Arithmetic-Grammar: The Development of Learning Model in Tenses

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Abstract. This study aims to discuss about learning tenses through *arithmetic-grammar* model. It was conducted with some steps: (1) preliminary stage, (2) field research, (3) tenses conception development, (4) expert validation, (5) product revision, (6) testing, (7) final products, (8) users' response. It was conducted in English education department and the respondents are both the students and the lecturer. The preliminary research and field research showed that the way and material complexity of learning are the problem mostly make students get difficulties to master tenses. Thus, it needs to build an effective learning model with more interesting way and simple material, through arithmetic based grammar. After the conducting this study, the results show that the product of tenses conception through *arithmetic-grammar* has a Good criteria with users' response average 46.48. Product usefulness aspects in improving grammar skills gained an average 4.88 and 4.54 for writing. It can be concluded that integrated arithmetic-grammar model is a good way for learning tenses and effective to improve students' tenses mastery.

Keywords: *arithmetic, tenses, learning model, arithmetic principle*

1. Introduction

Grammar is the most basic competency in learning a language. Grammatical competence is more than just the accumulation of grammatical knowledge [1] [2]. This is high-level learning that includes understanding, application, analysis, synthesis, and evaluation. By studying grammar, a person can know how to communicate well starting from vocabulary and its functions, sentence patterns, expressions and meanings so that speakers can determine the order of words to form meaningful language units [3] and mistakes can be minimized [4] [5]. It can be said that by mastering grammar one can use English and communicate well.

Previously, several studies on grammar in more detail had been carried out by several researchers by testing students' understanding and mastery of grammar, including focusing on mastery of grammar such as active and passive sentences [6], verb forms [7] grammar mastery in secondary schools [8] interrogative sentences[9], and sentence parts [10]. The problem of mastering grammar is actually influenced by several aspects and the grammar aspects are tenses-based problem.

Tense is the main core of English grammar because almost every part of English grammar related to Tenses, such as conditional sentence, subjunctive, tag question, passive voice, Etc. Tense is a major thing in learning English grammar and by knowing the formula of tenses, the learners will be able to construct meaningful and correct sentences in English [11] [12]. It is because no sentence in English without tenses in it. Tense is "a grammatical category which involves changing

the form of the verb to reflect the location of an event in time. The usual distinction is between past, present and future" [13]. It means that learners cannot create correct sentences and meaningful ones without understanding and mastering tenses. Meanwhile, learners mostly get difficulties in understanding it. According to a research conducted by [14] shows that learners' grammar scores about past tense is categorized low, so that they need to get an available treatment in order to increase the learners' learning grammar result from 59.05 into 79.03. in addition. Then, a research by [15] shows that English language teaching, including tenses, needs an innovative strategy in order to make an active learning process which is effective and interesting for the learners.

It is as stated that tense is a change of the forms of verbs based on the time and the event. Teaching tense will be more effective and easier if we can shorten and make the pattern simpler so that learners do not need to memorize many forms and patterns of tenses that fulfill their mind, like an automatization of algorithm [16] [17]. The pattern of tenses is basically looked like arithmetic pattern may make tenses easier to understand. It is as stated that mathematics is learned by learners in order to give them basic competences such as logical, analytic, systematic, critical and creative thinking [18]. According to [19] cited that including part of mathematics, namely a counting game that is used to develop numeracy skills that are very necessary in everyday life, especially the concept of numbers because it is the basis of developing mathematical abilities. Thus show that simplify a complex material of learning can help students understand it easier.

Changes in verbs based on differences in time and form of events actually form a definite pattern that can be grouped and combined systematically as same as in Mathematics or the basic of Arithmetic, for example, present uses verb 1 while continuous uses be + Verb-ing. So, the sum or combination of the present continuous tenses = Verb1 + be + Verb-ing → (verb1 + be) + Verb-ing → (is / am / are) + Verb-ing. From this pattern there are similarities with mathematics in basic addition. Arithmetic has four fundamental operations, namely addition, subtraction, multiplication and division [20].

From the explanation, it can be concluded that the basic arithmetic pattern can be used as an approach to learning 16 tenses. By combining the patterns of basic mathematics used as an approach to understanding the tenses formula and patterns can help students increase their understanding tenses more easily, quickly and effectively.

2. Method

This study was conducted in an English education department with some stages: (1) Preliminary stage, the stage of the interview studies on grammar to the lecturer and the students related to tenses learning process, (2) Field research, observation and literature review, (3) Development of tenses conception, (4) Experts' validation with the experts in the field of English and mathematics, (5) Product revisions, (6) Product trial, (7) Final products, (8) User response (users). The both students and the lecturer took a role as the respondents of the study. The instruments in this study are interview guidelines for teachers, assessment instruments for experts, and user response instruments related to the products produced. This study begins with interviews

and observations related to learning and teaching materials used by the lecturer of grammar. The subjects of the product implementation are semester 2 students of English education who are taking courses in the introduction to English grammar. This developmental study uses quantitative and qualitative approaches. Quantitative data comes from experts' judgment and product trials, while qualitative data are obtained from interviews and experts' reviews in the form of comments.

This data analysis technique uses descriptive analysis to determine product feasibility by experts. The learning material assessment category consists of 5 scales, namely very good, good, sufficient, less and very poor / not good. To test the effectiveness of the product, an analysis of independent sample t-test is used.

3. Result and Discussion

To develop the products in the form of using arithmetic principle in learning tenses conception, interviews were conducted as the need analysis stage, with the respondents of one lecturer, the head of English Education department, and 4th semester students who have obtained tenses at PBI. This aims to determine the needs and disadvantages in learning tenses. The analysis results are summarized in several aspects, namely:

- **Substance aspect**. Learning tenses is a vital requirement for students. The students are expected to master tenses as a provision in learning various skills in English, namely writing, speaking, reading, and also listening.
- **Method aspect.** It needs a creative and innovative method or model of tenses learning for students so that students can enjoy and be fun in the learning process.
- **Material aspects**. It needs an effective pattern or formula for learning tenses to facilitate students in learning tenses.

The stage of need analysis resulted reasoning of the importance, the objective and the basic concept of the product development. Those were used as the foundation in designing and developing the product. First, it was stated that the students must master tenses in accordance with the skills of English they learn. It meant that the product must cover all tenses materials as the students require to apply in English skills. Second, it should be constructed as an interesting and fun way in learning tenses. It was used to gain the students' motivation and joy to learn tenses. Third, the material must be presented in simpler pattern to make learning tenses easier, effective and more efficient. It can be stated that the model of arithmetic-grammar must cover all tenses material with fun way learning and having simpler pattern to make it more effective and efficient.

In the stage of product development, the researchers conducted a literature review and reference as the continuation to construct the basic and source in the product development, namely Mathematic-English based tenses concept. This concept is a collaboration between tenses and basic of arithmetic. The following is a picture that presents the construction and material scheme of 16 tenses that have integration with *arithmetic principle.*

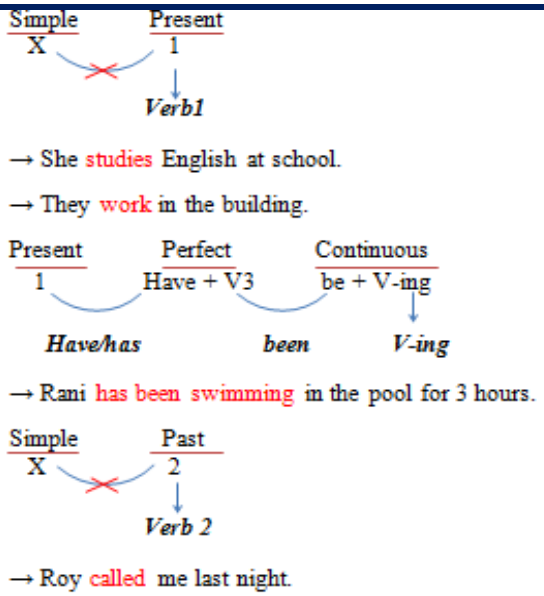

Figure 1. The Implementation of Arithmetic Principle on Tenses Pattern

To find out the validity of this product, the researcher also validates the product to expert judgment. Expert validation was taken from two validators, they are the validator in English education and the validator in the basic mathematics field. The results of the review indicate that there are several constructs need to be revised. This relates to the accuracy, completeness, and clarity of the conception of tenses with the basic of arithmetic concepts. Here is the comment from the reviewer:

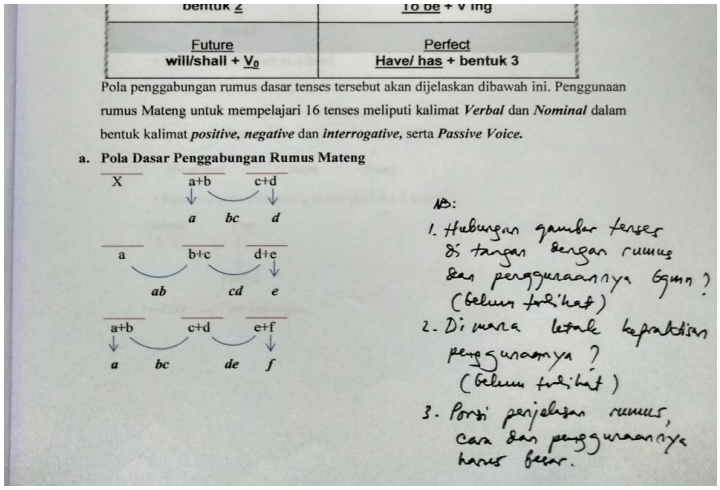

Figure 2. Reviewers' Comment on the Arithmetic-Grammar Conception

Overall, the results of the validation from expert judgment showed an assessment with an average of 4. This indicates that the product is feasible to use in learning grammar. This Arithmetic-English based tense concept and formula is appropriate to be used by foreign language learners to improve their tenses understanding. There are 2 variables that have a value of 3, namely the completeness and accuracy of the conception of tenses. Therefore, the

researcher conducted a product revision in accordance with the comments from the reviewer. Having completed the revision, it was taken to the product application in the treatment to the students of English education department.

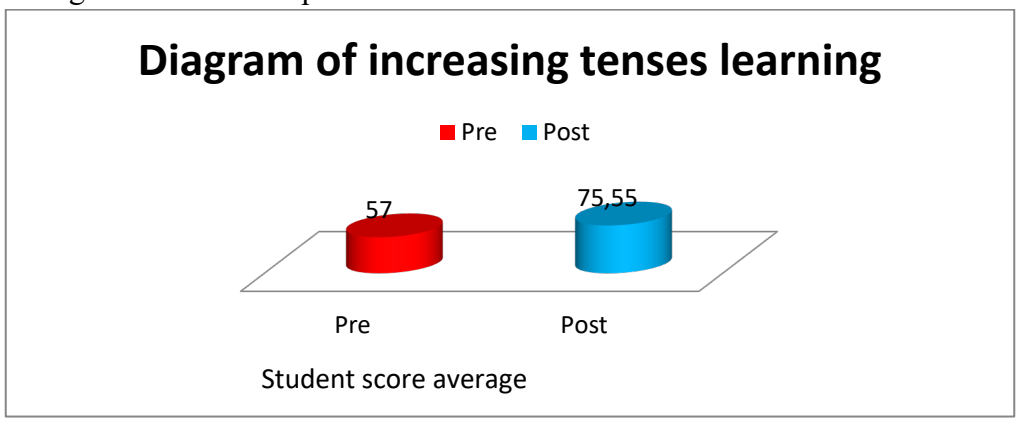

Figure 3. Comparison of Student Scores Average

In addition, to see the effectiveness of the product, researchers also processed the pre-test and post-test data using paired sample t-test analysis. The results showed that there were significant differences between the grammar learning pre-test using the lecture method and the results of the post grammar learning test using conception of tenses using *arithmetic-grammar.* This can be seen from the results of significance 0.00 <0.005.

The next data analysis process is on the users' responses. The users' response, by PBI students to the product implementation, tenses conception with *arithmetic-grammar* integration approach obtained an average value of 46.48 from 5 scales. The average is confirmed by using the criteria table obtained from this product have a **good** criteria. The high assessment results are on the usefulness aspect of the product in improving grammar skills with an average value of 4.88. Then the next high assessment is on the usefulness of the product in improving the ability to writing with an average value of 4.54. However, for the assessment of users regarding the usefulness of the product in improving listening skills, they obtain an average score of 3.62. This is because tenses mastery is not fully applicated as the basic of listening comprehension. The following diagram of the users' response to the product.

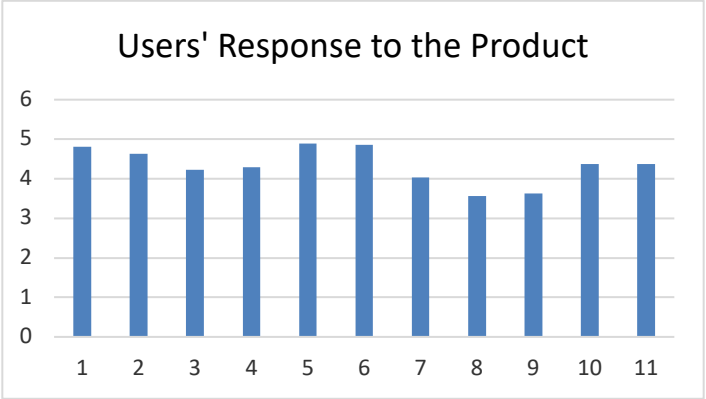

Figure 4. Users' Response to The Product

The development of the concept of Tenses with the integration approach of *arithmetic-grammar* in learning grammar obtained the results of validation with a percentage of 86%. This shows that this product is feasible and good to use. The novelty presented by researchers is a new pattern/ formula in tenses learning with a combination of English and the basic of Arithmetic. This is one way to simplify tenses so that they are easy to remember and use by learners. It is as stated that the use of the right learning model will be very helpful in the process of learning English, especially tenses [21]. This shows that learning tenses innovations make a significant contribution to grammar learning. The importance of learning innovation tenses is supported by the results of a study conducted by Vistari shows that the method of play, error correction, and intensive group discussion turned out to improve student learning outcomes, and all 36 students were declared complete in learning "Simple Future Tense " [22]. Furthermore, research conducted by Rouf shows that Aucion Grammar can improve students' understanding of simple present tense with B grade students of Mts Ma'arif Jumo Temanggung in the academic year 2015/2016 [23].

The stage of product trial implementation by PBI shows that there is an increase in the intermediate learning process before using product of tenses conception and after using it. The pre-test scores obtained by students had an average of 57 and the value obtained in the post-test was 75.55. Data were then analyzed using paired sample t-test analysis with the results that there were significant differences with the results of 0.00 <0.05 significance.

The value obtained by the user also shows the **Good** criteria. The average value is 46.48 from eleven variables given by the research team. The variables that are quite high are in 2 variables, namely the usefulness of the product in improving students 'grammar skills and students' writing skills. Mastery of one's tenses has a fairly high influence on writing skills. This is reinforced by several research results. The first study was conducted by Santosa which showed the results that there was a relationship between grammar mastery of the ability to write English narratives of students, especially in this case were students of class XI of SMK Negeri 2 Depok [24]. Furthermore, the research conducted by Rosalinah shows that there is a significant effect of grammar mastery towards descriptive English writing skill, as tobserved = 4,000> ttable = 1,684 at the 5% significance level [25]. It can be stated that the implementation of arithmetic-grammar model is appropriately used to learn tenses.

4. Conclusion

The development of the tenses concept trough arithmetic-grammar conception in learning tenses is needed. It is showed in the need analysis result that learning tenses need an innovative learning model and simple patter of tenses. It also obtained the results of proper validation with a percentage of 86%. This shows that this developed product is feasible and good to use, with the novelty of a new pattern/ formula in learning tenses with a combination of English and Arithmetic. The stage of product trial implementation by PBI students shows that the results are

significant differences with the results of significancy 0.00<0.05. The response of users also shows the Good criteria. The average value is 46.48 from eleven variables given by the research team. It can be concluded that arithmetic-grammar model is appropriate to learn tenses and can improve students' understanding.

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