USING INSTRUCTIONAL GAMES IN AN OPEN AND DISTANCE LEARNING ENVIRONMENT

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Abstract
Learning in an open and distance learning mode is challenging, especially to make students participate actively during the learning session. Students prefer to 'hide' by switching off the camera and microphone on their laptops throughout the learning session. Even during activity time, regular students will be responding, and many prefer to be present silently. Getting students to engage actively is a challenge for the instructors. They need to plan the lessons and activities creatively to motivate them to learn and eventually participate in the lessons. One of the approaches to teaching and learning that has been proven to increase students' motivation and engagement is by integrating gamification elements in the learning process. This approach has led to the creation and development of various games to suit various needs in education. *FunLinguistics* is a linguistics game for students taking language and Linguistics course. The purpose of the creation of this game is to help students doing their revision for tests. The game covers topics like morphology, syntax, semantics, and pragmatics. This paper intends to describe the process of developing the game and share students' view regarding the approach used to assist them in revising for tests. A structural gamification approach using Microsoft PowerPoint as the main platform with Visual Basic Applications (VBA) was adopted. The game consisted of questions set at different difficulty levels based on Bloom's Taxonomy. An online survey was conducted to get feedback on using the game for revision purposes. This paper hopes to offer some ideas for other language instructors to adopt and try out with their students.

Keywords: *Gamification, engagement, motivation, linguistics, ODL*

INTRODUCTION

Many things have been disrupted since the first announcement by the Prime Minister of Malaysia about the Movement Control Order (MCO) on 16 Mac 2020. Covid-19 has changed our lives. It has been affecting the economy, employment, social life and even education. The open and distance learning mode to teaching and learning was introduced, and since then, all the challenges began. Suddenly everyone had to be technology savvy just to ensure the students' learning process was not interrupted. There was a time when the situation seemed to be improving and the hope for things to be back to before rising. Alas, things did not get better.

The hope for face-to-face instruction had to be shelved. Despite the escalating cases of Covid-19 in most areas in early 2021, the one year of forced training to develop learning materials and equipped the instructors with relevant knowledge and skills to function well in the open and distance learning environment made the instructors more prepared to handle their classes this time. However, the novelty of having fully online classes has started to lose impact. Students started to be passive learners, waiting for the instructors to finish the lesson. Occasionally, they responded when the class instructor called out their name. They would be active when it was time to end the learning session. Something needs to be done to change the situation. Students need to be motivated and active for learning to take place. There is an approach that is worth considering, that is, the use of gamification in learning.

Gamification is essential to engage students in the learning activities (Darejeh & Salim, 2016; Ntokos, 2019; Rapp et al., 2019). Games in learning has been around since the seventeenth century; it has long been advocated in language learning for various reasons. More research on the use of games in education and, in particular, language classroom pointed to many of their benefits. Games in learning eliminate the misconception that all learning should be serious in nature (Ibrahim, 2017). Its introduction in the classroom does not downplay the seriousness of the lesson but, makes a lesson that may be dry and highly technical like linguistics appear student-friendly and could increases student motivation (Constantinescu, 2012; McKenzie & Punske, 2019). Using games is an essential tool that allows language instructors to add colors to their classrooms by providing challenge and entertainment. They are particularly valuable for beginners as a source of cognition that helps them adapt sounds and rhythms and comprehend the language.

Incorporating games into the lesson adds interest to what otherwise could be a very dull lesson and sustains students' interest in the subject (Thiagarajan, 1999; Wright et al., 2006). Games allow students to take leading roles, and through games, students and instructors' roles are changed (Crookall, 1990; Ibrahim, 2017). According to Crookall (1990), games give a chance to students to take responsibility for their learning and instructors to participate in their learning actively. From an instructional viewpoint, creating a meaningful context for language use is another advantage that games present (Gozcu & Caganaga, 2016). Games present a meaningful context for language use and enable instructors to create different contexts where language learning occurs unconsciously. In gamification, students focus on the game and acquire the target language incidentally, similar to first language acquisition (Cross, 2000). Furthermore, the peer interaction that takes place during the game provides context for meaningful communication (Wright, et al., 2006), the very platform needed for language learning (Krashen, 1985; Long 1991; Swain 1993).

Perhaps one of the most important findings related to the use of games in learning is by Gardner (1999), who listed a variety of intelligence gamification, connects to, for examples the interpersonal intelligence, visual/spatial intelligence, and bodily/kinesthetic intelligence. Participation in games provides the basis for comprehensible input where students need to understand what they listen and read, interact with each other to enhance comprehensibility by asking for repetition or giving examples (Long, 1991), and comprehensible output through speaking and writing where they could be understood (Swain, 1993). As games involve all the basic language skills, i.e., listening, speaking, reading, and writing, and very often, a number of skills are often required in a single game (Lee, 2000), and language skills receive a definite boost.

Games are also important to lower student anxiety (Richard-Amato, 1988). The variety and intensity of the games open up opportunities for participation by students of different personalities and characteristics, especially when games are played in small groups (Uberman, 1998). Another advantage of games involving small groups is that it becomes the venue for students to develop their communication skills such as how to disagree politely, how to ask for help (Jacobs & Liu, 1996), and how to communicate in a team (Ersoz, 2000).

Traditionally, games were only used in the language classroom as either warm-ups activities at the beginning of class, as part of fill-ins when there is extra time near the end of class or as an occasional bit of spice stirred into the curriculum to add variety. Developing games to be embedded into the linguistics pedagogy at various levels of a language course should be encouraged for it has obvious pedagogical advantages rather than as an occasional spice to add variety to the curriculum. Designers of language games need to consider various factors in designing the game, such as rules of the game, elements that encourage competition, and the language focus that is relevant to the curriculum. They should incorporate different difficulty levels suited for all students to participate and enjoy (Ibrahim, 2017).

THEORIES IN GAME DESIGN AND DEVELOPMENT

Gamification refers to the application of "game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kapp, 2012). It involves the application of game-playing elements such as points, timers, badges, and scoreboards to another type of activity such as in educational contexts. There are two types of gamification: structural and content gamification (Kapp, 2012).

Structural gamification refers to the application of game elements to propel learners through a game content with no alteration or changes to that content (Kapp, 2017). For example, after completing certain

topics, students will be given some quizzes. If they get the answers right, they will be awarded with digital badges. Mini lessons will appear if they get the answers wrong. These questions will be repeated several times until the students show mastery of the content. The students' progress will also be shared on the score-board. The use of badges, points, and scoreboards are examples of the application of gamification in admin-istering regular quiz sessions.

On the other hand, content gamification alters the content of a lesson and make it more game-like content (Kapp, 2012). It enlists students to take on an active role in a challenging context to solve prob-lems. It involves different combinations of game elements such as goals, rules of play, a sense of competi-tion or cooperation, point-scoring and levelling-up, feedback, and storytelling or role play. For example, a quest is created for students to complete. The quest usually includes a fantasy context. There will be obsta-cles and challenges. Students need to solve a puzzle in one minute to get a clue to complete the quest or something unfavourable will happen to them.

Both types of gamifications have strong underlying learning theories: Behaviourism, Cognitivism, and Constructivism. Besides the Cognitive Theory of Multimedia Learning, Bloom's taxonomy is also relevant in game design and development.

Behaviourism believes that behaviours can be conditioned by providing repeated stimuli, and these behaviours can be reinforced by rewarding the responses. Behaviourism considers that learning has occurred when there are changes in behaviour (Learning Theories, 2017). The gamification elements supported by Behaviourism are challenges, scores, badges, lives, timers, and leader-boards.

Cognitivism believes that students' existing knowledge can affect learning outcomes. Whenever stu-dents receive new information, they need to effectively organize and structure it to tap their previous knowledge, abilities, or skills (Learning Theories, 2017). Feedback is also important to facilitate the process of assimilation and/ or accommodation of new knowledge with the existing cognitive structure. The gamifi-cation element supported by Cognitivism is game levels.

Constructivism believes that learning occurs through active learning in which knowledge is construct-ed through the experience gained in situated contexts (Learning Theories, 2017). Students are given different tasks to allow them to manipulate materials and interact socially. They can experiment, examine phenome-na, gather data, make and test hypotheses, and collaborate with people. Mistakes are permissible and can be

corrected via feedback. The gamification element supported by Constructivism is instant explanatory feedback.

The multimedia elements are applied in the game design based on the Cognitive Theory of Multimedia Learning (Clark & Mayer, 2011). This theory believes learning is more than the notion that "people learn more deeply from words and pictures than just words alone" (Meyer, 2010, p.47). The theory explains that multimedia elements in learning activities are processed by visual and auditory channels (Dual Channels). Each channel can only process one type of information, either visual or auditory (Limited Capacity). For instance, the game tasks can be presented either in text or audio form. On top of that, learning can only occur when active cognitive processing occurs during the learning time (Active Processing). This active processing refers to filtering, selecting, organizing and integrating information based on prior knowledge. Active Processing increases when cognitive load is reduced. Cognitive load occurs when two or more types of processed information using the same channel are presented simultaneously. It is suggested that the game tasks be presented in smaller chunks via one channel to reduce the cognitive load. These multimedia elements must be selected carefully in the game design to fulfil the three principles in theory: Dual Channels, Limited Capacity and Active Processing.

Bloom's Taxonomy classifies cognitive learning objectives into six levels of complexity: remembering, understanding, applying, analyzing, evaluating, and creating (Anderson & Krathwohl, 2001). This taxonomy is used to design tasks in games and these tasks are arranged from easy to difficult to promote the mastery of skills and make the game more challenging.

PROBLEM STATEMENT

Leaning in the open and distance learning environment is not free of challenges. Challenges come from various angles, from the instructors, students, materials and even the teaching methods. Adaptation to the current learning situation is mandatory, and instructors could be the primary catalyst for adaptation. Online technology in learning could bring the instructor and students together but be together online does not mean the students are present. It is hard to keep the students engaged in an online learning environment (Plitnichenko, 2020). Having a dry course could add to the problem. Language instructors are well aware of the challenges students of linguistics undergo to grasp the subject as it contains new terminologies known as linguistic jargons and could also be a bit technical and complicated for some students. They need to be highly motivated to learn the course termed *a dry subject,* especially during the open and distance learning mode. Language instructors need to be creative and innovative in their teaching if they are to capture the attention

and interest of students throughout the course duration. *FunLinguistics* offers an alternative solution to the predicament the instructors and students of linguistics are experiencing. It is a linguistic instructional game purposely developed to assist students in Linguistics. This linguistics game is hoped to increase students' motivation and engagement in learning in the open and distance learning environment. The paper describes the process of developing the game and shares the students' view regarding the approach in using instructional games to assist them in revising for tests.

METHODOLOGY

This paper describes the process of developing the games, from choosing the platform to host the game, deciding on the multimedia and gamification elements to be included in the game designing questions for the game, including the theories that support the construction of questions, to how to use the game with the students. The game adopts a structural gamification approach that used Microsoft PowerPoint as the main platform with Visual Basic Applications (VBA) was adopted. The game consisted of questions set at different difficulty levels based on Bloom's Taxonomy.

The concept of structural gamification in the learning activities is applied in the design of *FunLinguistics* by including gamification elements in the learning activities such as score, scoreboards, time limitation and game levels. Learning theories such as the Cognitive Theory of Multimedia Learning, Behaviourism, Cognitivism and Constructivism are applied in designing and developing the activities. There are different types of games created for different topics such as Definition of selected terms (Level 1), Classification of synonymous words (Level 2), Identification of errors in sentences (Level 3), Analysis of conversations for violation of maxims (Level 4), Determine the use of morphemes in sentences (Level 5) and Composition of new examples based on the constituent diagrams (Level 6). This game is unique as it offers fun activities to increase student's engagement in learning as well as in revising for tests**.**

A short survey was conducted after the students completed playing the game to find out their view regarding the use of games in revising. The questionnaire was distributed to all students playing the games via a link to a google form. 30 out of 45 students taking the ALS426 Language and Linguistics course during the intersession semester from the LG243 English for Intercultural Communication Programme answered the questionnaire. The questionnaire consisted of 3 sections (A) students' details, (B) students' opinion on the game objectives and (C) students' suggestions on how to improve *FunLinguistics*. For section (B), students were asked to answer whether they strongly agree, agree, neutral, disagree or strongly disagree with the statements given. A simple descriptive analysis using percentages of students' responses for all sections of the questionnaire was conducted, and a summary of findings was tabulated.

FINDINGS OF THE STUDY

a)   Game Development

FunLinguistics is a digital instructional game that is designed by using Microsoft PowerPoint 2016 with the Visual Basic Application (VBA). PowerPoint is used as the software to design the game and the platform for playing it. Whereas the VBA is used to design the scoring board (leader-board). PowerPoint is chosen because it is available on most personal computers. Moreover, it allows multimedia and is easily edited since it is presentation software.

The *FunLinguistics* game adopts the structural gamification approach that does not gamify the course content but only the structure of the content. This approach is generally applied in designing games for instructional purposes (Darejeh & Salim, 2016; Ntokos, 2019). The game design includes multimedia and gamification elements. The multimedia elements applied in the *FunLinguistics* game are the onscreen text, graphics, and sounds. These elements are essential as they are crucial to grab students' attention in playing games. (Clark & Mayer, 2011). Some of the gamification elements that are included in the game are the reward structure (points, badges and leader-boards), cognitive difficulty levels (game levels) and time restriction (count-down timer or count-up timer) into the structure of the content (Kapp et al., 2012).

The multimedia elements are applied in the game design based on the Cognitive Theory of Multimedia Learning (Clark & Mayer, 2011). The theory explains that multimedia elements in learning activities are processed by visual and auditory channels (Dual Channels). Each channel can only process one type of information, either visual or auditory (Limited Capacity). Learning can only occur when active cognitive processing occurs during the learning time (Active Processing). Active Processing increases when cognitive load is reduced. Cognitive load occurs when two or more types of processed information using the same channel are presented simultaneously. Therefore, the multimedia elements are selected carefully in the game design in order to fulfil the three principles in theory: Dual Channels, Limited Capacity and Active Processing.

The gamification elements are designed by considering three learning theories which are Behaviourism, Cognitivism and Constructivism. Score, scoring boards, time limitation and positive reinforcements are supported by Behaviourism. Score and scoring boards are positive reinforcements that are important to change the behaviour by increasing students' probability of responding to learning activities (Zhou & Brown, 2014). In contrast, the time limitation is a punishment that can discourage the behaviour so that the

unwanted behaviour can be eliminated (Zhou & Brown, 2014). Time limitation is essential to create pressure (Schöbel et al., 2016) and increase focus (Browne et al., 2014).

The game levels, which involves the questions, are designed by using the revised Bloom's Taxonomy. The taxonomy has six cognitive difficulty levels arranged from the simple level to complex levels: Remember, Understand, Apply, Analyze, Evaluate and Create (Krathwohl, 2002). In the instructional game design, it is essential to start from the lowest cognitive level as when the cognitive level is increased, it creates the challenge that may increase students' engagement in completing more challenging tasks as the game level increases (Hamari et al., 2016). Game levels promote the mastery of learning from simple to complex cognitive levels. Thus, the element supporting Cognitivism that emphasizes learning requires the mental process, and learning mastery occurs according to stages from simple to complex cognitive levels (Zhou & Brown, 2014).

The taxonomy is applied to separate six cognitive difficulty levels. Table 1 describes the cognitive levels in the revised Bloom's taxonomy and how they are applied to create the game levels, and Figure 1 shows the screenshots of learning activities for Levels 1 to 6.

Table 1: Application of the revised Bloom's Taxonomy to create the game levels

	Cognitive Level in the revised Bloom's Taxonomy	Game Level
1.	Remember Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Level 1 Definition of selected terms (All chapters)
2.	Understand Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Level 2 Classification of synonymous words (Semantics - synonymy)
3.	Apply Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Level 3 Identification of errors in sentences (Semantics – homonyms and homophones)

| 4. | Analyze | Level 4 |
	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Analysis of conversations for violation of maxims (Pragmatics – Grice's Cooperative Principles)
5.	Evaluate	Level 5
	Present and defend opinions by making judgments about information, the validity of ideas, or quality of work based on a set of criteria.	Determine the use of morphemes in sentences (Morphology)
6.	Create	Level 6
	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	Composition of new examples based on the constituent diagrams (Syntax). The difficulty level of the games is based on Bloom's Taxonomy
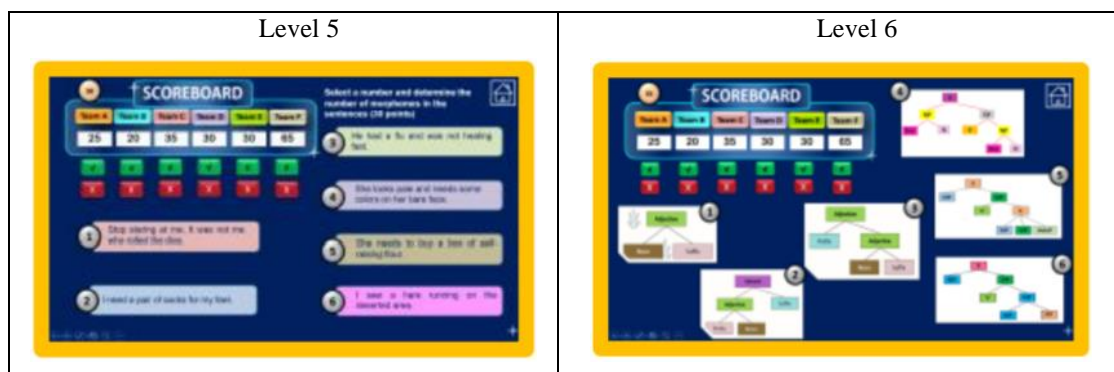
Figure 1: Screenshots of the tasks according to the game levels

FunLinguistics promotes learning by doing as students actively participate in groups to play the game. Thus, it supports Constructivism since the learning activity involves social interaction and cooperative learning that result in the construction of knowledge and emotion (Brown, 2006).

The game has several rules that describe the steps on how to play the instructional game. Apart from gamification elements applied in game design, game rules are crucial to engaging students (Boyle et al., 2016). Game rules must be fixed and clearly stated to govern how a game should be played (Garris et al., 2002). The game rules of *FunLinguistics* are as follows:

1. Divide the class into smaller groups of 4-6 members and name the groups.
2. Start the game with the lower difficulty level questions indicated by L1-L6.
3. Player 1 from each team will begin the game by choosing one (1) question at Level 1; if there are remaining questions, open to all groups. The first to answer will get the mark. Continue with Player 2 for Level 2 and so on.
4. Each player is given 3 minutes to answer the questions. Each team has two chances to help its members throughout the game. The answer must be provided within the same 3 minutes. The game handler will determine whether the answers are correct or incorrect. The question is opened to the other team to answer within one minute if the team fails to provide the correct answer.
5. Answers for all questions can be displayed by clicking the questions.
6. The game handler will record the score. √ for correct answers and X for incorrect answers. The overall scores can be seen on the leader board automatically.

b) Survey Results

The results of the survey are as follows:

Section A: The number of respondents

Figure 2 shows the number of respondents from each class. There were 3 classes involved in the survey, and 30 students answered the questionnaire, 40.3% from Group A, 16.7% from Group B and 40.0% from group C.
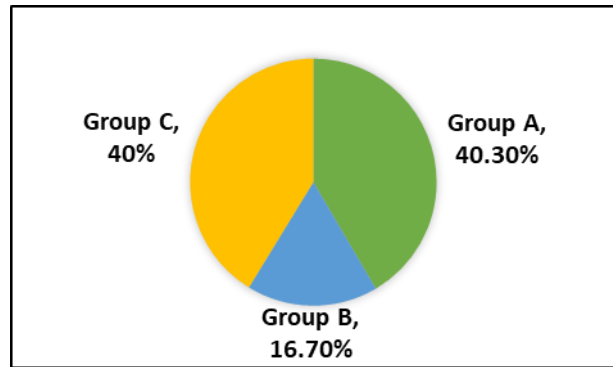

Figure 2: The number of respondents from each class

Section B: Game Objectives

The students were asked whether they agreed that *FunLinguistics* could assist in their revision. From Figure 3 below, 18 out of 30 (60%) strongly agree, 10 (33.3%) agree, 1 (3.3%) neutral, and 1 (3.3%) strongly disagree with the statement. This result shows that most of the students believed that *FunLinguistics* did assist them in revising.
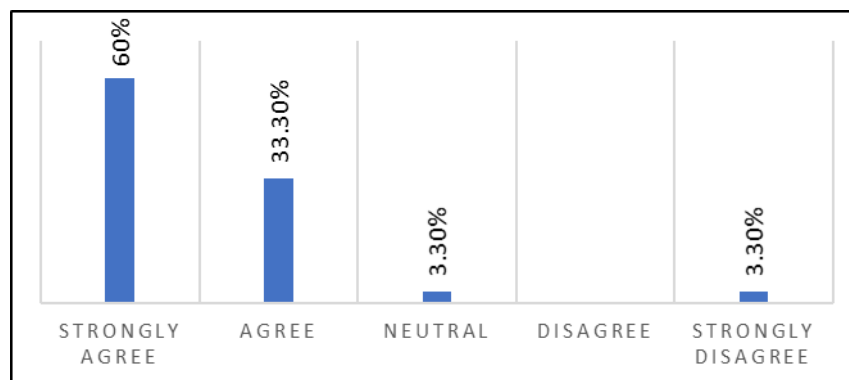

Figure 3: The game assisted students with revision.

When asked whether the game motivated them to get the right answers, 16 students (53.5%) strongly agree, 11 (36.7%) agree, 1 (3.3%) neutral, and 1 (3.3%) strongly disagree with the statement. These responses can be seen in Figure 4. The majority of the students agreed that they were motivated to get the correct answers. This result could be due to the scoreboard that offers a sense of competition among the groups.
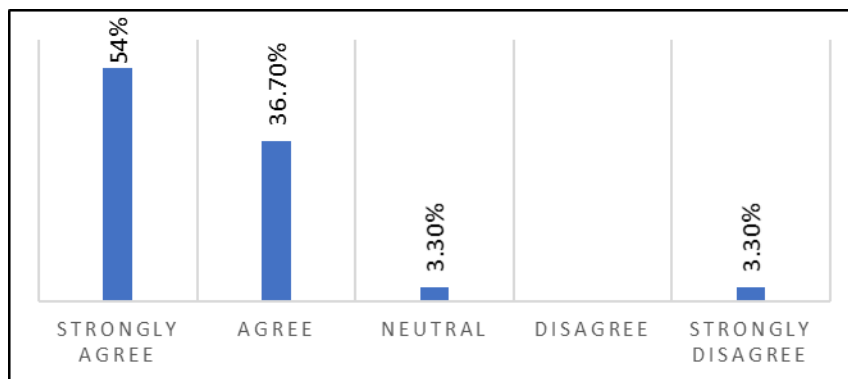
Figure 4: The game motivated the students to get the correct answers.

The next question was to determine whether students felt motivated to work as a team when answering the questions. Results in Figure 5 show that 18 (60%) strongly agree, 6 (20%) agree, 5 (16.7) neutral and 1 (3.3%) strongly disagree with the statement. It can be concluded that most students did find working together to get the correct answers was motivating. *FunLinguistics* provided the opportunity for students to work as a team.
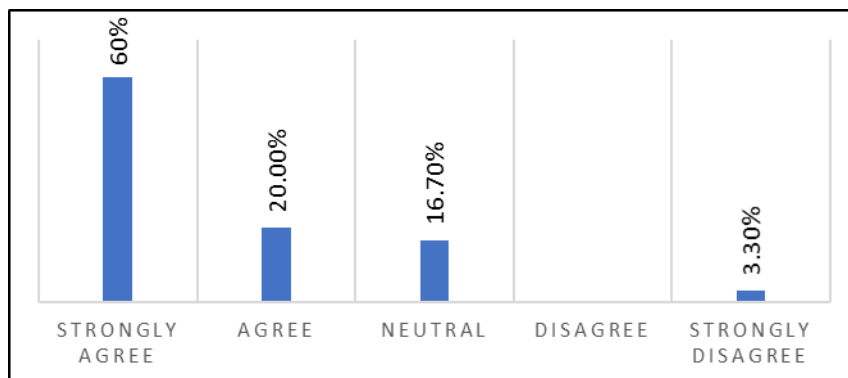

Figure 5: The game motivated the students to work as a team.

The survey elicited information on whether the students could learn four of the topics stated in the syllabus better via *FunLinguistics*. The four topics were Morphology, Syntax, Semantics and Pragmatics. These topics were to be tested in Test 2 of the course. Based on the results of the survey in Figure 6, 15 students (50%) strongly agree, 14 (46.7) agree, and 1 (3.3%) strongly disagree that the game helped them with Morphology.

14 students (46.7%) strongly agree, 15(50%) agree, and 1 (3.3%) strongly disagree that *FunLinguistics* helped them understand the topic on Syntax better.

As for Semantics, 16 students (53.5%) strongly agree, 11 (36.7%) agree, 2 (6.7%) neutral, and 1 (3.3%) strongly disagree that *FunLinguistics* helped them understand the topic better.

Lastly, for Pragmatics, 14 students (46.7%) strongly agree, 13 (43.3%) agree, 2 (6.7%) neutral, and 1 (3.3%) strongly disagree that the game helped them learn the topic better. In general, most of the students felt that *FunLinguistics* did assist them in learning the four topics: Morphology, Syntax, Semantics, and Pragmatics.
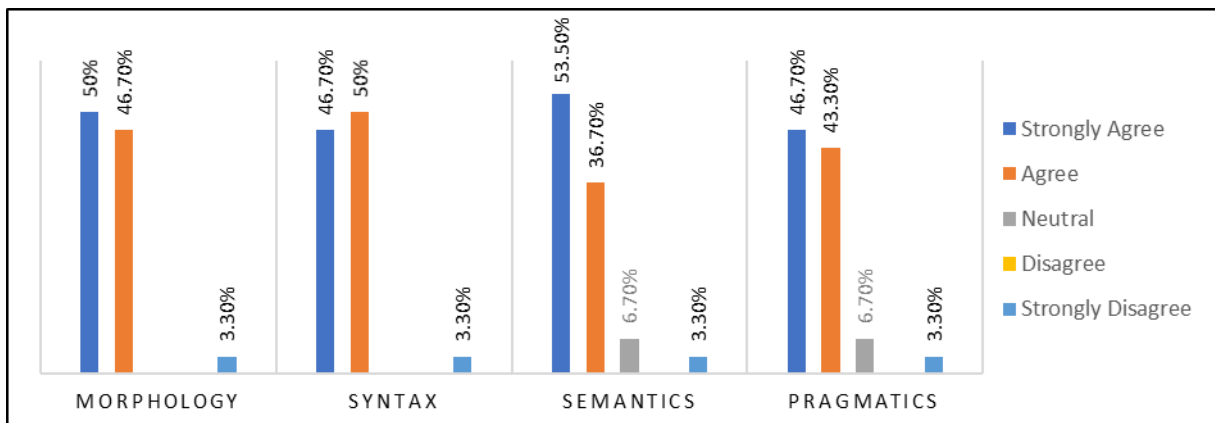

Figure 6: The game helped the students learn the topics better.

Section C: Suggestions to improve the *FunLinguistics* game

Most of the respondents said that the game was good and fun. The respondents also suggested several improvements to be made. The respondents suggested having more games and more questions so that they could practice more. They also requested the game to be made available offline to access it at their own time to repeat the revision. There was also a request to add more sounds, specifying the roulette and choosing the questions for dramatic purposes. The final suggestion was to request all players to turn on their camera to ensure the participation of all players.

CONCLUSION

The *FunLinguistics* game managed to attract the students to play the game to enhance their understanding of Morphology, Syntax, Semantics and Pragmatics. They found the game as relevant to them, and the game allowed them to have fun while learning and doing their revision.

This study shows that instructors need to be creative in designing activities for the students, not just for the open and distance learning environment but also for the face-to-face learning. When students enjoy

the learning experience, they will be more motivated to learn and be actively involved in their learning process. Gamification is one of the ways to do so. This study offers a process of designing an instructional game that includes the gamification elements to be included in the game and the difficulty level of the tasks to be created. The relevant multimedia and learning theories that back up the use and development of this instructional game also prove that having fun and learning could offer a better learning experience to the students.

Applicability of the Innovation

The *FunLinguistics* game is designed to assist students in doing revision in the open and distance learning mode. However, it can also be used during the face-to-face mode to increase student's engagement in the learning process.

Commercial Potentialities of the Invention

The *FunLinguistics* games can be packaged as supplementary activities for books and modules.

Academic and Intellectual Properties

The research conducted into the creation of this game, the various stages of its development and application in learning by students and the survey results obtained on its reception by students will be turned into a paper on innovation to be published with IJMAL. An IP application had been made to IRMIS and successfully obtained.

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