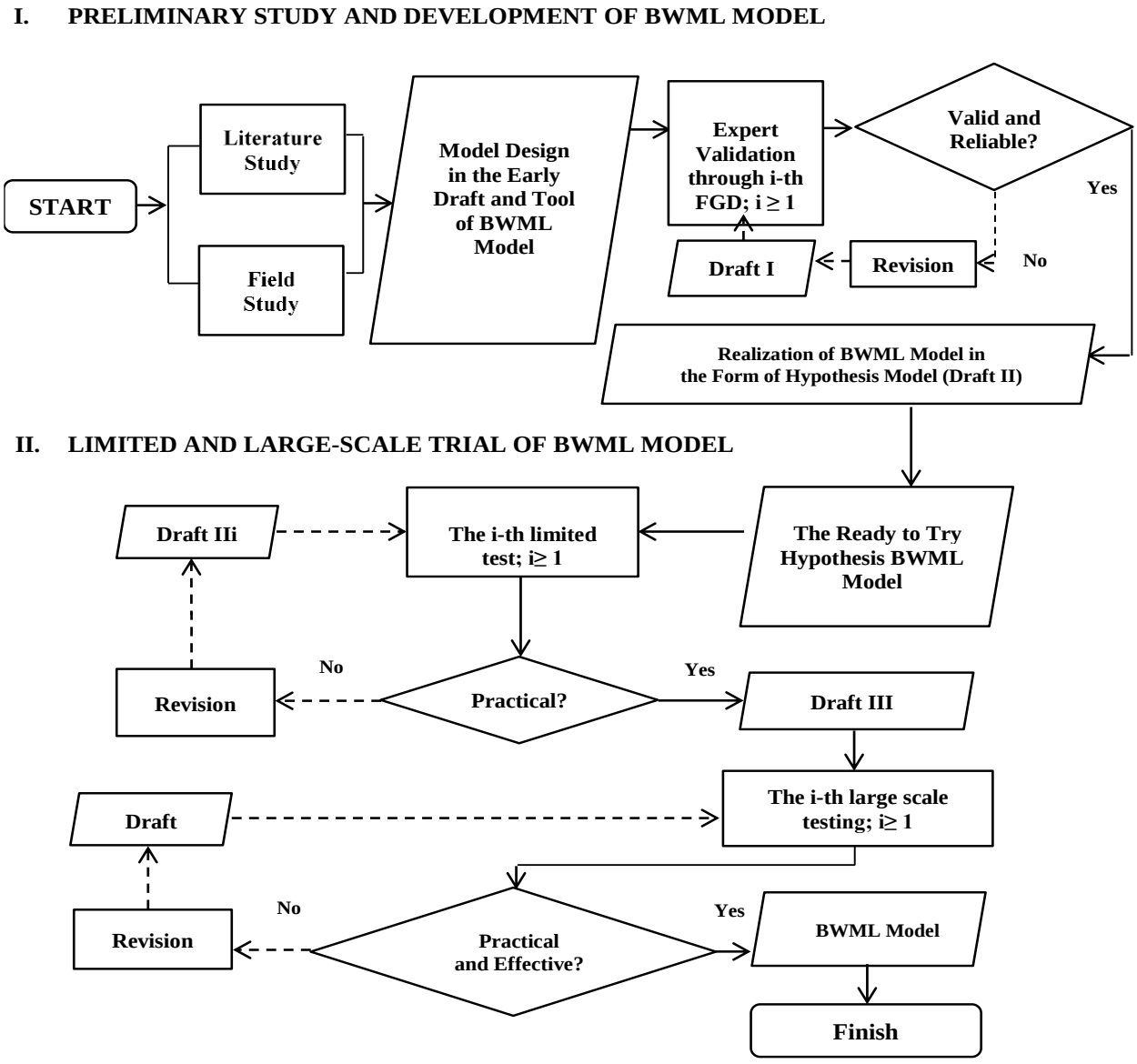

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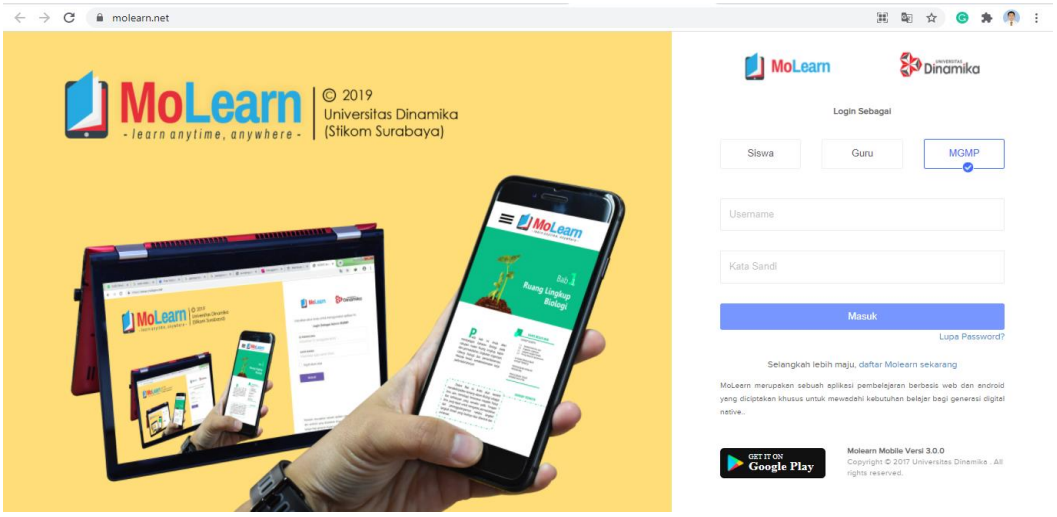
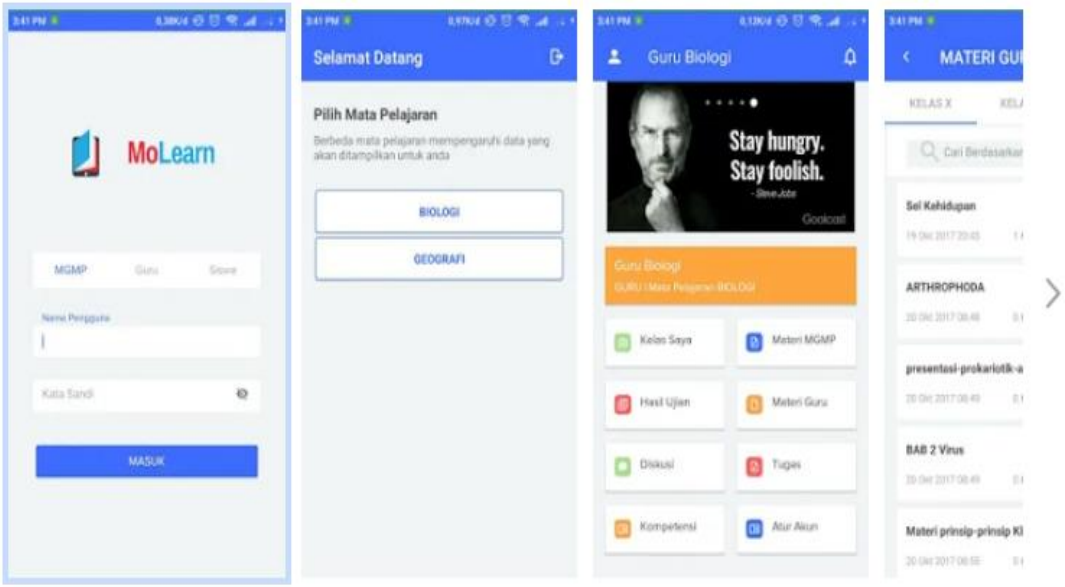


(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



(Source: https://play.google.com/store/apps/details?id=edu.stikom.molearn&hl=in)

Figure 3. MoLearn in mobile version (Intellectual Property Rights by Authors)

Each class has three observers to follow and assess the BWML model implementation. Each observer uses a valid and reliable instrument to observe the implementation of BWML model. The results of BWML model practicality in increasing student HOTs are presented in Table 1.

Table 1. BWML Model Practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
	State Senior High School II	Good	Valid	Reliable

3.3 BWML Model Effectiveness

The students were given a pre-test; the learning was then carried out a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain		Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	0.60	Moderate	Significant
	State Senior High School II	35	Significant	0.33	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	0.26	Low	Significant
	State Senior High School II	32	Significant	0.18	Low	

$\alpha = 5\%$

3.4 Research Implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the Covid-19 pandemic [26], [27], [28]. Including the need for innovation in education during the Covid-19 pandemic [29], [30], [31].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like developed countries.
- For researchers in developing countries, the results of this study can be used as motivation and generally used in improving the quality of learning, especially in increasing the students' HOTs of senior high school.

4. Conclusion

The focus of the BWML model is to increase the students' HOTs of senior high school. The BWML model in each phase is carried out and supported by using the MoLearn application. The results of this study indicate that the BWML model is proven to be valid, practical and effective in improving the students' HOTs of senior high school. The limitations of this research are still applied to Biology and Geography subjects. Further research can be carried out: (1) the BWML model can be developed in other subjects; (2) the BWML model can be developed for elementary, junior high school and Higher Education levels; (3) The BWML model can be customized to be fully online based.

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Development Blended Web Mobile Learning Model on Covid-19 Pandemic

Binar Kurnia Prahani[1], Budi Jatmiko[1], Bambang Hariadi[2], Dewiyani Sunarto[2], Tri Sagirani[2], Tan Amelia[2]

[1]*Universitas Negeri Surabaya, Indonesia*
[2]*Universitas Dinamika, Indonesia*

***Abstract* – Education Design Research (EDR) focuses on producing a Blended Web Mobile Learning (BWML) to increase the students' HOTs of senior high school. The BWML model in each phase is supported by using the MoLearn application (web and mobile version). The results indicate that the BWML model is proven to be valid, practical and effective in improving HOTs of senior high school students. Research implication such as: (1) The BWML model can be used as an alternative to digital-based learning, (2) The BWML model can be a reference for developing a hybrid learning model in Covid-19 pandemic, (3) For research in developed countries, the results of this research can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it.**

***Keywords* – Higher order thinking skills, BWML, Learning model, MoLearn.**

1. Introduction

Covid-19 pandemic has caused a lot of chaos in the world.

DOI: 10.18421/TEMxx-xx
https://doi.org/10.18421/TEMxx-xx

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya
Email: binarprahani@unesa.ac.id

Received: -----.
Accepted: -----.
Published: -----.

In addition, Covid-19 has had an effect in various lines of life, including education. The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills. The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have [1], [2]. Recent research results in the last three years indicate the importance of HOTs has been studied in several countries [3], [4], [5]. In addition, research also varies with HOTs including assessment [6], [7], [8], curriculum [9], media [10], and learning [11], [12]. The results of these studies confirm that HOTs need to be trained and owned by students [13], [14], [15].

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

Alternative solutions that already exist for improving student's HOTs are the Problem Based Learning (PBL) model [16], [17], [18] and blended learning [19], [20], [21]. The main advantages of PBL and blended learning are contextual problems and IoTS-based, making it easy to train and improve HOTs. However, in general there is no one that integrates PBL and blended learning models based on digital media to improve student's HOTs. Therefore, the researchers developed the BWML model.

The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be accessed in web and mobile version (see Figure 2 and 3). BWML is specially designed to improve the student's HOTs of senior high school. The BWML model is developed using EDR (education design research) which is supported by empirical studies and

learning theories, including social construction theory, cognitive theory, dual coding theory, behavioral learning theory, digital literacy and multi representation.

2. Research Method

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors) that have been validated, which have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practically observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version The development is carried out in two core stages (details in Figure 1) adapted from [22], [23], namely: (1) preliminary study and development of BWML model; (2) limited and large-scale trial of BWML model.

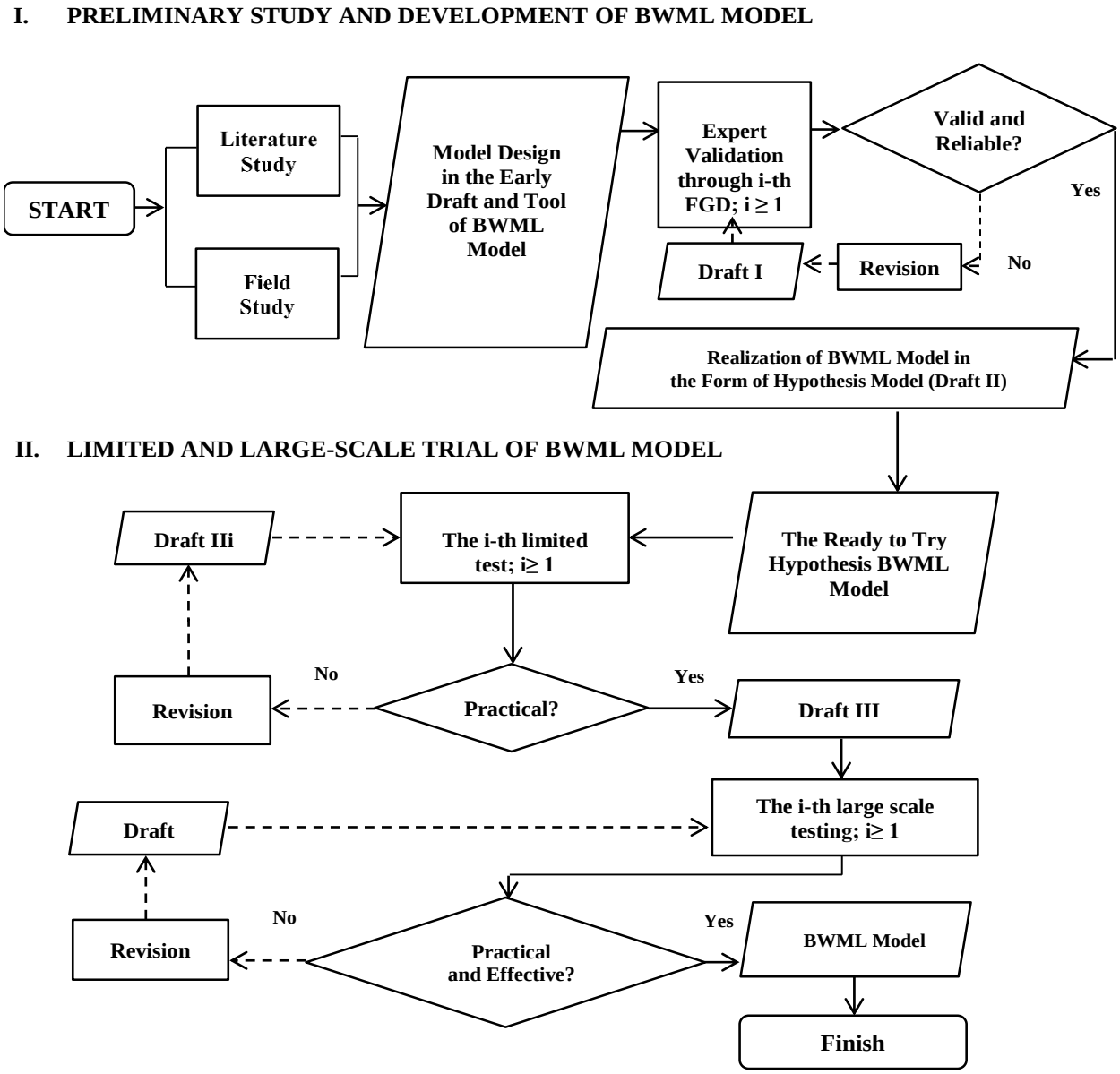


Figure 1 The EDR stages of BWML model

Effectiveness data analysis using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [22], [23]. The syntax of BWML model, such as:

- Phase I; Orientation based on IoTs and Big Data, focus on C4 and C5
- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
- Phase IV; Presenting, focus on C4, C5, and C6
- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [22], [23].

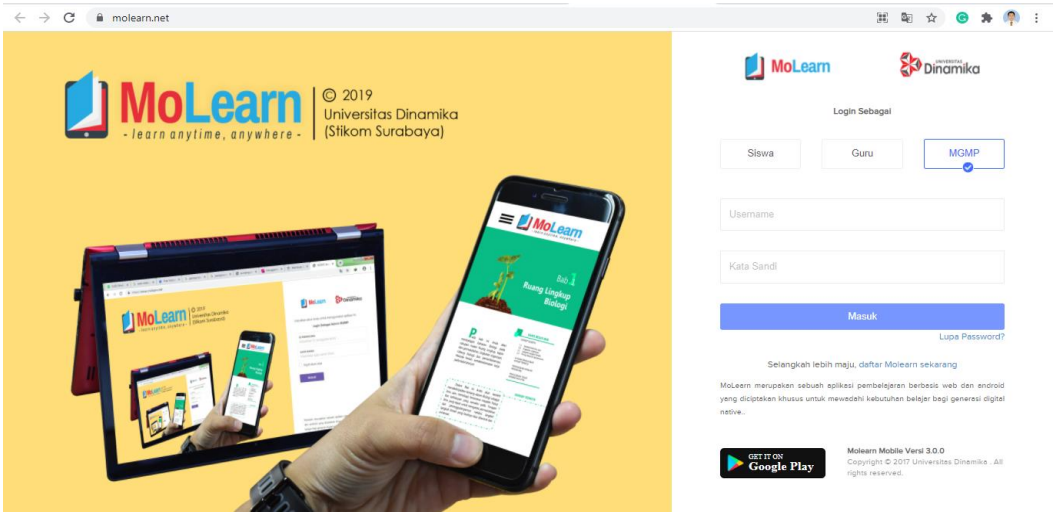
3. Results and Discussions

3.1 BWML Model Validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school. These results are used as a reference for continuing the second and third stages of the BWML model development.

3.2 BWML Model Practically

Observers are optimized to see the practicality of the BWML model which syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2 and 3.



(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)

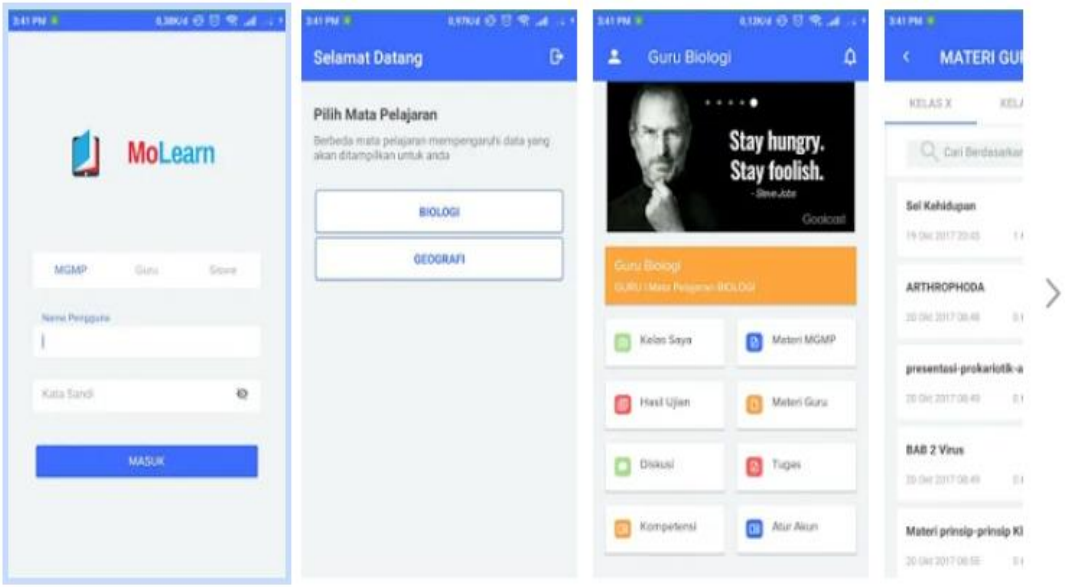


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Table 1. BWML Model Practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
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3.3 BWML Model Effectiveness

The students were given a pre-test; the learning was then carried out a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain	Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	Moderate	Significant
	State Senior High School II	35	Significant	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	Low	Significant
	State Senior High School II	32	Significant	Low	

$\alpha = 5\%$

3.4 Research Implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the Covid-19 pandemic [24], [25], [26]. Including the need for innovation in education during the Covid-19 pandemic [27], [28], [29].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like developed countries.
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Development Blended Web Mobile Learning Model on COVID-19 Pandemic

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***Keywords* –BWML, Higher order thinking skills, Learning model, MoLearn.**

1. Introduction

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DOI: 10.18421/TEMxx-xx
https://doi.org/10.18421/TEMxx-xx

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya
Email: binarprahani@unesa.ac.id

Received: -----.
Accepted: -----.
Published: -----.

In addition, COVID-19 has had an effect in various lines of life, including education. The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills. The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have [1], [2]. Recent research results in the last three years indicate the importance of HOTs has been studied in several countries [3], [4], [5]. In addition, research also varies with HOTs including assessment [6], [7], [8], curriculum [9], media [10], and learning [11], [12]. The results of these studies confirm that HOTs need to be trained and owned by students [13], [14], [15].

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

Alternative solutions that already exist for improving student's HOTs are the Problem Based Learning (PBL) model [16], [17], [18] and blended learning [19], [20], [21]. The main advantages of PBL and blended learning are contextual problems and IoTS-based, making it easy to train and improve HOTs. However, in general there is no one that integrates PBL and blended learning models based on digital media to improve student's HOTs. Therefore, the researchers developed the BWML model.

The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be accessed in web and mobile version (see Figure 2 and 3). BWML is specially designed to improve the student's HOTs of senior high school. The BWML

model is developed using EDR (education design research) which is supported by empirical studies and learning theories, including social construction theory, cognitive theory, dual coding theory, behavioural learning theory, digital literacy and multi representation.

2. Research Method

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors) that have been validated, which have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practically observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version The development is carried out in two core stages (details in Figure 1) adapted from [22], [23], namely: (1) preliminary study and development of BWML model; (2) limited and large-scale trial of BWML model.

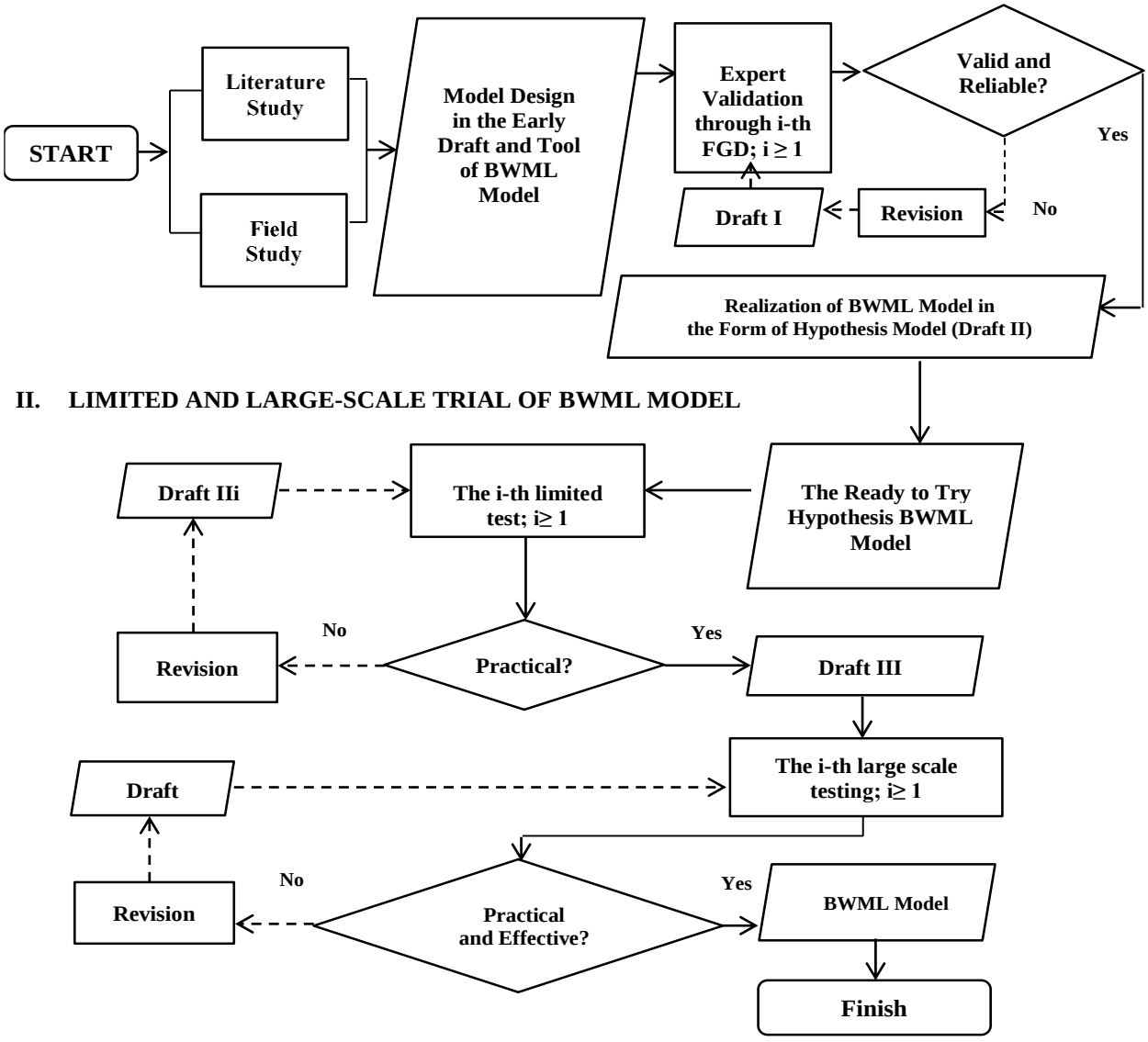


Figure 1 The EDR stages of BWML model

Effectiveness data analysis using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [22], [23]. The syntax of BWML model, such as:

- Phase I; Orientation based on IoTs and Big Data, focus on C4 and C5
- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
- Phase IV; Presenting, focus on C4, C5, and C6
- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [22], [23].

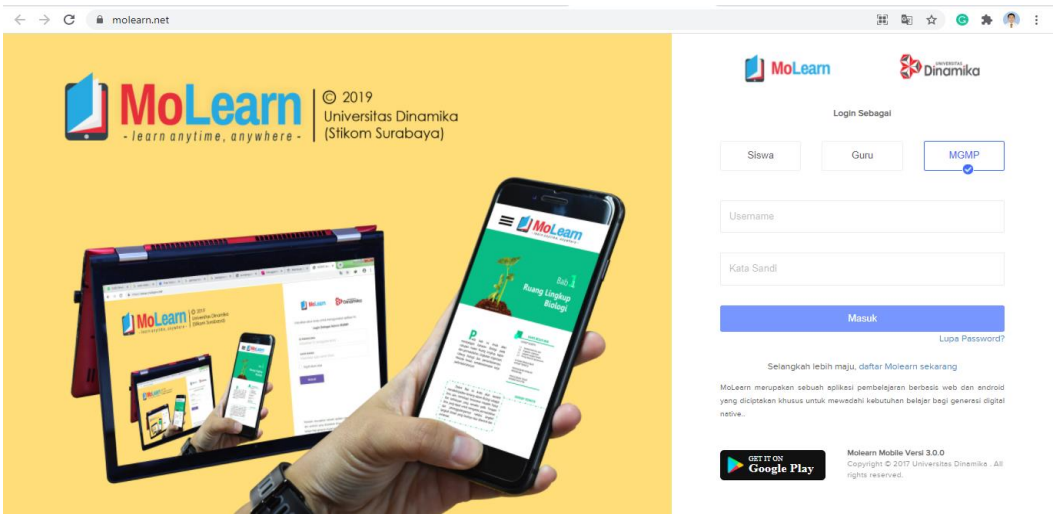
3. Results and Discussions

3.1 BWML Model Validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school. These results are used as a reference for continuing the second and third stages of the BWML model development.

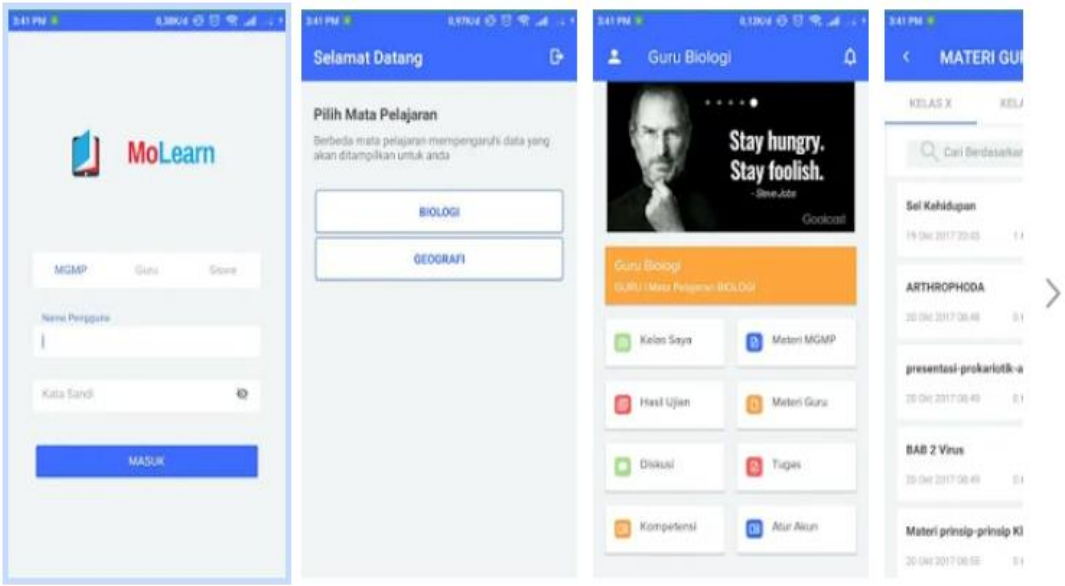
3.2 BWML Model Practically

Observers are optimized to see the practicality of the BWML model which syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2 and Figure 3.



(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



(Source: https://play.google.com/store/apps/details?id=edu.stikom.molearn&hl=in)

Figure 3. MoLearn in mobile version (Intellectual Property Rights by Authors)

Each class has three observers to follow and assess the BWML model implementation. Each observer uses a valid and reliable instrument to observe the implementation of BWML model. The

results of BWML model practicality in increasing student HOTs are presented in Table 1.

Table 1. BWML Model Practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
	State Senior High School II	Good	Valid	Reliable

3.3 BWML Model Effectiveness

The students were given a pre-test; the learning was then carried out a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain	Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	Moderate	Significant
	State Senior High School II	35	Significant	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	Low	Significant
	State Senior High School II	32	Significant	Low	

$\alpha = 5\%$

3.4 Research Implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the COVID-19 pandemic [24], [25], [26]. Including the need for innovation in education during the COVID-19 pandemic [27], [28], [29].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like developed countries.
- For researchers in developing countries, the results of this study can be used as motivation and generally used in improving the quality of learning, especially in increasing the students' HOTs of senior high school.

4. Conclusion

The focus of the BWML model is to increase the students' HOTs of senior high school. The BWML model in each phase is carried out and supported by using the MoLearn application. The results of this study indicate that the BWML model is proven to be valid, practical and effective in improving the students' HOTs of senior high school. The limitations of this research are still applied to Biology and Geography subjects. Further research can be carried out: (1) the BWML model can be developed in other subjects; (2) the BWML model can be developed for elementary, junior high school and Higher Education levels; (3) The BWML model can be customized to be fully online based.

5. Acknowledgments

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Development Blended Web Mobile Learning Model on COVID-19 Pandemic

Binar Kurnia Prahani[1], Budi Jatmiko[2], Bambang Hariadi[3], Maria Josephine Dewiyani Sunarto[4], Tri Sagirani[5], Tan Amelia[6]

[1]*Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia (binarprahani@unesa.ac.id)*
[2]*Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia (budijatmiko@unesa.ac.id)*
[3]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (bambang@dinamika.ac.id)*
[4]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (dewiyani@dinamika.ac.id)*
[5]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (tris@dinamika.ac.id)*
[6]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia (meli@dinamika.ac.id)*

***Abstract* – Education Design Research (EDR) focuses on producing a Blended Web Mobile Learning (BWML) to increase the students' HOTs of senior high school. The BWML model in each phase is supported by using the MoLearn application (web and mobile version). The results indicate that the BWML model is proven to be valid, practical and effective in improving HOTs of senior high school students. Research implication such as: (1) The BWML model can be used as an alternative to digital-based learning, (2) The BWML model can be a reference for developing a hybrid learning model in COVID-19 pandemic, (3) The research result can be used as empirical data that web and mobile integration in learning has proven successful.**

***Keywords* –BWML, higher order thinking skills, learning model, MoLearn**

1. Introduction

COVID-19 pandemic has caused a lot of chaos in the world.

DOI: 10.18421/TEMxx-xx
https://doi.org/10.18421/TEMxx-xx

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya
Email: binarprahani@unesa.ac.id

Received: -----.
Accepted: -----.
Published: -----.

In addition, COVID-19 has had an effect in various lines of life, including education. The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills. The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have [1], [2]. Recent research results in the last three years indicate the importance of HOTs [3], [4], [5]. In addition, research also varies with HOTs including assessment [6], [7], [8], curriculum [9], media [10], and learning [11], [12]. The results of these studies confirm that HOTs need to be trained and owned by students [13], [14], [15].

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

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The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be

accessed in web and mobile version (see Figure 2. and 3.). The BWML is specially designed to improve the student's HOTs of senior high school. The BWML model is developed using EDR (education design research) which is supported by empirical studies and learning theories, including social construction theory, cognitive theory, dual coding theory, behavioural learning theory, digital literacy and multi representation.

2. Research method

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors), the results that have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practical observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version. The development is carried out in two core stages (details in Figure 1) adapted from [22], [23], namely: (1) preliminary study and development of the BWML model; (2) limited and large-scale trial of the BWML model.

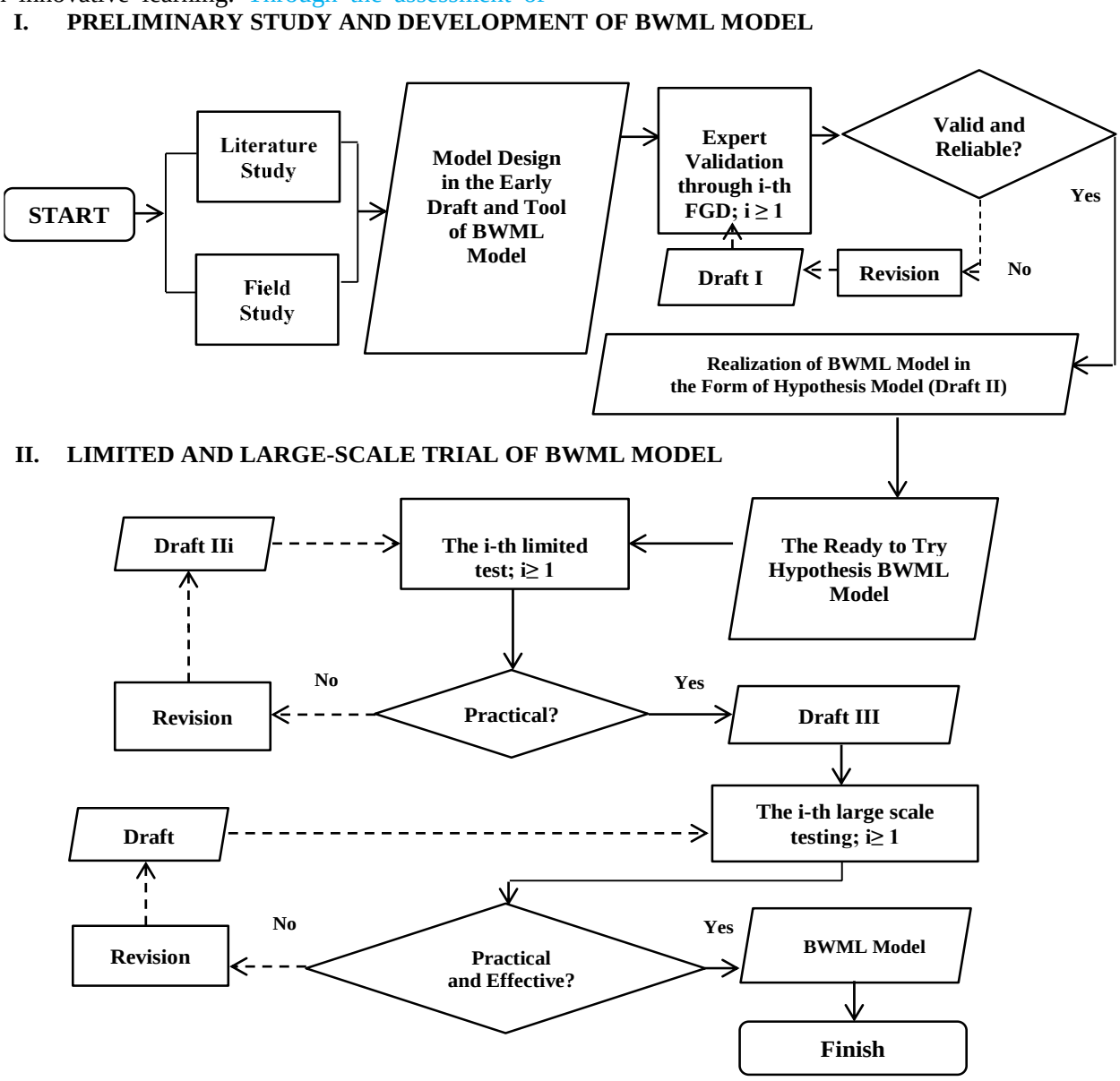

Figure 1 The EDR stages of the BWML model

The effectiveness data (HOTs) were analyzed using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [22], [23]. The syntax of the BWML model, such as:

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- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
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- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [22], [23].

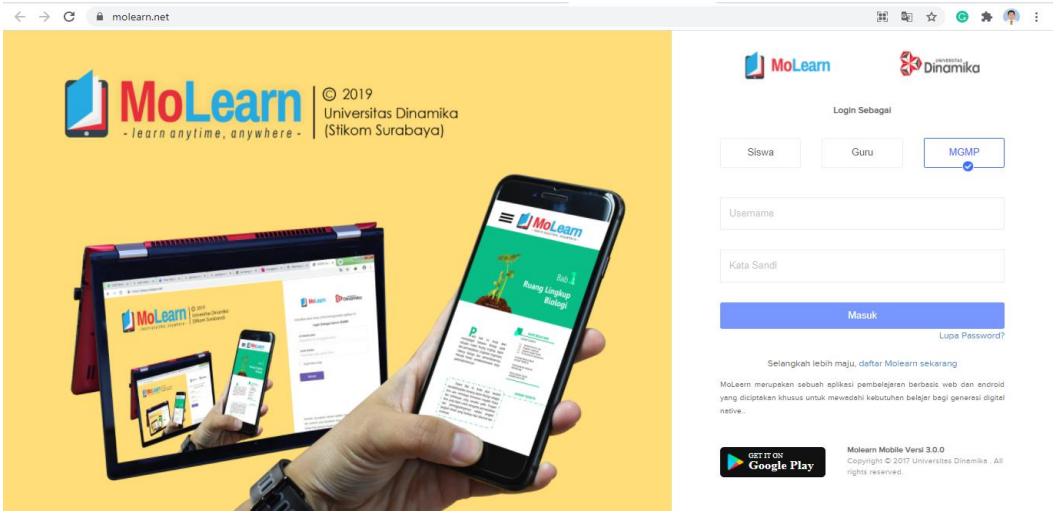
3. Results and discussions

3.1 BWML model validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school. These results are used as a reference for continuing the second and third stages of the BWML model development.

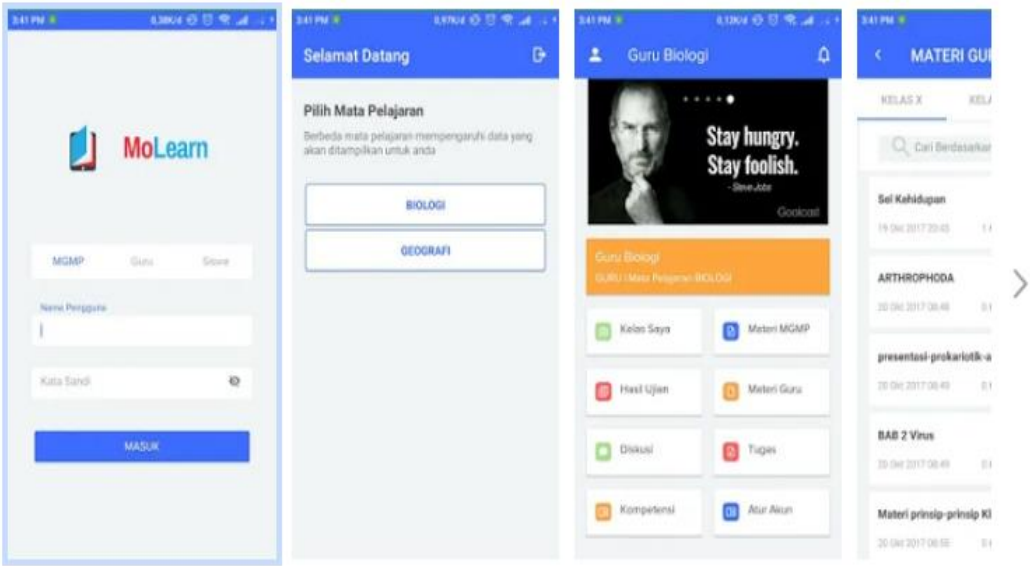
3.2 BWML model practically

Observers are optimized to see the practicality of the BWML model syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2. and Figure 3.



(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



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School		Practically of BWML Model		
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BWML Model (Experiment Group)	State Senior High School I	Good	Valid	Reliable
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3.3 BWML model effectiveness

The students were given a pre-test; the learning was then carried out with a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

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Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results.

Group		N	Wilcoxon test	N-gain	Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	Moderate	Significant
	State Senior High School II	35	Significant	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	Low	Significant
	State Senior High School II	32	Significant	Low	

$\alpha = 5\%$

3.4 Research implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the COVID-19 pandemic [24], [25], [26]. Including the need for innovation in education during the COVID-19 pandemic [27], [28], [29].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that the BWML can contribute to hybrid learning innovation in Indonesia.
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Development Blended Web Mobile Learning Model on COVID-19 Pandemic

Binar Kurnia Prahani [1], Budi Jatmiko [1], Bambang Hariadi [2], Maria Josephine Dewiyani Sunarto [2], Tri Sagirani [2], Tan Amelia [2]

[1]*Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia*
[2]*Universitas Dinamika, Raya Kedung Baruk 60298, Surabaya, Indonesia*

Abstract **– Education Design Research (EDR) focuses on producing a Blended Web Mobile Learning (BWML) to increase the students' HOTs of senior high school. The BWML model in each phase is supported by using the MoLearn application (web and mobile version). The results indicate that the BWML model is proven to be valid, practical and effective in improving HOTs of senior high school students. Research implication such as: (1) The BWML model can be used as an alternative to digital-based learning, (2) The BWML model can be a reference for developing a hybrid learning model in COVID-19 pandemic, (3) The research result can be used as empirical data that web and mobile integration in learning has proven successful.**

Keywords **–BWML, higher order thinking skills, learning model, MoLearn.**

1. Introduction

COVID-19 pandemic has caused a lot of chaos in the world. In addition, COVID-19 has had an effect in various lines of life, including education.

The need for innovation in the field of education, especially innovative learning models that can be effective and efficient in improving students' higher-order thinking skills.

The higher order thinking skills (HOTs) have proven to be one of the main needs that students must have [1], [2]. Recent research results in the last three years indicate the importance of HOTs [3], [4], [5]. In addition, research also varies with HOTs including assessment [6], [7], [8], curriculum [9], media [10], and learning [11], [12]. The results of these studies confirm that HOTs need to be trained and owned by students [13], [14], [15].

In fact, the student's HOTs of senior high school before being given the treatment were still not optimal. Preliminary studies were found in several senior high schools (private and state) in East Java, Indonesia. In general, the HOTs of students were still not optimal. This result is supported by the HOTs category national exam questions; students have not yet got the maximum. In addition, the optimization of digital learning media has not been seen evenly. The results of interviews with students indicated that they wanted to learn by optimizing digital learning media so that they did not get bored of learning in class.

Alternative solutions that already exist for improving student's HOTs are the Problem Based Learning (PBL) model [16], [17], [18] and blended learning [19], [20], [21]. The main advantages of PBL and blended learning are contextual problems and IoTS-based, making it easy to train and improve HOTs. However, in general there is no one that integrates PBL and blended learning models based on digital media to improve student's HOTs. Therefore, the researchers developed the BWML model.

The BWML model is a hybrid-based learning that combined PBL and blended learning with the MoLearn application. MoLearn application can be accessed in web and mobile version (see Figure 2. and 3.). The BWML is specially designed to improve the student's HOTs of senior high school. The BWML model is developed using EDR (education

DOI: 10.18421/TEM104-51
https://doi.org/10.18421/TEM104-51

Corresponding author: Binar Kurnia Prahani,
Universitas Negeri Surabaya, Jl. Lidah Wetan 60213, Surabaya, Indonesia
Email: binarprahani@unesa.ac.id

Received: 25 June 2021.
Revised: 02 November 2021.
Accepted: 08 November 2021.
Published: 26 November 2021.

design research) which is supported by empirical studies and learning theories, including social construction theory, cognitive theory, dual coding theory, behavioural learning theory, digital literacy and multi representation.

2. Research Method

This study is Educational Design Research (EDR) on innovative learning. Through the assessment of three experts (professors), the results that have been declared valid and reliable include: (1) Learning Media (Syllabus, lesson plan, student worksheet, and student books); (2) Research instruments (Practical observation sheet and HOTs assessment sheet); (3) MoLearn, web version; and (4) MoLearn, mobile version. The development is carried out in two core stages (details in Figure 1) adapted from [22], [23], namely: (1) preliminary study and development of the BWML model; (2) limited and large-scale trial of the BWML model.

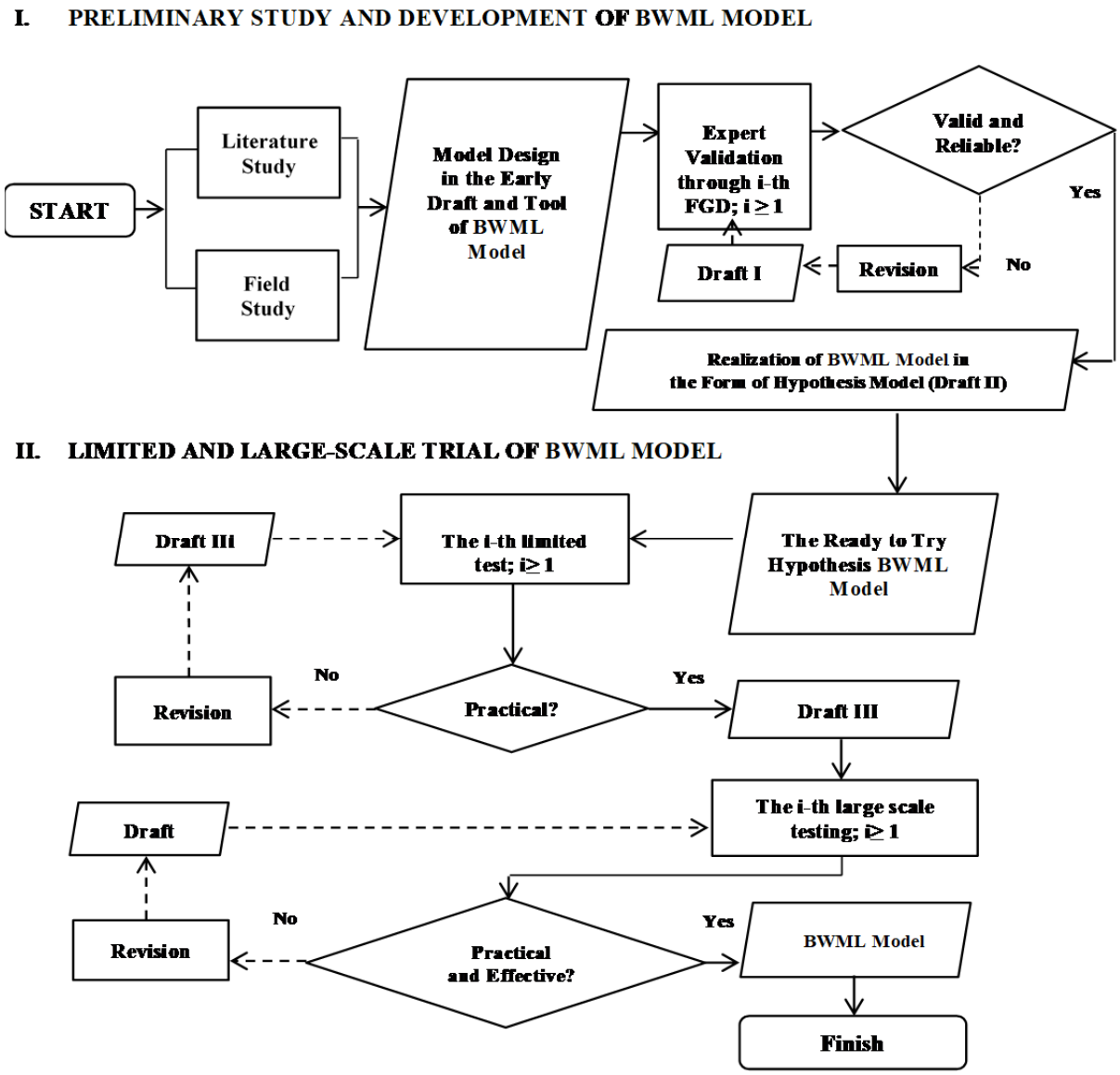


Figure 1. The EDR stages of the BWML model

The effectiveness data (HOTs) were analyzed using inferential statistics and N-gain. Indicator of HOTs are Analyzing (C4), Evaluating (C5), and Creating (C6) [22], [23]. The syntax of the BWML model, such as:

- Phase I; Orientation based on IoTs and Big Data, focus on C4 and C5
- Phase II; Investigation, focus on C4, C5, and C6
- Phase III; Analyzing, focus on C4, C5, and C6
- Phase IV; Presenting, focus on C4, C5, and C6
- Phase V; Evaluating, focus on C5

The core of the BWML model implementation has a percentage of 10% (classroom, course, and reading) on phase I, 70% (on the job experience) on phase II-IV, and 20% (mentoring and coaching) on phase V to maximize the increase of students' HOTS [22], [23].

3. Results and Discussions

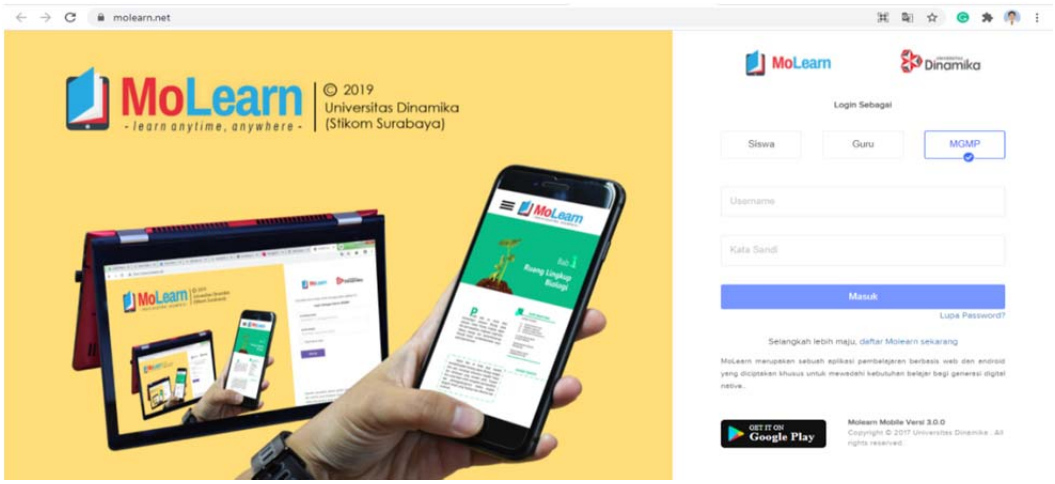
3.1. BWML Model Validity

The BWML model has been developed and validated by three experts (Professor). In general, the validation results show that the BWML model is valid and reliable to be used to increase the student's HOTs of senior high school.

These results are used as a reference for continuing the second and third stages of the BWML model development.

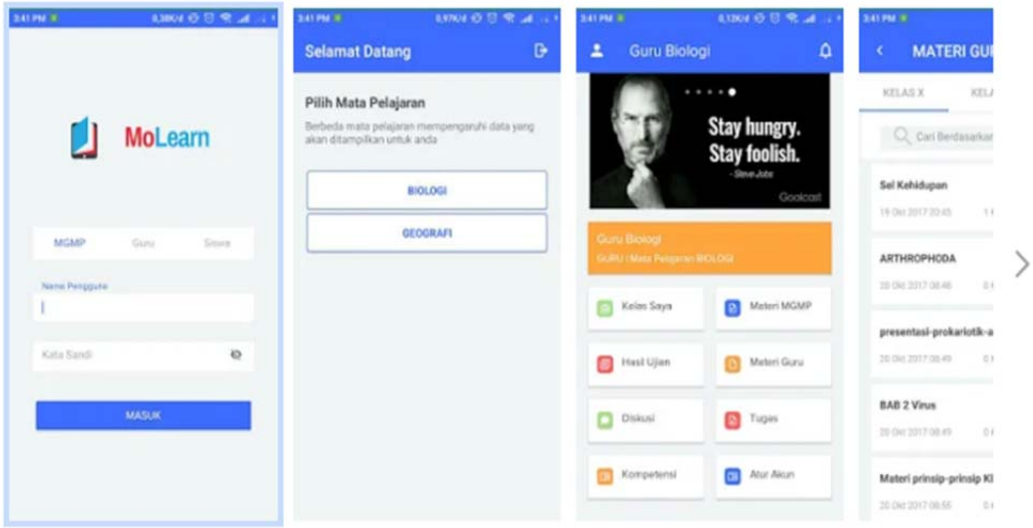
3.2. BWML Model Practically

Observers are optimized to see the practicality of the BWML model syntax. In addition, there are two MoLearn applications that have been developed by researchers in implementing the BWML model as shown in Figure 2. and Figure 3.



(Source https://www.molearn.net/)

Figure 2. MoLearn in web version (Intellectual Property Rights by Authors)



(Source: https://play.google.com/store/apps/details?id=edu.stikom.molearn&hl=in)

Figure 3. MoLearn in mobile version (Intellectual Property Rights by Authors)

Each class has three observers to follow and assess the BWML model implementation. Each observer uses a valid and reliable instrument to observe the implementation of the BWML model. The results of the BWML model practicality in increasing student HOTs are presented in Table 1.

Table 1. BWML model practically

School		Practically of BWML Model		
		Criteria	Validity	Reliability
BWML Model (Experimen Group)	State Senior High School I	Good	Valid	Reliable
	State Senior High School II	Good	Valid	Reliable

3.3. BWML Model Effectiveness

The students were given a pre-test; the learning was then carried out with a post-test. The analysis results are presented in Table 2. Table 2 shows that the results of the BWML model implementation are applied in two state senior high schools. In addition, there are two control classes that use learning based on the current curriculum in Indonesia.

The first result, the results of different tests using the Wilcoxon test model showed a significant difference in the results of the pre-test and the post-test. The second result, HOTs N-gain value in the class using the BWML model is better (moderate) than the control class (low). Third, there is consistency of HOTs N-gain scores in both groups, which also proves that the BWML model can consistently increase the students' HOTs of senior high school.

Table 2. Wilcoxon test, N-gain score, and Mann-Whitney U on HOTs results

Group		N	Wilcoxon test	N-gain	Mann-Whitney U
BWML Model (Experiment Group)	State Senior High School I	35	Significant	Moderate	Significant
	State Senior High School II	35	Significant	Moderate	
Learning based on Current Curriculum in Indonesia (Control Group)	State Senior High School I	35	Significant	Low	Significant
	State Senior High School II	32	Significant	Low	

$\alpha = 5\%$

3.4. Research Implication

- The BWML model can be used as an alternative to digital-based learning. Digital learning supports solutions in the COVID-19 pandemic [24], [25], [26]. Including the need for innovation in education during the COVID-19 pandemic [27], [28], [29].
- The BWML model can be a reference for developing a hybrid learning model.
- Web and Mobile integration in learning is something that is still rare in Indonesia. This means that the BWML can contribute to hybrid learning innovation in Indonesia.
- For research in developed countries, the results of this study can be used as empirical data that the integration of web and mobile in learning has been proven to be successful even though in terms of resources it is not like developed countries.
- For researchers in developing countries, the results of this study can be used as motivation and generally used in improving the quality of learning, especially in increasing the students' HOTs of senior high school.

4. Conclusion

The focus of the BWML model is to increase the students' HOTs of senior high school. The BWML model in each phase is carried out and supported by using the MoLearn application. The results of this study indicate that the BWML model is proven to be valid, practical and effective in improving the students' HOTs of senior high school. The limitations of this research are still applied to Biology and Geography subjects. Further research can be carried out: (1) the BWML model can be developed in other subjects; (2) the BWML model can be developed for elementary, junior high school and Higher Education levels; (3) The BWML model can be customized to be fully online based.

Acknowledgments

The author's gratitude goes to to the Ministry of Finance of the Republic of Indonesia who has supported funding [KEP-16 / LPDP / 2020 dated March 18, 2020].

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