Abstract

Kata Kunci: Pengembangan, permainan edukasi, morfologi, kesadaran bermorfologi

Abstract
Morphological awareness (MA) has relation to language development. Most of Informatics students class of 2017 in Politeknik Kota Malang are lack of MA especially in vocabulary and reading comprehension. Therefore, this present study is aimed at developing instructional game “Adventure of Word” to improve morphological awareness. This is Research & Development study which used Lee & Owens’ development model. From the result of expert validation, from media expert it got 96.8% and from media/design expert it got 78.7%. As those results, the product is categorized as ‘valid’. After the product has been validated, the next step is try-out to the students. It got 96.6% which meant the product is classified as ‘excellent’. It can be concluded that the product was well-developed as instructional media to teach morphology explicitly so that can help students to improve their morphological awareness especially in root word, prefix, suffix, and circumfix.

Keywords: development, instructional game, morphology, morphological awareness
INTRODUCTION

In linguistics, morphology is defined as a study of internal word structure and formation of word (Haspelmath & Sims, 2010; Lieber, 2009). In a word, there is a smallest unit that carries a meaning called morpheme (Bangs & Binder, 2017). While, there is a term called morphological awareness (MA) that implies this small unit. MA is a conscious awareness as one of linguistic abilities in reflecting, analyzing, and manipulating the small linguistics unit called morpheme (Carlisle, 2010). MA is a metalinguistic skill that has positive impact and contribute to individuals’ ability in learning another language (Carlisle, 2010; Oz (2014), include English. In learning another language, vocabulary learning has a very crucial role (Malekian, 2016). The effects of MA on vocabulary knowledge can be as mediation to know the meaning of word (Zhang & Koda, 2012). Vocabulary knowledge and MA are two language skills that to be essential in reading comprehension (Amirjaili & Jabbari, 2018). MA can be as strong predictor of English vocabulary and reading comprehension (Jiang, Kuo, & Sonneburg-Winkler, 2015). By knowing the meaning of word, it can help students to comprehend reading text. It can be concluded that MA has relation to language skills include vocabulary and reading comprehension.

Vocabulary and reading comprehension are two activities or skills given for vocational higher students in English as Foreign Language (EFL) class in Politeknik Kota Malang (POLTEKOM) majoring Informatics Engineering in English 3 course. Vocabulary building is usually given in the beginning of every topic discussion, while one of reading activities is given when the students have material about Introductory to Test of English as Foreign Language (TOEFL). TOEFL topic and material is introduced as preparation because they have to pass TOEFL with certain expected score as the requirement of their graduation. In TOEFL, one of test sections is reading comprehension. In doing this section, MA can take the role.

However, based on the observation in class, it was found some problems regarding on MA. Usually, in the beginning of teaching a new topic in class, the first thing that should be done is building vocabulary about the topics, and for example the topic given in English 3 course is about job communication with sub topic of job profession. The students have to guess the name of profession by the root word given as clue, for example the root word teach becomes teacher or program becomes programmer. The suffix -er means the one who. However, when the root word of bank given, most of them do not realize about the word banker. They tend to guess by mentioning teller or even costumer service. Besides, some problems are found when they have reading activity.

In reading activity, to measure whether the students understand the text or not, there are some questions given based on the text, and one of the question types also asks about the vocabulary meaning. It is like in reading section of TOEFL. However, it takes long time for them, to read and understand the text. They do not have rich vocabulary. The students tend to find the unknown words from bilingual dictionary rather than predict the words. Using morphology along with context is the most effective way to solve the meanings of new words (Blachowicz and Fisher, 2004). It means the students do not have any sufficient morphology knowledge when they have new words. So, it is important to teach them about root words and affixes to improve their MA.

Studies about MA were conducted by researchers regarding vocabulary, reading and even writing. They are dominated by Experimental Studies, for example MA for children or young learners were conducted by Kirby, et al. (2011); Zhang & Koda (2013); McCutchen & Stull (2015); and Northey, McCutchen, & Sanders (2016). From their results, MA affects to children’s literacy. Not only for children, giving intervention to adult learners were also conducted by following researchers Deng & Trainin (2014); Kraut (2015); Jiang, Kuo, & Sonnenburg-Winkler (2015); Bangs & Binder, (2016); and Akbulut (2017). Based on the results of studies, the participants in experimental groups perform better than control groups when they have tested. Experimental groups are treated by morphological knowledge, like introducing and identifying base and root word, prefix, and suffix. Having MA can give good advantage to
English vocabulary, writing and reading ability to adult learners. From the studies above also, it can be said that morphology knowledge can be given to both young and adult learners. Morphology study for POLTEKOM students is not given explicitly. Students do not have enough material to learn about morphology. In the regular English class, teachers and books are as the main sources of knowledge. Based on observation that the researcher who is also the teacher has had and based on the preliminary study through interview to the 12 students of Informatics Engineering class of 2017 that has been conducted, it is found some facts and conclusions.

The facts are stated as follow. First, students tend to be bored if they have to read the text from the book or paper, or worst they do not read at all, especially if they are not forced by the teachers to read and learn. Second, their major is Informatics Engineering, which deals with Information Technology or IT, and using technology is their preference, especially in playing game. Because they think, by playing the game they can get activity of learning by doing, they can practice by themselves based on what they have had in theory. So, they expect there is multimedia interactive such as game as instructional media for them to learn.

Furthermore, some of students do not like English subject much, but they realize that English is important to learn because English is needed when they want to apply for job. For example, most of companies need their applicant to have any English certification like TOEFL or other English tests. Then, among four skills in English such as listening, speaking, writing, and reading, reading is the most important skill to be learnt. Based on some of these characteristics, so it is needed to provide interesting and attractive learning environment to attract and motivate them to learn English especially to improve their morphological knowledge on Information and Communication Technology or ICT-based in reading activity that they can use in daily usage as supplementary material.

Learning English is an activity that can be done by playing the game. Reading is as one of skills in learning English, commonly the most emphasized skill that is taught since at elementary school and it is also as a subject that deal with practice and a high degree of individualization is needed so that teachers find the game playing to be an especially valued method (Heinic, Molenda, and Russel, 2002). Because the students’ problem is lack of MA found in their vocabulary building and also reading, it is better to provide instructional game with appropriate game’s types like adventure, strategy, simulation, action, or others that can be played on students’ gadget.

Reading means the reader makes meaning from written text, and the text can be narrative and storytelling text. One of types of game is adventure game, and adventure game is characterized by its narrative and story-based (Blanco, Marchiori, Fernandez-Manjon, 2014). Not only that, adventure games is a game type which purposed in puzzle solving and completing a story (Afram, 2013). It is realized or not, if the players play the adventure game, they should read the text given and solve the puzzle words based on the text. So, to improve their MA in the form of adventure game is one solution for the problems arise.

As stated previously, studies on MA are dominated by experimental studies. On experimental studies, there is a strong hypothesis and the researcher compares two groups or more to be controlled and experimented to find the cause and effect by giving the experimental group with a treatment (Gay, Mills, & Airasian, 2012). To know whether the treatment has effect or not, there are pre- and post-test that should be conducted and proving the hypothesis whether MA can influence or have contribution to language development or not. In giving treatment of knowledge, instructional media can be as an important role. So, this present research is more interested in developing the media that is instructional game on ICT-based rather than directly to test students without any good and appropriate treatment media.

One study about developing media in morphology was conducted by Pradita & Sadiq (2016). They have developed student vocabulary worksheet by using affixes. The study was conducted by using the sample students of Grammar for English Teacher class.
at Islamic University of Indonesia by using Wutsqo and Borg & Gall (2003). One of the results revealed that based on the experts’ recommendation, practicality aspect has fulfilled the minimum criteria with certain notes on 21st century learning. As Heinich, Molenda, and Russel (2002) stated that the 21st century is the era that could be characterized as the age media and technology. By providing technology media for learning, it can be as the solution for students to learn and improve their MA.

The Instructional design model is generally developed by ADDIE model. The name of ADDIE consists of the following steps, namely analysis, design, development, implementation, and evaluation. This current study is focusing on multimedia game-based as instructional media. One instructional design model related to multimedia design is proposed by Lee & Owens (2004). Lee & Owens (2004) proposed ADDIE stages which every stage or part has completely explained in the way of multimedia-based development. Therefore, in developing instructional game “Adventure of Word”, the researcher used ADDIE model proposed by Lee & Owens (2004).

Morphology, Morpheme, and MA

Haspelmath & Sims (2019) defined morphology into several definition. First, morphology is a study about the words internal structure. Second definition is morphology as a study about systemic co-variation in the form and meaning of words. The last definition is morphology is a study of the combination of morphemes to yield words.

Morpheme is a minimal unit in linguistics sign which has meaning (Fromkin et al, 1996; Bangs & Binder, 2017). Haspelmath & Sims (2010) further explained the words are easily segmented, for example broken up into individually meaningful parts: read + s, read + er, kind + ness, un + happy, and so on.

Morpheme are divided into two, free and bound. The free morpheme can stand alone and be individual words for example man, sick, prove, allow, frog, ride, eye, while bound morpheme cannot stand alone as words but they have to combined with other morphemes to modify meaning of a word, bound morpheme can be either prefixes de-, ex-, un-, or suffix such as –er, -ion, ly (Fromkin et al, 2015; Lieber, 2009). Bound morpheme can be also divided into two; derivational and inflectional morpheme. According to Fromkin et al 1996, derivational morpheme may change the syntactic category of word for example –able, un-, re-, while inflectional morpheme does not change the syntactic category of the words or morphemes to which they are attached. The example is -s, -s, -er, -est, -ing,.

Morpheme is smaller than word, or, in a word might consist of one or more morpheme. For example the word books contain two morphemes book and –s. Affixes can change the tense, quantity, and meaning of the root word. The morpheme –s is also as affix that show quantity or in this context is plurality or more than one book. If we omit –s in the end of word, so the quantity, tense and meaning will be different. Morpheme that occurs before or in the beginning other morphemes such as un-, re-, pre-, dis, and bi- are called as prefixes, while morpheme that occur after or in the end other morphemes such as –er, -ness, -ize, -ist, -ly, is called as suffixes (Fromkin et al, 1996). Another affix in language is circumfix. The morphemes that occur before and after root / base word is called as circumfix.

Haspelmath & Sims (2010) added root is a base that cannot be analyzed any further into constituent morphemes. The example is paint in pointer, or read in reread. Paint and read here are as root. When a root is combined with an affix, it composes a stem. However, according to Haspelmath & Sims (2010), the word part that an affix is attached to is called the base. He adds sometimes a base is also called as a stem. Fromkin et al (1996) has illustrated the word unbelievable is composed from believe as root, and believable as base word.

While, there is a term MA that implies the morphemes. MA is one form of students’ developing linguistics awareness as the ability to analyze, reflect on, and manipulate the morphemic/morpheme units in words (Carlisle, 2015). Oz (2014) added that the morphemic unit here includes derivational morphemes (e.g. suffix –tion, -er, and prefix
re-, un-) and inflectional markers (e.g. –s, -ing, -ed, -est). By knowing the morpheme meaning, it can help someone to guess or understand the meaning of words (Amirjalili and Jabbari, 2018). While a morphology is a study of word formation in which to form a word, it needs a number of units called morpheme (Oz, 2014). He added that developing awareness in English morphology can help students understand on how words enter language, and how they are formed from affixes and root. It can be said that MA, morpheme, and morphology cannot be separated. In developing MA, it needs to know about morpheme that covers in morphology study.

Language teachers can teach MA in class as part of explicit language instruction by adopting instructional strategies (Oz, 2014). These also can be used to improve students’ MA. The strategies are stated as follow:

1. Teaching morphology explicitly as a separate component of instruction of vocabulary.
2. Improving students’ MA as a cognitive strategy through explicit steps in which students: 1) admit that they do not know the word, 2) identify the word for recognizable morphemes, both in root and suffix, 3) think of a possible meaning based on word parts, and 4) check the word meaning in context.
3. Teaching students to recognize the use of roots, prefixes, suffixes, or other affixes, and how words are transformed.
4. Teaching students with similar spelling and meanings in English and native language – to help their comprehending in reading.

Language teachers can implement various activities to promote their students’ MA such as mix and match, find the words, etc. or give morphological instruction from simple words to more complex words.

**METHOD**

**Research Design**

The research design used in this study was Research and Development (R & D) by using development process by Lee & Owens (2004). They proposed multimedia called ADDIE that covers Analysis, Design, Development, Implementation, and Evaluation.

**Research Participant**

The research participant in this study was students of Informatics Engineering Politeknik Kota Malang class of 2017. There were fourteen students in this class. However two of them were deaf students. So, the researcher just used the data form twelve students from need analysis and try-out because two deaf students might be treated by other treatments.

**Data Collection Technique**

In collecting data, the researcher used different instruments in each stage. In analysis that consists of preliminary study and need analysis, it is used interview in preliminary to know their difficulty and motivation in learning English especially in English lesson. The researcher used semi-structured interview due to the list of interview questions had been already prepared which was adapted from Saleng (2014) which this was done to know the availability of the media used in the classroom and the characteristics of the students. In need analysis it is used questionnaire by using theory of Hutchinson & Waters (1987) which it was used what the problems and difficulties arise for the students in learning English, especially in lack of MA in vocabulary building and reading activity and system requirement for the product. So the data gathered from the need analysis were used to design and develop the instructional media. In stage of Evaluation that consists of expert validation and try-out, it is used questionnaire that was adapted from Brown (1995), Nunan (2004) and Anggraini (2015).

**Data Analysis Technique**

In preliminary study, it was analyzed descriptively since the instrument used was interview and the result of this has already written on introduction part. In need analysis, it was analyzed quantitatively, which the result as a basic for the researcher to develop the media. In expert validation stage, the data collected was analyzed quantitatively and descriptively. The quantitative data were collected by using questionnaire then the expert as validator put check mark in one of scores from “poor” to “excellent”. “Excellent” or score 4 means if the
indicator is consistently found in the product, “good” or score 3 means if the indicator is usually found in the product, “fair” or score 2 means if the indicator is inconsistently found in the product, and “poor” or score 1 means if the indicator is not found in the product. So the researcher counted the frequency of appearance of scoring, then percentage it. The comments from the validators were analyzed descriptively.

The result of analysis from the expert validation was synthesized to get feedback information which can be used to know the strength or weakness of the product from the product validation. Table 1 below shows about the revision scale in product validation.

**Table 1. Revision Scale in the Product Validation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Category</th>
<th>Action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 – 100%</td>
<td>Valid</td>
<td>No revision</td>
</tr>
<tr>
<td>56 – 75%</td>
<td>Valid enough</td>
<td>No revision</td>
</tr>
<tr>
<td>40 – 55%</td>
<td>Less valid</td>
<td>Revision needed</td>
</tr>
<tr>
<td>0 – 39%</td>
<td>Not valid</td>
<td>Revision needed</td>
</tr>
</tbody>
</table>

(Adopted from Saleng, 2014)

Last, in try-out, it was analyzed quantitatively. The questionnaire used “yes” or “no” questions or answers, and the researcher counted the frequency of appearance “yes” or “no” answer, then percentage it. After counting them, the mean of “yes” percentage was counted then converted into quality levels, namely excellent, good, average, and poor. Table 2 shows the qualification of the product.

**Table 2. The Qualification of the Product**

<table>
<thead>
<tr>
<th>Attainment Level</th>
<th>Quality Level</th>
<th>Action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 – 100%</td>
<td>Excellent</td>
<td>No revision</td>
</tr>
<tr>
<td>75 – 84%</td>
<td>Good</td>
<td>No revision</td>
</tr>
<tr>
<td>65 – 74%</td>
<td>Average</td>
<td>Revision needed</td>
</tr>
<tr>
<td>55 – 64%</td>
<td>Poor</td>
<td>Revision needed</td>
</tr>
</tbody>
</table>

(Adopted from Saleng, 2014)

**RESULT**

The instructional game “Adventure of Word” consists of several parts and menus, those are storyline, ‘Home’ menu, ‘Lesson’ menu, ‘Options’ menu, ‘Goal’ menu, ‘Credits’ menu, ‘Start’ menu. In ‘Start’ menu, there are three levels, those are Beginner, Intermediate, and Advanced. The experts were asked to fulfill the validation form that consists of aspect, indicators, and scores in the range of 4, 3, 2, and 1. The score 4 (four) is excellent which means the indicator is consistently found in the product, 3 (three) is good which means the indicator is usually found in the product, 2 (two) is fair which means the indicator inconsistently found in the product, and 1 (one) is poor which means the indicator is not found in the product. Both content and media/design experts have validated the same parts and menus in game but in different aspects / indicators.

**The Content Expert Result**

The content expert was a lecturer in English department in one of universities that teach some linguistics subjects such as morphology, syntax, and pragmatics. The aspects that the content expert validated are physics, grammar, vocabulary, punctuation, definition, example, word class, and affix meaning.

Based on the result, the valid indicators or items are 96.8%, and the valid enough indicators or items are 3.2%. There is no less valid or even not valid aspects and indicators. The ‘valid enough’ or ‘good’ score found in the aspect grammar and punctuation in few part in game such as story line. Even though there is unperfected score, the category was valid enough which meant ‘no revision’.

The overall result of content validation can be seen in figure 1 to know the percentage of category.

**Figure 1. The Result of Content Validation**
To conclude, from the content aspect, this product as media to teach morphology to improve students’ morphological awareness is dominantly excellent or ‘valid’.

The Media/Design Expert Result

The media/design expert is an animation/multimedia and game development lecturer in one of Polytechnic institutions. The aspects that should be validated by media/design expert are Physics, Image, Sound, Color, Font, Character, Shape, Icon, and Program Operation.

The result revealed that from the media/design expert, the ‘valid’ indicators or items are 77.2%, the ‘valid enough’ indicators or items are 16.9%, the less valid indicators or items are 5.9%. There is no ‘not valid’ aspects and indicators.

The unperfected scores mostly went to the aspect of font and image/visual asset. The inappropriateness fonts were gotten in ‘credits’ menu and start menu in beginner and advanced level. All of these got ‘fair’ or less valid which meant need to be revised. Based on the media/design expert, the most important aspect that should be revised was in aspect of image in advanced level and for the rest menu that got ‘fair’ score are not necessary to revise because this product is expected to be developed in the future. In addition, the researcher also revised ‘credits’ menu about font.

After the game product has been revised in visual assets in advanced level and font in ‘credits’ menu, the validation sheet has returned back to be validated. So, after the last assessment of validation, it is gotten the result as shown in figure 2.

![Figure 2. The Result of Media/Design Expert](image)

There is an increasing of “valid” total percentage from 77.2% to 78.7% after revised. The indicators that showed “less valid” decreased from 5.9% to 4.4%. While, the total of “valid enough” is still 16.9%.

To sum up, from the expert validation it got ‘valid’ as majority result. After the product has validated, it could be tried to the students as participants.

The Try-out Result

The try-out was done in a small scale of students, which were attended by 13 students include the deaf students. One another student was absent for several days and it was hard to contact him. So, the researcher just used the existing students at that time as the data. Moreover, there is no highly significant different result if the test were not tested to one student who was absent at that time.

There are 8 questions stated on the questionnaire which was filled by eleven students. The questions contain positive statement questions which signed with the word “can” or “able to”. So, if the students answered “yes”, it means they give positive or good response to the game. The result was, on the first question, 11 out of 11 students or 100% said “yes” the instructional game “Adventure of Word” provides new vocabulary for the students. On the second question, 9 out of 11 students or 81.8% said “yes” the instructional game “Adventure of Word” can help students to understand the vocabulary without any help (such as dictionary), while 2 students or 18.2% said “no” or they do not understand if they only play the game. On third question, 11 out of 11 students or 100% said “yes” for instructional game “Adventure of Word” can help student in learning root word in English. On fourth question, 11 out of 11 students or 100% said “yes” for instructional game “Adventure of Word” can help students in learning the affixes in English.

On fifth question, 11 out of 11 students or 100% said “yes” or instructional game “Adventure of Word” can help students in knowing the meaning of the English affixes. On sixth question, 10 out of 11 students or 90.9% said “yes” for instructional game “Adventure of Word” can be as a solution in learning English morphology, while one student or 9.1% said “no”. On seventh question, 11 out of 11
students or 100% said “yes” or instructional game “Adventure of Word” provide another learning variation in reading activity. On the last question, 11 out of 11 students or 100% said “yes” or instructional game “Adventure of Word” can be as teaching media that the students can access and learn by themselves.

Based on the result, above, the average of “yes” answer is 96.6% for all of questions, it means that the instructional game “Adventure of Word” is ‘excellent and there is no revision in this stage. It can be concluded that the instructional game “Adventure of Word” can be as a teaching media as supplementary material to teach the students about morphology so that they can improve their morphological awareness.

DISCUSSION
From the result, there are several points that can be discussed. From the result of both validations the percentage of the product is still dominantly categorized as valid. It means the product is excellent. This result is in line with the previous research as conducted by Sukirman (2013) who developed English word formation materials. The result from this research was the textbook that contains English word formation materials are excellent and well-developed. The difference is that the current research is the form of game, while the previous one is in the form of textbook. The current researcher used multimedia game because now this era is 4.0 or where it is characterized by the use of technology in every aspects include education. Moreover, by using technology, it can help both teacher and students in teaching and learning process like helping students in improving their achievements, motivating them in learning, and improving learning (Allsop & Jessel, 2015; Nawjad, Rahim, & Wakil, 2018).

By providing instructional game “Adventure of Word”, it can fix the problem faced that lack of morphological awareness. It can be seen from the result of try-out. From the try-out part, overall, the students had positive feedback on the game. It can be seen from the result of try out. Most of them answer the “yes” answer for almost in all questions. It means the students think that the instructional game “Adventure of Word” can help them in enriching new vocabularies, learning root word and affix and providing them another teaching media in reading.

However, from the result of try-out, the students were not only interested in playing the game or trying to answer the questions text, they also did a little analysis on the game like the button, how the program operation runs. It happened might be because they are also Informatics Engineering students which in the future they will developed the program such as the current game.

Most of the students can guess the meaning by seeing the picture display in beginner level. It can also be shown from the result of the questionnaire that they had fulfilled. It is 81.8% of students who answered they know the meaning of the word without seeing the dictionaries. Because as stated in chapter I, one of students problem why they were lack of morphological awareness is that they did not have sufficient vocabulary. First, the students guess the root word first, and then try to guess the meaning of the affix. They can guess the meaning just by seeing the pictures. Pictures can be as the tool or solution as teaching media in enriching the vocabulary. It is accordance with what Akdogan (2017) said. He stated that there are many types of game in language teaching that can enrich students’ mastery vocabulary. “Adventure of Word” may be one of those kinds of game. Moreover, based on need analysis, most of students want if the teaching media should provide the pictures rather than only full of text.

CONCLUSION
From the result of the research, it can be concluded that both from validation and try-out, the instructional game “Adventure of Word” is well-developed and can be as supplementary materials to teach students about root word, prefix, suffix, and circumfix in vocabulary and reading activity that suits with students’ of Politeknik Kota Malang especially majoring Informatics Engineering. So that, their morphological awareness can be improved. Furthermore, by providing the
teaching media in the form of technology game can provide different variation for students in learning language. This research also has implication theoretically and practically. Theoretically, by providing this instructional game for students, it can motivate them in learning. Like what Reigeluth, Beatty & Myers (2017) said that various aspects of game can promote intrinsic and extrinsic motivation. Intrinsic motivation means that the students can play the game by themselves without any force from other people like teacher as it is developed based on their problems and needs. While, extrinsic can be shown from the scoring keeper or result of end game. The end of this game in each level is students are able to see or review the morphemes that they have collected. In review morpheme, they can see the correct meaning of affixes and the class or words. They can practice by themselves in pronouncing the words because the game equipped with the pronunciation feature. Practically, this product has been validated by the experts and tried to the research subject, therefore, the product can be used for students wherever and whenever without any companion from teacher to give instruction to learn. So that, they can learn morphology with different learning environment from regular class.

For the betterment if the product, the product should be developed in the future not for its product itself but the use of the media for the future research. The researcher proposes several suggestions. First, the game product needs to be revised in several parts such as the font size in beginner and advanced level should be set in bigger size. Then, the instructional game “Adventure of Word” is aimed to improve students’ morphological awareness, since it is for improving, so it is better in the future to test the students whether their morphological awareness, is really improving or not with other research designs such as experimental and classroom action research.

REFERENSI
Deng, Q. & Trainin, G. (2014). The effect of morphological strategies training for English language learners. Faculty Publications: Department of Teaching, Learning and Teacher Education. 169
Merrill Prentice Hall.