

Guided Discovery Based Gamified Tasks for Improving Primary Pupils' Grammar Learning

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Abstract

This research aimed at improving primary pupils' grammar learning in order to increase their grammar achievement by discovering the grammatical language features as well as motivating them to grasp the grammar content accurately and practice its tedious tasks with fun. Grammar rules and practice drills of units six and seven in the Ministry of Education second term English Language Textbook for 6th primary grade (Time for English 6) were introduced to the experimental group in the form of guided discovery based gamified tasks in order to determine how far guided discovery based gamification was effective in improving their grammar learning. The participants were 64 6th year primary grade pupils from one of Ismailia public governmental primary schools. The research design was the experimental one in which the participants were divided into two groups: Experimental group of 32 pupils and Control group of 32 pupils. The measurement tool was a grammar test developed by the researcher. The findings revealed that discovery based gamified tasks improved primary pupils' grammar learning significantly. So, they are recommended to be used.

Key Words: Grammar, Guided Discovery, Gamification, Gamified Tasks.

Background

Guided discovery is an instructional design model in which learners find out information within a suitable environment facilitated by the teacher to develop their understanding (EduTech Wiki, n.d.). It enhances young learners' self-autonomy grammar learning since learners must elicit the rules independently within provided materials and examples (Alfieri, Brooks, & Aldrich, 2011). It combines between inductive and deductive approaches to overcome their drawbacks and make use of their benefits. Accordingly, it starts with learner's elicitation of the rule, then it calls for extra application to avoid misunderstanding (Saumell, 2012). However, it lacks the elements of fun, risk, challenge, mastery and competition that motivate the learners.

To encourage learners' interactive grammar practice with excitement and enjoyment, grammar should be gamified (Carpenter, 2015). Since young children learn a new language more easily and get the most of it through games, grammar should be taught through meaningful activities where learners can have fun while getting engaged in active participation (Adam, 2015). Gamification is a new pedagogical strategy that applies game design elements in non-game situations or contexts to expand learners' productivity and participation with motivational skills (Werbach, & Hunter, 2012 and Huotari, & Hamari, 2012). In this respect, grammar tasks should be creative enough to let learners take risks and engage deeply in language learning (Murugiah, 2013, & Hadfield and Hadfield, 2015).

Consequently, grammar can be taught by a mix between guided discovery to promote self-autonomy based elicitation of the rule as well as gamification to stimulate engagement with fun. This is to ensure learners' interaction and motivation which are the two key elements for enhancing a successful grammar instruction in a way that guarantees developing the primary pupils' grammatical awareness.

Review of literature and related studies

1. Grammar

1.1 Grammar role in language learning

Grammar plays a significant role in foreign language learning accurately and fluently for it is the heart of language as claimed by Saaristo (2015, p.279). Agape (2015) states that grammar is necessary to convey expressions precisely in oral or written discourse since it ties closely into vocabulary in learning and using the foreign language as well as it can evolve from the learning of chunks of language. This is in line with the findings of the analytical study that was conducted by Kumar, Kumar and Sagar (2015). In this study, they referred to the importance of grammar learning in an English as a Foreign Language (EFL) context for better speaking and writing as well as effective listening and reading. To sum up, grammar learning

and its appropriate usage are necessary for effective and competent EFL communication (Lin, 2008) since the role of grammar in communication comes in organizing words, clauses and phrases into meaningful sentences (Dalil, 2013, p.10).

1.2 Grammar Teaching in Egypt

Grammar is necessary for language competence since it affects learners' four language skills. Kumar, Kumar and Sagar (2015) assert that accuracy and proficiency require knowledge and application of grammar to use communicative skills effectively. Moreover, grammar instruction should be the basis of English language learning when English is a foreign or a second language (Words Worth English Language Lab, 2016). In Egypt, English is a foreign language and it is not accordingly acquired naturally. Hence, learning grammar structures is important when teaching English at schools. However, most primary pupils at public governmental schools, lack grammatical awareness.

McIlwraith's and Fortune's insight paper (2016, pp.2-6) about English language teaching and learning in Egypt, which states that Egypt was placed last of 148 countries for the quality of its primary education and that ELT in the primary stage lacks the teaching quality as it is restricted to giving instructions, explanation of grammatical rules deductively using the board and deciding the activities to be practiced while ignoring inductive grammar teaching. Mekawy's study (2016, pp. 10-11) on the Egyptian preparatory pupils' grammar learning at the governmental public schools in Ismailia revealed that those pupils encountered problems when memorizing and using grammar rules properly because of the traditional grammar explicit explanation adopted and commonly used by most teachers.

Such results were in line with Ibrahim's & Ibrahim's study (2017) on classroom language practice in Egypt. In this study, they referred to the ineffective traditional approaches and methods of teaching English such as direct method and grammar-translation approach. However, they recommended the use of strategies that focus on meaning-making and problem-solving to improve English

Language Teaching (ELT) in Egypt like many other countries of the world.

As a preliminary investigation for such a problem, open interviews were conducted with 16 ELT inspectors and 18 EFL primary teachers at three governmental public primary schools in Ismailia gather their views on their satisfaction level with the primary pupils' grammar achievement at the governmental public schools as well as the reasons for the primary pupils' lack of grammatical awareness. The results showed their dissatisfaction with the pupils' weak grammatical performance in English Language tests.

The ELT inspectorate in Ismailia attributed such negative performance to the low-quality grammar teaching that ignores inductive teaching and learning with fun and concentrates. The EFL primary teachers claimed primary pupils' reluctance to learn grammar explicit explanation because of its boring content and tedious repetitive grammar practice drills. That is why the current study used guided discovery based gamification as an attempt to overcome the low-quality grammar teaching as referred to by ELT inspectors as well as primary pupils' reluctance to grammar learning as mentioned by EFL primary teachers.

In this respect, a grammar test was administered as a pilot study to assess a class of 36 6th primary grade pupils' grammatical awareness in one of Ismailia public governmental schools. This test assessed their achievement for the grammatical structures which they had studied in Units 1, 2, 3, 4 and 5 from their "**Time for English 6**" course book before the first term exam. In this exam, there were 40 multiple choice items and 40 rearrangement items. They were the types of grammar questions included in the Ministry of Education English Exams for 6th primary grade. It showed that primary pupils' grammar achievement level was low.

2. Guided Discovery

2.1. Definition

According to Richards and Schmidt (2002) guided discovery is where "Learners develop processes associated with discovery and

inquiry by observing, inferring, formulating hypotheses, predicting and communicating” (p. 162). Guided discovery is a technique or a situation where the learner must find the rules independently but with the help of the teacher’s provided materials or examples of a language item (Alfieri, Brooks, & Aldrich, 2011 and British Council, n.d.). Saumell (2012) defines it as “A modified inductive approach in which there is exposure to language first, inference, explicit focus on rules and practice”. In line with Saumell’s definition, Caprario (2013) assumes that guided discovery is a learner-based inductive approach to developing explicit knowledge.

In the current study, Guided Discovery can be operationally defined as “An inductive & deductive approach where English Language teacher elicits the grammar rule from the primary pupils within a context or through illustrations, examples and materials, then develops an explicit knowledge about the rule and engages them in practice drills on the rule”.

2.2. Phases of Guided Discovery

Saumell (2012) and Caprario (2013) discuss the following step by step methodological procedures for guided discovery:

1. Exposure to language through examples or illustrations. This, for example, could be through isolated sentences, sentences in context or photos.
2. Observation and analysis of the language through guided questions. In this step, the teacher, for example, can ask learners to complete the gaps in sentences or rules; or to match examples and rules.
3. Statement of the rule. Here, the construction of the new knowledge takes place by eliciting the rule from the learners.
4. Application of the rule in practice tasks graded by difficulty or complexity. Teacher should vary the tasks from controlled practice to free practice.

2.3. Benefits

Guided discovery is a valid and useful Teaching English as a Foreign Language (TEFL) method at all levels of language learning (Saumell, 2012). It increases learners' understanding of grammar structures while helping the learners reach higher levels of comprehension; such as application, analysis and creation (Belkina, Geykhman, & Yaroslavova, 2015). It helps learners retain the discovered grammar structures more constantly since it merges with the notion of consciousness-raising which is based on building tasks in a way that learners practice pattern identification by figuring out the targeted feature of the language (Thornbury, 2011). Thus, it is a tool recommended for use by teachers to encourage learners' self-autonomy learning and make learning more memorable (British Council, n.d.).

Learners can acquire cognitive skills when discovering grammar rules such as problem solving and critical thinking skills since these skills are based on learners' own reasoning (Saumell, 2012). This is confirmed in Caprario's study (2013) to check out how beneficial guided discovery is in grammar instruction by reviewing Second Language Acquisition, Foreign Language Instruction, and Educational Psychology literature. It showed that teachers can lead a learner-centered instruction that encourages critical thinking and problem solving in addition to language learning.

Above all, guided discovery helps benefit learners more from what they learn through active participation, collaboration and extra language practice individually, in pairs, in groups or as a whole class (Widodo, 2006 and Eggen, & Kauchak, 2012). That is why learners who experience guided discovery method, perform better in their language tasks as indicated by Alfieri, Brooks and Aldrich (2011) in their study of a comprehensive analysis for 164 studies.

3. Gamification

3.1. Definition

According to The Multimedia Game for Inclusion Project (2014) Gamification is “The use of machines and the feel of a game to inspire positive change in others awakens the same human instincts that drive people to compete in sports and other fun activities” (p.44). It can also be defined as a process of using game mechanics, thinking and elements to nongame tasks to make them look like a game; such as using achievement badges or leaderboards to increase learners’ motivation and improve their learning (Kapp, 2014 and Shah, 2016).

In light of the definitions mentioned above, gamification can be operationally defined as “A pedagogical strategy in which English Language teacher applies the appropriate game elements to non-gaming and boring grammar content (structures and tasks) and make it sound like a game in order to motivate the primary pupils to learn grammar deeply and practice it with fun”.

3.2. Differences between gamification and game-based learning

It is commonly misunderstood that gamification is game based learning. On the contrary, there are subtle differences between both of them. Shah (2016) refers to the following two slight differences between gamification and game based learning:

- a. Gamification is a game thinking for applying game elements to non-game contexts in a way that encourages learners’ motivation (Werbach, & Hunter, 2012); nevertheless, game based learning is based on an adopted ready-made game with the knowledge that learners can get from its content (Caponeto, Earp, & Ott, 2014).
- b. Gamification helps the teacher monitor learners’ progress and help the learners track their performance; however, game based learning just makes all learners interested in what they learn.

3.3.Types

According to Kapp (2013), there are two main types of gamification:

a. Structural gamification

No changes are made to the content itself to become game-like; however, they are only made with the structure around the content to sound like a game. This type aims at motivating the learner to get engaged in what they learn through rewards. The most common elements in this type are points, achievement badges and levels.

b. Content gamification

Changes are made to the content to make it more game-like by applying game elements and game thinking. This type focuses primarily on repackaging the language content to make it more attractive and stimulating for learning.

3.4.Elements or mechanics

Primary school pupils love any element of a game to be applied to the language content they learn (MK, 2015). So, English Language teachers can determine the game elements or mechanics that make the most sense for their gamification effort and apply them throughout the grammar tasks performed by primary pupils. Healy (2013), Kapp (2014) and Flores & Francisco (2015) define the following regular and mostly used game elements as follows:

1. Points: They are visible signs of success with which learners can monitor their progress through the gamified experience.
2. Badges: They are awarded for achievements or nonlinear accomplishments.
3. Leaderboards: They are boards used for displaying the learners who has earned the most points in a gamified task.
4. Quests: The tasks learners have to perform in a game.
5. Levels: There are three levels for a gamified task. The basic level in which the learner is guided and learns the experience. The intermediate level where most learners can participate since it is

neither too hard nor too easy. The hard level in which learners must know what they are doing without help or guidance.

6. Avatars: Visual representation of a player such as a racing car.
7. Rewards: Awards to motivate learners to accomplish the task in the game.

Kapp (2014) adds the following elements or mechanics that drive learner motivation and engagement as well as make the most sense of gamification:

8. Rules: They are used to make the tasks challenging within the gamified experience and to ensure fair competition among learners
9. Objectives: They are the intended learning outcomes that learners have to accomplish by the end of the gamified experience.
10. Feedback: There are six types of feedback that learners can get in a gamified experience. Conformational feedback indicates what is right and what is wrong. Corrective feedback guides the learner towards the correct response. Explanatory feedback is corrective and shows why a response is incorrect or incomplete or partially incorrect. Diagnostic feedback explains the reasons for incorrect choices and corrects misconceptions or misunderstanding. Natural feedback is the feedback that learners get when playing the game in the natural world. Artificial feedback is the one received by the learners in the form of the text that does not occur in real world.
11. Mystery: It is the unknown information that learner should realize to fill the gaps in understanding.
12. Action: Tutorial is a recommended action when starting a gamified experience.
13. Challenge: Posing difficulty to the gamified task so it requires deep thinking rather than achieving by guessing from the beginning of the game until the end. The challenge here is the learner who can stand as the last player.
14. Risk: Contrary to most learning environment, learners should risk when taking actions or making decisions during the game. There are different ways to put learners at risk while playing the game. For instance, learners may lose the game and start over in case of wrong

actions, or lose all the points collected in case of incorrect decisions, or lose in case the time is over. Risks help them pay closer attention, focus their efforts and get engaged with the task.

15. Cooperation and Competition: A social element is the act of working together to accomplish the target outcomes; however, there should be competition by having opponents so that learners make their best to optimize performance.
16. Mastery: Learners can have the opportunity to move on to the next level of higher difficulty once the problems are solved and the key points are collected.

3.5. Gamification Model

To apply gamification to the teaching or learning process in an educational context, the following five step model is a guide for the teacher to gamify instruction.

Figure (1)

A Five Step Gamification Model



(Huang , & Soman, 2013, p.7)

According to this model, there is a series of five steps to plan a gamified task as follows:

1. Understanding the target audience and the context:

There should be an analysis of the audience and context to understand key factors that might hinder learner's progress in learning; such as the group size, environment, skills sequence and motivation.
2. Defining learning objectives:

Formulating the ILOs (Intended Learning Outcomes) is the starting point of any successful teaching or learning experience through gamification (Hanuman, n.d., p.24).
3. Structuring the experience:

Teacher should divide the experience into milestones as well as identify the skills sequence (from simple to complex) and what learners need to achieve by the end of each stage (Hanuman, n.d.,

p.24). In this case, the teacher can motivate the learners who experience problems to get motivated and compete.

4. Identifying resources:

Here, the teacher should identify the following:

- a. Tracking mechanism for measuring learners' progress. If there is a deadline for the task, then the tracking mechanism is time. If there is a rank, the tracking mechanism is points, etc.
- b. Level for the accomplishment of the ILOs so that learners can move on to the next task or lesson.
- c. Rules for what the learners can or cannot do to ensure a fair learning environment for all learners on equal foot.
- d. Feedback for learners' responses so that learners can check out what went right and what went wrong. Accordingly, they could avoid any misunderstanding.

5. Applying gamification elements:

Teacher should decide which elements to be applied. The most commonly used game self-elements are avatars, badges, leaderboards, levels and time restrictions (Hanuman, n.d., p.24). Such elements get the learners focus on self-competitions and self-achievement. There are Social elements such as competition, cooperation and achievement badges.

3.6. Advantages

Gamification can be used to enhance foreign language learning (Flores, & Francisco, 2015). It turns the unpleasant and tedious grammar tasks into an exciting practice for learners' engagement, active involvement and language acquisition (Froehlich, 2011 and Under, 2014). In this regard, it motivates learners intrinsically rather than extrinsically as it challenges them to achieve the ILOs and they get satisfied (abstract feedback) when competing against the other classmates to reach the achievement mastery level (Hanson-Smith, 2016). It is also an outstanding tool for external motivation through the adopted rewarding system (The Multimedia Game for Inclusion Project, 2014, p.45). In this respect, Landers, Armstrong and Collmus (2017, p. 465) mentioned that gamification can enhance learning only

when it is linked with motivational and learning outcomes; otherwise, it fails.

Gamification enables teachers track learners' progress and monitor their performance as well as improved skills (Incentive Research Foundation, 2014, p. 3 and Iñigo, 2015). It helps learners use the techniques of learning by mistakes without embarrassment (Huang, & Soman, 2013, p.24). Moreover, applying game-design thinking and game elements to non-game tasks helps the learners understand subtleties and nuances of language items being taught and be aware of the language patterns they learn (Abrams, & Walsh, 2014).

Gamification is supposed to be used when teaching hard, tedious and monotonous content to raise awareness and provide a certain mechanism for improving learning (Iñigo, 2015). Consequently, it is highly recommended to be used when teaching grammar since grammar tasks are boring and the content is tough to learn.

4. Guided Discovery based Gamification

4.1. Definition

In light of the procedural definitions of Guided Discovery Learning and Gamification, Guided Discovery based Gamification, as a mix, can be operationally defined as: *“An inductive & deductive teaching strategy where English Language teacher applies appropriate game elements while eliciting the grammar rule from the primary pupils through illustrations, examples and materials as well as while engaging pupils in task performance for application and extra practice after an explicit statement of the grammar rule in order to improve their grammar learning with fun.”*

4.2. Rationale behind Guided Discovery based Gamification for Grammar Instruction

There are two main reasons for combining guided discovery and gamification when teaching grammar to primary pupils:

First, the great results gained when applying each of them separately in grammar instruction, could refer to their possible and high positive effect on improving the primary pupils' grammar learning if they were used together.

As for the studies on guided discovery and grammar learning, guided discovery turns out to be one of the best methods as referred to in the study that was conducted by Huang (2008). In this study, guided discovery was proved to generate active learning and enhance the grammar learning outcomes particularly when teachers provide careful guidance to help learners reflect on the target grammar rules. Also, in Singaravelu's study (2012), an analysis was made for the problems of the learners in learning grammar through conventional methods as well as an experiment to determine the effect of discovery learning. The findings revealed that discovery learning is more effective than the traditional methods for grammar learning.

Other studies were conducted to prove the high impact of gamification on grammar learning. Zarzycka-Piskorz (2016) attempted to determine how effective the application of game elements is on learners' motivation and active involvement in grammar learning. The findings revealed the increase of learners' motivation to learn and practice grammar. In Catholic University of Surabaya, Mufidah (2016) conducted a study to determine the effect of gamification on learners' English Language anxiety and grammar achievement. The findings of the English Proficiency test showed positive outcomes and significant effect of gamified tasks on learners' grammar performance.

Second, the woven combination between Guided Discovery and Gamification aims at making the best use of the benefits and features of each of them together for effective grammar learning as follows:

Table (1)

A combination between Guided Discovery and Gamification

Guided Discovery	Gamification
<p>Natural Learning:</p> <p>Implicit grammar learning by getting the grammar rules from examples within contexts as it takes place in real-life language acquisition.</p> <p>Induction:</p> <p>Eliciting the grammar rules from the learners through provided examples and materials so they become memorable.</p>	<p>Fun:</p> <p>Using game mechanics to repack the tough grammar content and make it more appealing so that pupils learn and practice the unpleasant grammar tasks with fun.</p> <p>Risk:</p> <p>Learning grammar becomes risky so learners focus more attention and work harder to grasp the grammar rules and fulfill the tasks in a game.</p> <p>Tracking mechanisms (Progress monitor):</p> <p>Allowing learners to judge their progress through visible signs such as points, badges and time.</p> <p>Challenge (Conflict):</p> <p>Strict rules such as time limit in gamified tasks propel conflict that encourages learners' deep thinking to perform the grammar tasks successfully since there are winners and losers.</p> <p>Reward System (Extrinsic Motivation):</p> <p>Learners are encouraged through rewards</p>

such as badges and leaderboards to participate actively and get fully engaged with the content while learning and practicing grammar task.

Competition (Intrinsic Motivation):

Learners get an abstract feedback which is the act of competing against opponent classmates. Such self-satisfaction motivates the learner intrinsically to grasp the tough grammar rules.

Mastery:

Learners are able to move to a higher next level only when they master the target grammar content.

What Guided Discovery and Gamification have in common:

Learner-Centered:

Learners work independently to find information through guided discovery and so they get engaged in the learning process. Also, Gamified tasks expand their participation with intensive interaction with the content.

Creativity:

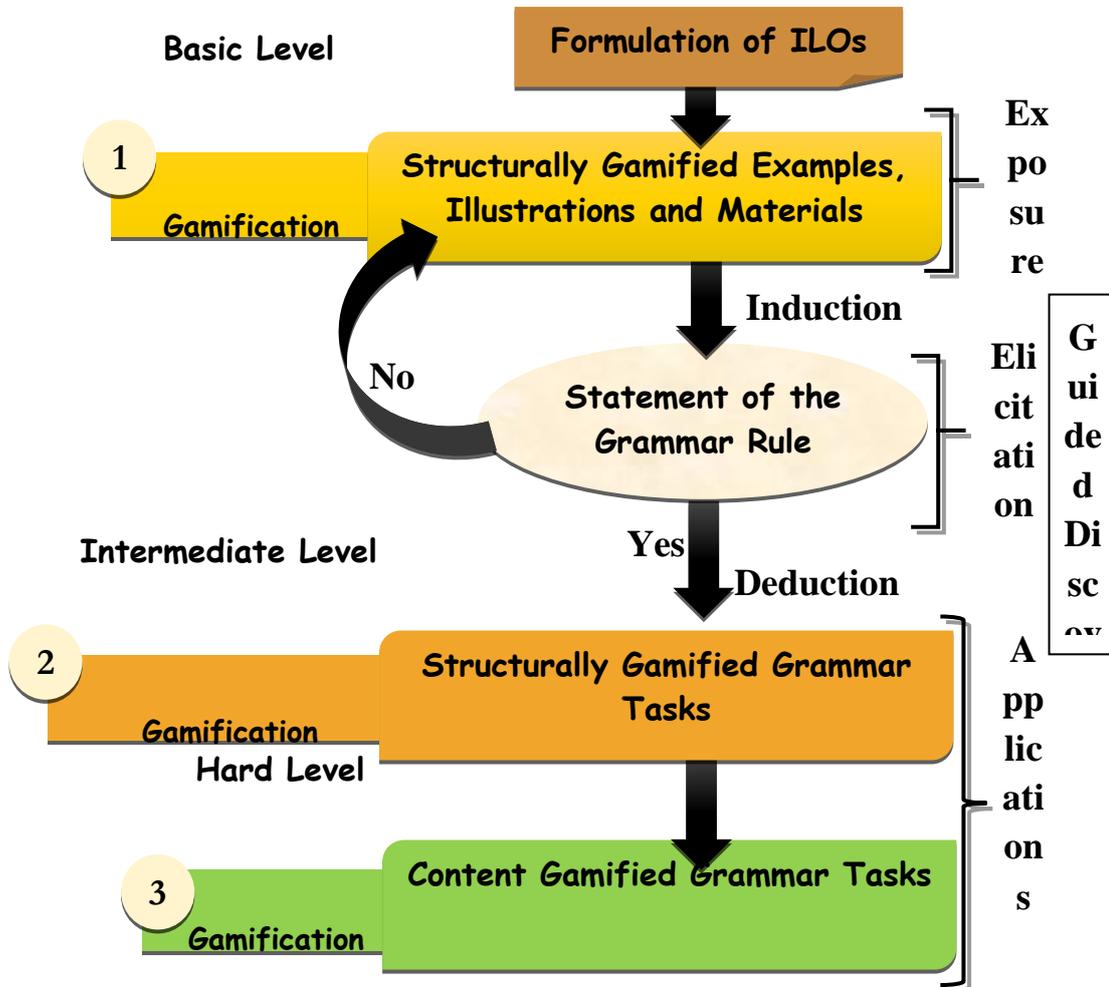
Guided discovery helps develop problem-solving and critical thinking skills. Besides, learners should think creatively to win the game and so they work harder when learning grammar.

4.3.Guided Discovery based Gamification Framework

In light of the phases of guided discovery learning and the five-step gamification model as well as game elements or mechanics, the following figure presents a framework developed by the

researcher for the proposed and combined pedagogical strategy of Guided Discovery based Gamification:

Figure (2)
Guided Discovery based Gamification



In figure (2), the proposed guided discovery based gamification strategy starts with the formulation of ILOs. This formulation is followed by three main phases for guided discovery in which game elements are applied. These phases are mixed with three difficulty levels structuring the gamified experience as follows:

1. Formulation of ILOs:

At the start, the teacher identifies the outcomes that primary pupils should accomplish when doing the guided discovery based gamified grammar tasks.

2. Exposure:

This is the first phase of guided discovery in which the teacher provides the grammar structure through examples, illustrations and/or materials within the basic level of a gamified experience. In this level, primary pupils learn the grammar structures by observation and analysis of the provided contexts and they are guided by the teacher. The following game elements are applied to structurally gamify the target grammar patterns: Objectives, Points, Rules, Challenge, Competition, Mastery, Leaderboard, and Explanatory Feedback.

3. Elicitation:

This is the second phase of guided discovery in which the teacher elicits the grammar patterns from the primary pupils. If they fail to discover the grammar rule, they will start over the game again and go back to the exposure phase. If they discover the rule, the teacher will make an explicit statement of the grammar rule and they will go to the next level of the gamified experience.

4. Application:

This is the third phase of guided discovery in which the primary pupils practice the grammar rule in two types of gamified tasks:

a. Two structurally gamified grammar tasks (Multiple Choice and Rearrangement): The game level here is intermediate where all pupils get involved in the performance of these gamified tasks since they are the standard types of questions in the Ministry of Education English Language Exam at this stage. Without changing the content of these tasks, the following elements are applied to make changes just to the structure around the content of individual grammar practice: Objectives, Points, Rules, Challenge, Competition, Mastery, Leaderboard, and Diagnostic Feedback. If pupils score 90% of total score points in these two gamified tasks, they can move on to the next level of the gamified experience.

b. A content gamified grammar task: This is the hard and final level of the gamified experience where pupils must play the game in pairs or groups without teacher's help. In this level, pupils use grammar patterns to read, speak and write. Here, the last player in the end is the winner. The grammar content is completely changed

in the form of a game by using the following game elements: Action, Risk, Cooperation, Badges, Avatars, Objectives, Points, Rules, Challenge, Competition, Leaderboard, Mastery and Conformational Feedback.

Statement of the problem

According to the pilot grammar test and in spite of the importance of 6th primary pupils' grammatical awareness for competence in language communication and proficiency in language skills, their grammar achievement is low. Thus, this research sought to develop their grammar achievement through guided discovery based gamified tasks.

Questions

This research attempted to answer the following questions:

1. What are the features of the guided discovery based gamified tasks for improving 6th year primary pupils' grammar learning?
2. To what extent will such guided discovery based gamified tasks affect the 6th year primary pupils' grammar learning?

Hypotheses

1. There is a statistically significant difference between the experimental group's mean scores of the pre- and post-administrations of the grammar test in favor of the post-administration.
2. There is a statistically significant difference between the mean scores of the experimental and control groups in the post-administrations of the grammar test in favor of the experimental group.

Aim

This research aimed at improving primary pupils' grammar learning through guided discovery based gamified tasks.

Delimitations

This research was delimited to the following:

1. 64 6th year primary grade pupils from a public governmental school in Ismailia.

2. The grammar structures included in the language course book of the **Second Term Time for English Book (Units 6 and 7 of the Mid-term exam)** since this is the Ministry of Education English Language Textbook for 6th year primary grade at public governmental schools.
3. Gamification is provided face-to-face in the language classroom with the pupils.

Method

1. Participants

64 6th primary grade pupils from one of Ismailia public governmental primary schools (Al-Emam Ali Primary School). They were divided into two groups: One class of 32 pupils for the experimental group and the other one of 32 pupils for the control group after checking out their equivalence. All the participants were not re-sitters. They were male and female and their ages ranged between 11 and 12 years old.

2. Design

The experimental design of two groups (Experimental & Control groups)

3. Instrument

A grammar test was designed for assessing the 6th year primary pupils' grammar achievement in the target grammatical structures included in units six and seven of the Ministry of Education English Language Textbook (Time for English 6). The grammar test is composed of two types of questions (Multiple Choice and Rearrangement) as they follow the standard types of grammar questions in Ministry of Education English Exams at this stage. There are 40 items in each of the two types of questions. The total score is 80 so each item scores one point in case of correct answer.

To check the validity of this test, a checklist was submitted to a jury committee of university TEFL staff members to verify the test items' representation of the intended learning outcomes. This checklist presented the intended learning outcomes accompanied

by their related test items, and a three-level scale of consistency (Inconsistent, consistent and very consistent) between each of the intended learning outcomes and their test items. Another checklist was also submitted to jurors of English Language senior teachers and supervisors in the field of TEFL to provide their viewpoints for their appropriateness to 6th primary grade pupils. This checklist presented the items of each question type with a two-level scale of appropriateness (Appropriate and Inappropriate). As for the test reliability, Alpha (α) formula was used in order to estimate the reliability coefficient. The value of the reliability coefficient was (83.1%) for the grammar test. Thus, the test reliability was established.

The Tasks

Table (2)

The Guided Discovery Based Gamified Tasks for the grammatical structures of Units 6 & 7 in the 2nd Semester “Time for English” Course book

The Guided Discovery Based Gamified Tasks		
Grammar Rule	ILOs (Intended Learning Outcomes)	The practice
Unit 6 1. Adverbs of manner	Peri od 1 1. Inferring the grammar pattern(s). 2. Selecting the correct grammar form for the adverbs of manner. 3. Rearranging the words to form meaningful sentences with the correct order for the adverbs of manner.	One structural gamification task for elicitation and two structural gamification tasks for Application)
	Peri od 2	Game name: Playing cards

	<p>4. Collect the cards of adjectives with their matching cards of adverbs and vice versa.</p>	<p>Group Practice</p>
<p>2. Questions with How in the past simple tense</p>	<p>Period 1</p> <p>1. Inferring the grammar pattern(s). 2. Selecting the correct grammar form for the How questions in the past simple tense. 3. Rearranging the words to form meaningful sentences with the correct order for How questions in the past simple tense</p>	<p>One structural gamification task for elicitation and two structural gamification tasks for Application)</p> <p>Individual Practice</p>
	<p>Game name: Leaping Frog</p> <p>Period 2</p> <p>4. Put the cards in order to form questions with How in the past simple tense. 5. Speak to answer how questions with the appropriate adverb of manner.</p>	<p>One content gamified task for applying the grammar rule</p> <p>Pair Practice</p>

Table (2) continued

The Guided Discovery Based Gamified Tasks for the grammatical structures of Units 6 & 7 in the 2nd Semester “Time for English” Course book

The Guided Discovery Based Gamified Tasks		
Grammar Rule	ILOs (Intended Learning Outcomes)	The practice
Unit 7 3. The past simple tense of movement verbs	1. Inferring the grammar pattern(s). 2. Selecting the correct grammar form for the past simple tense of movement verbs. 3. Rearranging the words to form meaningful sentences with the past simple tense of movement verbs.	One structural gamification task for elicitation and two structural gamification tasks for Application)
	4. Fill in the crossword puzzles with verbs in the past simple tense.	Individual Practice Group Practice
4. Past continuous and When	1. Inferring the grammar pattern(s). 2. Selecting the correct grammar form for the Past continuous and When clauses. 3. Rearranging the words to form meaningful sentences with the correct order for	One structural gamification task for elicitation and two structural gamification tasks for Application)

clauses	Period 2	the Past continuous and When clauses.	Individual Practice
		<p>Game name: Snakes and Ladders</p> <p>4. Write the answer of the question using the past continuous in light of the attached picture.</p>	<p>One content gamified task for applying the grammar rule</p> <p>Pair Practice</p>

As shown in table (2), there were **two class periods** for each of the four grammar rules as follows:

In the 1st period of each grammar rule, primary pupils got individual practice on each grammar rule through three guided discovery based structural gamified tasks in 30 minutes. In the first task, they found the grammar structure. In the other two tasks, they practiced the types of grammar questions (Multiple Choice and Rearrangement) in their standard language exams. Without changing the content of the three non-gaming tasks, they were structurally gamified by applying game thinking (overcoming challenges and problem-solving) and some elements of the game; such as objectives, rules, points, leaderboards, challenge (winners and losers), competition (abstract feedback). In this period, pupils went through the following two gamification levels while performing the grammar gamified tasks:

Basic Level: The task asked the pupils to infer the grammar pattern from the provided examples or materials. It was structurally gamified by adding the following elements as in this basic level model task:

- ILO: Infer the grammar patterns of the target grammar rule in light of the highlighted parts of the provided example and/or materials.

- Points: Ten points for each pattern (e.g. the past simple for regular verbs ending with one a Consonant).
- Rules: Correct statement of a pattern in the target grammar rule and get a score of ten points.
- Challenge: The more grammar patterns are discovered, the more likely to get closer to the top rank.
- Competition: Individual abstract feedback when competing against the others.
- Leaderboard: Writing the names of the winners on the leaderboard in an order according to the number of the correct patterns discovered by the pupil.
- Mastery: Moving to the next level in case of correct elicitation of grammar rule.
- Feedback: Explanatory feedback (What went right / wrong & why it was wrong)

Intermediate Level: There are a Multiple-Choice Question (MCQ) of five items **and** a Rearrangement Question (RQ) of five items. They were structurally gamified by adding the following elements as in this intermediate level model task:

- ILO: Choose the correct answer for the target grammar rule. (MCQ) **or** Rearrange the words to make correct sentences. (RQ)
- Points: Five points so that one point for each correct choice. (MCQ) **or** Five points so that one point for each sentence in the correct order. (RQ)
- Rules: Finish in two minutes and get a score of five points. (MCQ) or (RQ)
- Challenge: The first five to finish in two minutes or less are the winners. (MCQ) or (RQ)
- Competition: Individual abstract feedback when competing against the others. (MCQ) or (RQ)
- Leaderboard: Writing the names of the winners on the leaderboard. (MCQ) or (RQ)
- Mastery: Only allowed to move to the next difficulty level when getting 90% of the total points. (MCQ) or (RQ)

- Feedback: Diagnostic Feedback (Why it was wrong and how to correct it). (MCQ) or (RQ)

In the 2nd period of each grammar rule, primary pupils got pair or group practice on each grammar rule through one guided discovery based content gamified task in around 10 minutes of action (tutorial) and 20 minutes of game play in which game thinking and elements were applied to alter the content completely. So, they extended their grammar learning with more focus on review since they went through the **Hard Level** of the gamified experience. The following is an example of content gamified tasks for one of the grammar rules:

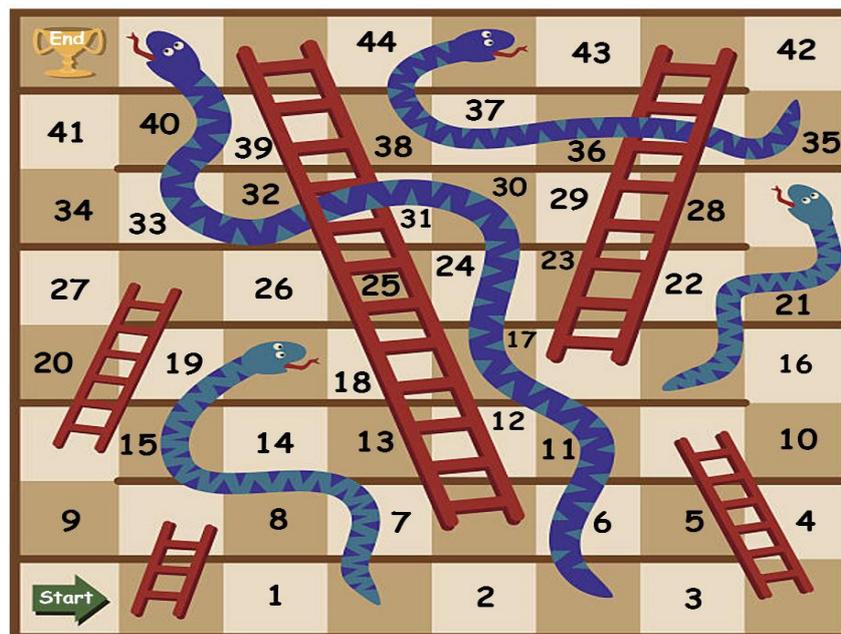
Content Gamified Task: Snakes and Ladders

ILO: By the end of this gamified experience, primary pupils are expected to write the answer of the question in the past continuous tense in light of the attached picture.

The grammar content of past continuous tense with when clauses was repacked by applying the following game elements or mechanics:

Figure (3)

Snakes and Ladders: Past Continuous and “When” clauses



Designed by the researcher

- Action: This is a model tutorial for the instructions of Snakes and Ladders game:
 1. Pupils are divided into 16 pairs of players.
 2. Each pair has got a pile of 44 folded two-sided cards with numbers corresponding to the numbers on the squares of the game board. On one side, there is a “What” question in the past continuous with “when” clause and on the other side, there is a picture to write the answer under it.
 3. The game is played in a 30-minute round.
 4. There is one small plastic racing car for each player.
 5. At the start of the game, the two players roll the dice. The one who gets a higher number, starts the game by rolling the dice again and moves the car to the square according to the number of the dice.
 6. When the player’s car stops on a square with a number, the player picks up a folded two-sided card randomly. In this case, s/he unfolds the card to read the question and write the answer in light of the picture.
 - a. If the answer is correct, the player has got the chance to roll the dice again and so on.
 - b. If the answer is incorrect, the player’s car gets backward where it was last time.
 7. When the player’s car stops on a square with a ladder bottom, the player’s car moves upwards to the square where the ladder ends.
 8. When the player’s car stops on a square with a snake head, the player’s car moves downwards to the square where the snake tail is.
 9. The winner of is the first one to reach the end square.
- Objective: The racing car should reach the end square to get the champion cup and write the correct answers in the past continuous tense.
- Points: One point for each correct written answer.
- Rules: The racing car should reach the end square to get the champion cup by rolling the dice in 30 minutes. The player only rolls the dice twice when the answer is correct. The player’s car

gets back where it was when the player's answer is incorrect. The player's car moves upwards in case of ladders and downwards in case of snakes.

- Challenge: The first racing car to reach the champion cup square is the winner.
- Risk: The possibility of losing the game when not reaching the champion cup square or not finishing in 30 minutes. The possibility of losing the whole game and start over when getting downwards frequently because of snake head squares.
- Competition: Abstract feedback when competing against the opponent player.
- Avatars: Each player has got a visual representation in the form of a plastic small racing car in a different color.
- Feedback: Conformational Feedback (What went right & wrong in the target grammar pattern)& Natural Feedback (What went right & wrong in the game).
- Achievement Badges: A badge is awarded for the player scoring more points.
- Leaderboards: One leaderboard is for writing the names of the players in an order according to the total number of earned points. Another one is for writing the names of the winners in the 16 pairs.
- Mastery: Moving to a new gamified experience for the next grammar rule when getting the most points or standing as the last player.

Treatment

Teaching the guided discovery based gamified tasks in the second semester of the academic year 2016-2017 (4 weeks/ 2 days a week/ a 30-minute class per day) so that there were:

- Three guided discovery based structural gamified tasks for individual practice in the class periods on Mondays.
- One guided discovery based content gamified task for pair or group practice in the class periods on Thursdays.

	1 st week	2 nd week	3 rd week	4 th week
Mondays	13/2/2017	20/2/2017	27/2/2017	6/3/2017
Thursdays	16/2/2017	23/2/2017	2/3/2017	9/3/2017

Results

Hypothesis I : There is a statistically significant difference between the experimental group's mean scores of the pre- and post-administrations of the grammar test in favor of the post-administration. The paired sample t-Test was used to verify this hypothesis. The following table demonstrates the experimental group's average scores of the pre- and post-administrations of the grammar test:

Table (3)

Paired Sample t-Test value of the difference between the mean scores of the Pre-and Post-administrations of the grammar test for the experimental group

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Pre-administration	32	4.7812	1.844510	-60.778	.000
Post-administration		72.4375	5.142721		
The Effect Size level of guided discovery based gamified tasks on primary pupils' grammar learning					
Independent variable	Dependent variable	t ² Value	DF	η ²	Effect Size level
Guided Discovery based Gamification	Grammar Learning	369.39652	31	0.92	Large

Table (3) shows the significance of the paired t-value. The Effect Size for the independent variable on the dependent variable was estimated by using Eta-squared and it was Large. Thus, hypothesis one was verified.

Hypothesis II : There is a statistically significant difference between the mean scores of the experimental and control groups in the post-administrations of the grammar test in favor of the experimental group. The independent samples t-test was used to test this hypothesis. The

following table (4) demonstrates the control and experimental groups' average scores in the post-administration of the grammar test:

Table (4)

Independent Sample t-Test value of the difference between the mean scores of the experimental and control groups' post-administrations of the grammar test

	Number of Participants	Mean Scores	Standard Deviation	t-Value	Significance
Control Group's Post-administration	32	33.1875	9.053381	-21.3244	.000
Experimental Group's Post-administration	32	72.4375	5.142721		
The Effect Size level of guided discovery based gamified tasks on primary pupils' grammar learning					
Independent variable	Dependent variable	t ² Value	DF	η ²	Effect Size level
Guided Discovery based Gamification	Grammar Learning	454.73003	62	0.88	Large

Table (4) shows the significance of the independent t-value. The Effect Size for the independent variable on the dependent variable was also estimated by using Eta-squared and it was Large. Thus, hypothesis two was verified.

In light of the large effect sizes, guided discovery based gamified tasks helped improve the 6th primary grade pupils' grammar learning. Thus, aim of the study was achieved.

Discussion of results and logs

This section deals with two parts. Part One which is called "Discussion of results", discusses the significant findings for the positive results that may be due to the combination between guided discovery and gamification. Part Two which is called "Discussion of logs", manipulates the language teachers' and primary pupils' comments observed by the researcher during the treatment.

Part One: Discussion of results

In light of the beneficial uses of guided discovery in the language classroom, the significant results may be due to increasing the primary pupils' understanding of grammar by practicing well-chosen higher comprehension level tasks as what was stated before by Belkina, Geykhman and Yaroslavova (2015). It may be also due to helping pupils

retain the target grammar rules so that they become memorable since it is based on the notion of consciousness-raising and the use of higher cognitive skills such as problem solving to find out language features through practice (induction). This goes with what was explained by British Council (n.d.), Thornbury (2011) and Saumell (2012) as well as confirmed by the results of Alfieri's, Brooks' and Aldrich's analytical study (2011) and Singaravelu's study (2012) which assured that learners performed better in their language tasks and learnt grammar more effectively through guided discovery learning. Also, the verification of the hypotheses was probably because of the advocacy of guided discovery for real-life language acquisition so that implicit grammar learning is a natural way of language learning as shown in Caprario's study (2013).

Since gamification calls for using the game elements or mechanics, the significant results may be due to the rules, objectives, challenge, risk, competition, reward system, mastery and tracking mechanisms that are basically applied to non-gaming situations or contexts. Using such elements turned the tough grammar content and tedious grammar practice into fun as was assured by Healy (2013), Kapp (2014) and Flores & Francisco (2015). It may also be due to linking gamification with motivational ILOs as indicated by Landers, Armstrong and Collmus (2017, p. 465) and as approved before in Zarzycka-Piskorz's study (2016). Moreover, it may be owing to enhancing teacher's ability to track the pupils' performance and monitor their progress. This goes with what was previously mentioned by Incentive Research Foundation (2014, p.3) and Iñigo (2015). As illustrated by Abrams and Walsh (2014), the significant findings may be as a result of applying game-thinking to non-game grammar tasks, which helps pupils understand the subtleties and nuances in the patterns and uses of the target grammar rules. This is consistent with Mufidah's experimental study results (2016) which showed the positive effect of gamification on the students' grammar achievement in Catholic University of Surabaya.

Consequently, the positive results of the current research may be due to the combination of the benefits of the guided discovery as well as the features and game elements of gamification.

Part Two: Discussion of logs

Before the treatment, the language teachers at the school were eager to attend a gamified lesson. They said, “We wonder how a gamified language content will look like”. Once the primary pupils were informed about the gamified grammar lessons they would have, they were extremely thrilled. They said, “Wow! Are we going to have fun in our language classroom? When shall we start? We are ready to play”.

During the treatment, the language teachers’ comments about the up-to-date pedagogical strategy of gamification were jotted down. Such comments showed how enthusiastic the primary pupils were when learning grammar within a gamified experience and how creative the teacher becomes when using it. Moreover, teachers gave their comments about the great mix between two meaningful and relevant pedagogical strategies (guided discovery and gamification). They stated that the pupils would not easily forget what they learnt by discovery and with fun since they were encouraged through games to figure out the grammar rules implicitly and practice them in an interesting and motivating manner. In line with teachers’ comments, the pupils’ comments confirmed the exciting moments they had while playing during grammar learning and practice. They also referred to their ability to memorize the grammar rules smoothly with great understanding.

After the treatment, the language teachers commented on the game elements that added sense to the guided discovery based gamified grammar tasks. They verified the importance and creativity of gamifying the inductive and deductive approaches to teaching grammar since they helped the pupils retain the boring grammar structures and practice the tedious grammar drills. In this respect, they explained that elicitation became easier and more memorable when applying the appropriate game elements and mechanics. They talked about the risks that pupils had in a

game and how such risks made the learning outcome unexpected so that the pupils paid the closest attention and focused their greatest efforts on what they were doing. They also referred to the self-satisfaction (abstract feedback) that pupils could get through competition whether individually, in pairs or in groups. They were pretty interested in the game mechanic of Mastery where pupils could not get to a new level without mastering the target content. They also referred to how easy it was to monitor pupils' progress in grammar learning through the tracking mechanisms of the time restrictions and the points scored.

When the primary pupils were asked about how useful and interesting the grammar lessons were, their commentary replies stressed three main points. First, they showed their happiness with the reward system in the form of badges and leaderboards as well as the avatars that represented them in the games. Second, they revealed their feeling of learning undeliberately since they got natural feedback which they used to get when playing games outside the classroom. Third, they indicated their keen desire to learn the correct grammar pattern in order to challenge each other and win the game.

Recommendations and Suggestions

Recommendations:

The following are the recommendations of the current study:

1. Well-structured gamified tasks should be used as they can encourage learners' active involvement in language learning.
2. Language teachers of the primary grade can make use of the proposed framework of guided discovery based gamification to help pupils engage actively and learn grammar naturally, in a more memorable way and with fun.
3. Governmental public and experimental primary, preparatory and secondary schools should gamify the tough grammar content and the tedious grammar practice drills for better and more memorable grammar learning.

Suggestions:

Here are some suggestions for possible further research:

1. The Effect of Guided Discovery based Gamified Tasks on Primary Pupils' Vocabulary Learning.
2. A Gamification-based Program for Developing EFL Public Speaking Skills for Secondary Students.
3. Conducting studies on Using Gamification to Teach Poetry, Novel or Drama for the Students at the Faculty of Arts or Faculty of Education.
4. Conducting studies on Using Gamification to Improve Grammar Learning for the Learners in Different Grade Levels.

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