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EFFECTIVENESS OF A GAMIFICATION APPLICATION IN LEARNING MANDARIN AS A SECOND LANGUAGE

[1]Mun Pei Ng, [2]Norlidah Alias & [3]Dorothy Dewitt
Department of Curriculum and Instructional Technology
Universiti Malaya, Kuala Lumpur

[3]Corresponding author: dorothy@um.edu.my

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ABSTRACT

Purpose - Gamification is an effective method to boost students' academic achievement and engagement in second language learning. This study aimed to test the effectiveness of the gamification application, *Class Dojo*, among Year 4 pupils who are learning Mandarin as a Second Language (MSL). It also sought to investigate how the MSL learners became more engaged in learning Mandarin when using *Class Dojo*.

Methodology – A quasi-experimental design with a pre-test and a post-test was conducted to collect data among thirty (30) Year 4 pupils enrolled in the MSL course. The pre-test and a post-test were used to determine the effectiveness of *Class Dojo* in elevating the pupils' achievement in learning MSL. The mean scores of the pre-test and post-test were compared and analyzed using t-tests to determine if they were significantly different. Data from observations, the pupils'

self-reflective journal, and the collection of 'Dojo Points' were grouped into five main themes and analyzed in order to investigate how the participants were engaged in learning MSL.

Findings – The findings showed that there was a significant improvement in the academic results of the participants. The pupils' high rate of attendance, task completion, frequent Mandarin usage, positive behavior, and favorable perceptions of *Class Dojo* indicated that they were engaged in learning in the MSL class.

Significance – The findings of this study provide MSL educators and instructional designers with information to consider whether gamification applications could be used as an effective teaching tool or virtual class management tool to enhance pupils' engagement and improve learning outcomes.

Keywords: Gamification, Mandarin as a Second Language, learning Mandarin.

INTRODUCTION

The significant development of the Chinese language worldwide is mainly be attributed to China's industrial and economic progress. Mandarin is widely regarded as an important foreign language. By the end of 2018, more than 2.7 million people from 154 countries were reportedly learning Chinese as an additional language (Gong et al., 2020). In Asia, courses in Mandarin are being offered in countries such as Indonesia, Japan, Singapore, and India. In Malaysia, MSL is a new elective subject introduced under the new transformative curriculum (KSSR) for primary schools (Ministry of Education, 2016). The said curriculum is in line with the Malaysian government's policy of preparing students to be global citizens who have acquired knowledge of an additional language in primary school (Ministry of Education, 2013). MSL is gaining popularity among parents of children attending national schools in Malaysia. It has been implemented as an elective subject in 150 selected national primary schools in Malaysia since 2008. Teaching MSL is a challenging task as Mandarin is a fairly new and unfamiliar language for pupils who study in national primary schools. MSL teachers typically face a number of challenges which

include pupils' lack of Mandarin communication skills, their lack of exposure to Chinese culture, and their behavioral problems while learning Mandarin.

Motivation is linked to a sense of purpose and it is an important factor in language learning among learners who aspire to learn a second or foreign language (Tan et al., 2012). Many students are strongly motivated to learn Mandarin and become bilingual in Mandarin and English in order to improve their job prospects, and these students tend to perform well (Zhong, et al., 2021). Hence, goal-orientation and task-value provide pupils with a purpose for studying a second language and this directly affects self-regulated learning, pupils' achievement, and positive attitude (Ocak & Yamac, 2013). Passing examinations is a goal-oriented target among students who need to perform well. However, in Malaysia, pupils who enroll in MSL classes are exempt from taking any exams (Ministry of Education, 2017). Hence, as there are no examinations or language proficiency tests, students lack the drive to study Mandarin. Hence, other strategies need to be adopted in order to motivate the MSL learners.

Gamification has been shown to be effective as a language learning tool to improve students' achievement and facilitate their engagement in learning Mandarin. A variety of gamification applications, such as Chinese Candy Crush, DuoLingo, and ChineseSkill have been developed to enhance the experience of learning Mandarin. Several studies have found that gamification is an effective tool to teach MSL (Chee et al., 2020; Osman & Abdul Malek, 2018; Rawendy et al., 2017). Gamification has been employed as a tool for motivation in learning (Dichev & Dicheva, 2017). MSL learners have difficulty learning the tones in the "han yu pinyin" script. Rote learning and repetitive exercises often lead to feelings of boredom and a resistance to learning new characters among MSL learners (Nel et al., 2019). In addition, lack of confidence and unwillingness to practice speaking Mandarin among learners in the lower grades may be attributed to feelings of anxiety about learning a new language. In this study, a gamification application, *Class Dojo,* was introduced in the MSL classroom to enhance pupils' Mandarin language skills. Hence, the effectiveness of the gamification approach on these pupils' performance will be evaluated to determine whether there are any significant differences in the pupils' Mandarin language learning after using *Class Dojo*. In addition, this study also aimed to investigate how the pupils became more engaged in the MSL course when using *Class Dojo*.

LITERATURE REVIEW

Gamification

Gamification, a term first defined by Nick Pelling in 2002, refers to a tool that applies game-like elements to improve user interface design in order to make electronic transactions more attractive (Pelling, 2011). Gamification differs from game-based learning. It employs game design elements and game mechanics in non-game environments for the purpose of engaging the user and enhancing desired behaviors (Alsawaier, 2018; Chou, 2020; Kapp, 2012; Morris et al., 2013). Recently, gamification has started to gain popularity and has been widely used in various areas.

Gamification techniques have been found to be effective in enhancing users' engagement and performance in various areas, such as business and marketing (Arnab et al., 2015), medical training programs (O'Connell et al., 2020), education (Dichev & Dicheva, 2017; Nand et al., 2019; Smiderle et al., 2020), and sports (Bitrián et al., 2020).

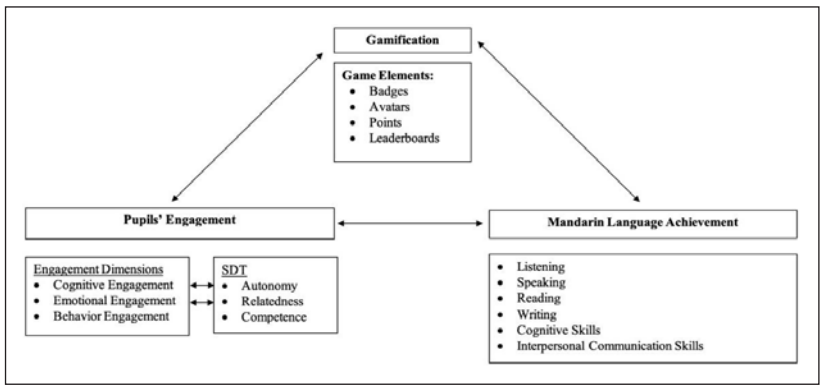
In the context of education, the findings of several studies have indicated that gamification is an effective tool in improving pupils' engagement and facilitating learning outcomes (Arnab et al., 2015; Cahyani, 2016; Orhan-Goksun & Gursoy, 2019; Smiderle et al., 2020; Tan & Hew, 2016), bringing positive effects in terms of motivation (Alsawaier, 2018; Bitrian et al., 2020), basic psychological needs, and academic performance (Dindar et al., 2020; Orhan-Goksun & Gursoy, 2019). Gamification employs game-like elements such as scores, badges, competition, achievements, leader boards, and rewards as instant feedback, and when applied to real-world situations, it is able to increase learners' engagement by compelling them to reach their targets (Glover, 2013). Feedback provides an appraisal of progress towards goals, motivating the learner to put in more effort, to persist, and to concentrate on the task assigned (Garris et al., 2002). As stated in the Self-Determination Theory, specific game design elements bring about specific psychological consequences and can influence the satisfaction of basic psychological needs. According to certain studies, badges and leader boards have a positive impact on competence and needs satisfaction, while avatars influence experiences of social relatedness (Sailer et al., 2017). Although extrinsic rewards can be less effective than intrinsic motives, both intrinsic and extrinsic motives play a role in determining learners' behavior. Hence, gamification can

influence learners' behavior and keep them engaged in the classroom. However, while gamification has been shown to initially stimulate learners' motivation and promote engagement, it does not appear to contribute to sustainable learning results (Hummel, 2020). In addition, there is insufficient evidence to support the long-term benefits of gamification in the context of education (Dichev & Dicheva, 2017).

Gamification was adopted to enhance learners' engagement and improve language achievement in learning MSL, as well as to encourage self-directed learning. It includes numerous fundamental game aspects and is believed to be linked to students' involvement and Mandarin language achievement. Mandarin language achievement includes listening, speaking, reading, writing, interpersonal communication skills, and cognitive skills. Meanwhile, pupils' engagement consists of three engagement domains (cognitive, behavioral, and emotional) and the Self-Determination Theory (SDT). The relationship between Mandarin language achievement theory, pupils' engagement, and gamification are summarized and illustrated in the following diagram (Figure 1). The following section will provide further explanation regarding all the elements under Mandarin language achievement, pupils' engagement, and gamification.

Figure 1

The Relationship between Mandarin Language Achievement, Pupils' Engagement, and Gamification



Mandarin as a Second Language (MSL)

In foreign language education, the most influential national guidelines have summarized the objectives of foreign language teaching under

five goal areas also known as the five "Cs", namely Communication, Culture, Related Knowledge (Connections), Comparisons, and Community Communication (Communities) (American Council on the Teaching of Foreign Languages, 1996). The goals of foreign language teaching include to expand learners' perspectives and enhance their knowledge as well as cognitive thinking abilities.

Meanwhile, according to the International Curriculum for Chinese Language Education (Hanban, 2014), the general aim of teaching Mandarin as an international language is to enable learners to acquire knowledge and skills in the language, while cultivating self-regulated and cooperative learning. In Malaysia, learning MSL emphasizes five focus areas: speaking, listening, reading, writing and 'qu wei yu wen' (doing interesting language activities) (Ministry of Education, 2017). These focus areas in the MSL curriculum are similar to the 'Chinese as a second language curriculum' in China, where emphasis is given to the four basic linguistic skills and cultural elements of the Chinese language (Liu, 2001) in order to build a strong foundation for language communication skills.

In the past, the objectives of learning MSL in Malaysia and China were to achieve language skills, language learning strategies, and cross-cultural communication skills. However, the MSL curriculum currently shows the need to further expand MSL learners' knowledge of perspective and cultivate their cognitive thinking skills. As seen in Malaysia, there has been a trend of younger learners learning MSL. This phenomenon has prompted educators to consider a pedagogy that is more suitable for young learners. As for children, second or foreign language learning is synchronized with their cognitive ability and cognitive processes. As a result, rather than just developing the ability to communicate in the target language, second language teaching should also help children learn to recognize their surroundings, accumulate knowledge, and improve their cognitive abilities (Lu, 2018). Hence, relevant pedagogies for language teaching should be considered with language teaching standards and used as reference to further improve the teaching of MSL.

Motivation to learn a second language can be intrinsic or extrinsic (Deci & Ryan, 1990). External motivation for learning a second language is mainly manifested as an instrumental need, such as to secure a job or for use when travelling. Meanwhile, the behavior

of self-determined learners can be derived from both intrinsic and extrinsic motivation, identified as regulation (Deci & Ryan, 2000). Six categories of motivation have been identified, namely intrinsic motivation, extrinsic motivation, task value, ability, belief, and expectations for success (Hsieh, 2014). However, most models have highlighted intrinsic motivation, which focuses on the aim of completing a task derived from involvement (Malone, 1981; Malone & Lepper, 1987). Moreover, motivation is commonly associated with engagement, as the two display a variety of similar characteristics, including cognitive engagement and intrinsic motivation.

Despite the fact that motivation and engagement are closely related, the two are not the same. Motivation has been connected to psychological factors that improve behavior. In contrast, engagement is associated with the amount of energy expended on various tasks and activities (Alsawaier, 2018). Pupils' engagement dimensions and SDT are further investigated in the following section to find out how gamification might be useful for teaching MSL.

Student Engagement

Student engagement in classroom activities is essential for successful learning (Digamon & Cinches, 2017). The SDT requires taking into account fundamental psychological needs for competence, autonomy, and relatedness, in order to understand human motivation (Deci & Ryan, 2000). There are three main dimensions of student engagement: emotional engagement, cognitive engagement, and behavioral engagement (Bond & Bedenlier, 2019; Fredericks et al., 2004; Redmond et al., 2018). The level of pupils' thinking skills is often used to indicate cognitive engagement (Skinner & Belmont, 1993), where pupils put in a lot of effort to gain a deeper understanding of a topic, become more independent, and increase their autonomy in learning (Bond & Bedenlier, 2019). Autonomy refers to the amount of freedom that a student has while learning in the absence of external rewards, control, and pressures (Furrer & Skinner, 2003). Sometimes, pupils tend to feel dominated by rewards, and this causes a change in the perceived site of causality for their behavior from internal to external (Deci & Ryan, 2000). If the teacher allows pupils to choose their own learning activities and to make connections between their schoolwork and their interests, learning is promoted. Therefore, intrinsic motivation can be enhanced by engaging pupils in interesting activities that provide novelty and optimal challenges.

When students' engagement is addressed in emotional terms, it apparently refers to the attitude or interest of the learners who involve themselves with the instructional materials (Chi & Wylie, 2014). Pupils who are behaviorally engaged in learning activities are more likely to adhere to behavioral norms such as attendance and involvement (Cappella et al., 2013), and they are less likely to participate in disruptive or negative behavior (Fredericks et al., 2004). Such pupils will be attentive, ask pointed questions, find support for task(s) assigned by the teacher, and actively participate in classroom discussions (Boykin & Noguera, 2011).

In addition, researchers also believe that a good relationship between a teacher and his or her pupils would enhance the learning process in a classroom (Digamon & Cinches, 2017; Skinner & Belmont, 1993). Pupils' sense of relatedness is important for promoting engagement in learning and improving academic performance (Furrer & Skinner, 2003). Pupils who are emotionally engaged will experience affective reactions such as interest, enjoyment, and a sense of belonging (Fredericks et al., 2004). Hence, pupils who are continuously engaged in learning activities are more likely to achieve higher grades and perform better in school.

The concepts of these dimensions of engagement and SDT can be applied to the physical classroom or the digital learning environment. However, the difference lies in the type of technology or instructional methods used by instructors to foster student engagement in the classroom (Bernotaite, 2020). Researchers believe that student engagement is influenced by diverse contextual factors and that technology plays an important role in improving student engagement (Bond & Bedenlier, 2019; Schindler et al., 2017). Therefore, gamification was applied in this study to investigate how pupils engaged with this novel technology.

Gamification Elements and Classroom Evaluation

Gamification has the potential to help teachers monitor their pupils' performance by conducting formative evaluation using this technology. Evaluation is an important element in learning as it provides instructors with useful feedback. The generally accepted position is that games themselves are not sufficient for learning. However, there are elements

of games that can be triggered within an instructional context to help pupils achieve effective learning (Garris et al., 2002). Some elements of games, such as points, badges, and achievements, can be integrated into evaluation components. Instant feedback in gamification can provide valuable information about students' performance and help teachers to refine pedagogical strategies (Zapata-Rivera & Bauer, 2012). If evaluation using gamification is well-designed, it will provide valuable information on education to relevant stakeholders (Menezes & Bortolli, 2016). Game-based evaluation systems have the ability to motivate pupils while also posing a challenge for teachers (Fishman & Deterding, 2013). Hence, behavior management tools of gamification can help teachers to reduce the amount of paperwork they have to complete, although they still need to restructure the pedagogies.

Gamification as a Classroom-based Assessment Tool

Classroom-based assessment is an evaluation method used by teachers to determine how much and how effectively students are learning in a classroom setting (International Bureau of Education, 2020). In the Malaysian context, classroom-based assessment is a continuous assessment done throughout the year for all subjects taught in school. It is a formative evaluation for feedback and includes concrete, measurable details for specific requirements (Morris et al., 2013). Classroom-based assessment aims to determine and record the development of students' progress in learning based on teachers' professional judgement. Teachers may evaluate their students' performance in a formative or summative way using various evaluation methods, such as examination, writing exercises, oral exercises, project work, quizzes, presentations, and other learning activities (Ministry of Education, 2022).

There is limited research on gamification in education, and most studies have focused on its use in higher education. Currently, there does not appear to be any studies carried out on the usage of gamification in the context of learning MSL in Malaysian primary schools to identify whether it can improve student behavior and learning outcomes. Therefore, this study aimed to investigate how pupils engaged with gamification in the MSL course and to assess the usefulness of gamification in improving Mandarin language proficiency.

METHODOLOGY

Design of Study

This study employed a single group pre-test and post-test designed to determine the effectiveness of the gamification approach on pupils' performance in learning MSL. This was conducted by investigating whether there was any significant difference in pupils' progress in learning Mandarin after using the application, *Class Dojo*. In order to investigate pupils' engagement in the MSL course when using *Class Dojo*, data was collected from observations, pupils' self-reflective journals, and records on the application such as 'Dojo Points' achievement and pupils' attendance.

Participants

The participants consisted of a group of 30 Year 4 pupils from a selected national primary school in Ipoh where MSL classes were held. All of them were Malay pupils (100.0%, n= 30) whose first language was not Mandarin. Some of the participants (6.67%, n=2) did not have any experience learning Mandarin, some (16.67%, n=5) have learned Mandarin for 1–2 years, about a third (36.66%, n=11) have learned Mandarin for 3–5 years, while the rest (40.00%, n=12) have learned Mandarin for more than 5 years.

Instruments

i) Instrument for Academic Achievement (Pre-test and Post-test)

The instrument to measure academic achievement was a set of pre-test and post-test questions. The test comprised thirty (30) multiple-choice questions designed to assess participants' knowledge of Mandarin terms and phrases. The questions for the pre-test and post-test were the same, but they were arranged in random order to ensure internal validity, since the same test was given to the same group of pupils. This instrument was validated and verified by a group of experts who are experienced MSL teachers.

The scores from the pre-test and post-test were used to evaluate the effectiveness of the gamification application, *Class Dojo* in relation

to the participants' learning achievement. A parametric statistical test known as t-test was used to determine whether there was a significant difference in achievement by comparing the means of the pre-test and post-test scores (Fraenkel et al., 2019). This method has been used in previous studies in the context of gamification and learning Mandarin (Rawendy et al., 2017).

ii) Instrument for Pupils' Engagement (Dojo Points)

The instrument for pupils' engagement comprised checklists with a record of frequencies related to pupils' attendance, task completion, usage of Mandarin in production activities such as speaking and writing, participants' behavior in helping others, as well as responses transcribed from pupils' self-reflective journals. The frequencies were obtained from the 'Dojo Points' system in the *Class Dojo* application, which was employed to evaluate how the participants engaged in learning MSL using *Class Dojo*. Pupils' attendance and achievement of 'Dojo Points' were analyzed and reported in the form of tables and histograms. The presence of outliers in the histograms should prompt researchers to study the use of median as synthesis statistics and the use of parametric or nonparametric hypothesis test (Nuzzo, 2019). In addition, pupils' perception of the use of *Class Dojo* was examined and recorded based on their feedback and self-reflective journals.

Class Dojo was selected because it is a well-developed gamification application which serves as an observational assessment tool. It is an effective classroom behavior management tool that allows teachers to assess pupils and receive immediate feedback. A number of teachers have used *Class Dojo* as a tool to assess their pupils in science, engineering, and physical education classes (LaFave, 2016). The digital platform helps teachers to track the behavior of their pupils (both individually and in groups) immediately with the point system using mobile devices (Cetin & Cetin, 2018). Quantitative and qualitative evidence of pupils' behavior are available to the pupils and their parents. The pupils' attendance can be easily tracked by their parents and school administrators.

Procedure

Ethical approval was obtained from the school principal. Parents and students were informed of the possible effects of the study and

parental consent was obtained before the gamification app was used. The researchers helped each participant to create a portfolio in the *Class Dojo* application and taught them how to manage their avatar and the application through mobile phones and desktops. The teacher explained the rules and regulations to the participants, including how to gain badges and points with their participation, in class and after class.

The total duration of this study was 12 weeks and 12 hours. The contents of the MSL course were based on Year 4 syllabus. The following lessons were conducted using *Class Dojo*:

- Chapter 1: "*jīn tiān qì zěn me yang?* 今天天气怎么样？" (How is today's weather?)
- Chapter 2: "*jié rì* 节日"(Festivals
- Chapter 3: "*wǒ yào* mǎi 我要买" (I want to buy)
- Chapter 4: "*wǒ chuān* 我穿" I wear.

The lessons were designed to consist of a variety of activities: oral exercise, role-play, group activity, and assessment. In the MSL course, formative assessment, self-assessment (journal writing in *Class Dojo*), and summative assessment were conducted in class to help the participants check and understand how far they had progressed.

Categories of 'Dojo Points' were created in the *Class Dojo* application such as "speaking Mandarin", "on task", "participate" and others, in order to encourage participants to speak Mandarin in class (Figure 2). Participants who always spoke Mandarin in class, interacted with others in Mandarin, completed tasks on time, participated actively in answering questions, and involved themselves in group activities, were given points. Other positive behavior badges, such as "helping others", were introduced to reward participants who extended help to their classmates and teacher. These badges were designed to encourage participants to earn more points while developing excellent disciplinary habits. At the end of class, the teacher displayed the leader board (Figure 3) in front of the class. Alternatively, the participants could check their scores using their personal *Class Dojo* application. In addition, the teacher assigned assignments or projects to be completed at home through the *Class Dojo* application (Figure 4).

Figure 2

Categories of 'Dojo Points' in Class Dojo.

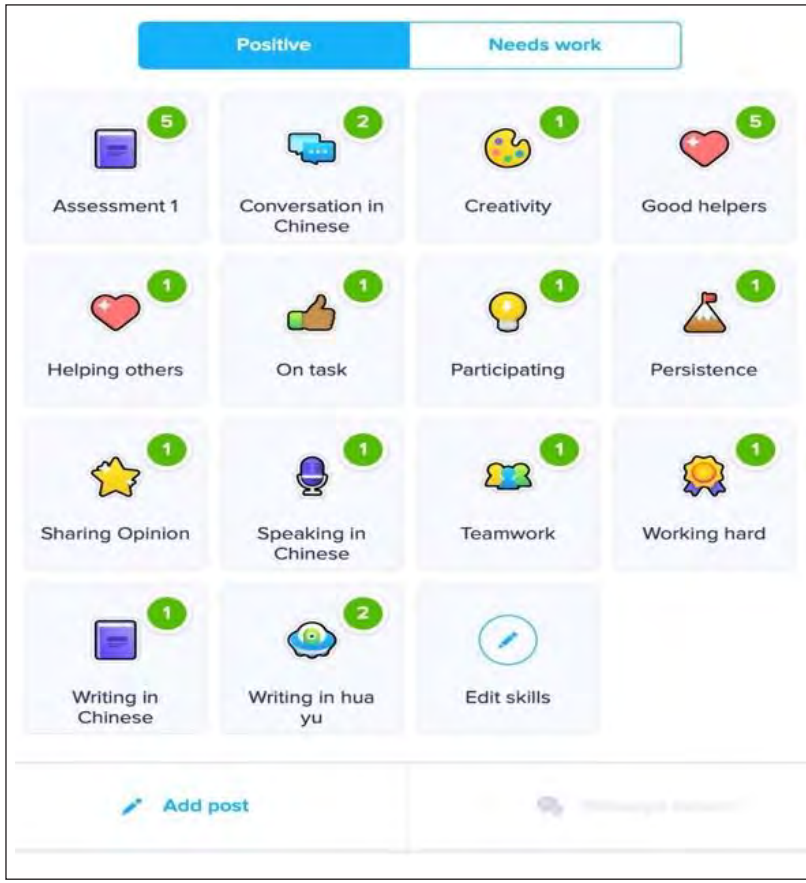


Figure 3

Pupils' Avatars

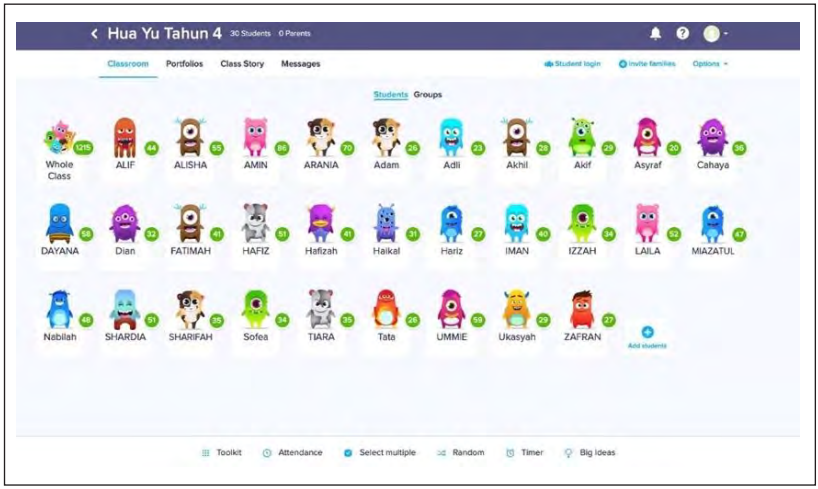
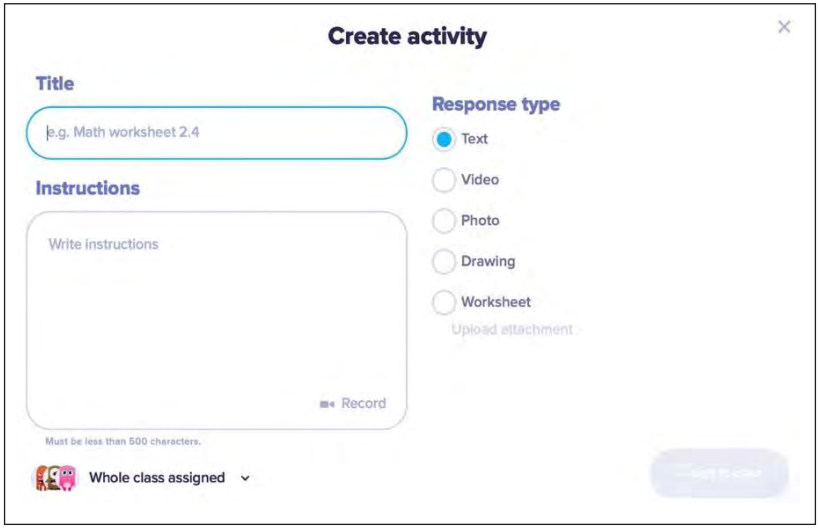


Figure 4

Creating Activities



RESULTS

In this section, the findings are presented in terms of: i) the effectiveness of *Class Dojo*, and ii) how the pupils were engaged during the MSL classes through using *Class Dojo*.

i) Effectiveness of *Class Dojo* application

In order to determine the effectiveness of the *Class Dojo* application, a paired-sample t-test was used to compare the two sets of test scores (pre-test and post-test). The findings of the pre-test and post-test were evaluated. Table 1 shows that there was a significant difference between the pre-test (mean = 56.078, SD=11.667) and post-test (mean=64.957, SD=15.116) marks; t (30) =-4.597, p <0.5. The mean scores indicated that the post-test scores were significantly higher than the pre-test scores, reflecting the participants' achievement following the implementation of *Class Dojo*.

Table 1

Comparison of Pre-Test and Post-Test Achievement in Relation to using Class Dojo

	M	SD	t-value	p -value	Effect size
Pre-test	56.078	11.667	-4.597	0.00004	0.587
Post-test	64.957	15.116			

The findings indicated that the gamification application, *Class Dojo* brought about positive effects on the participants' academic achievement, as evidenced by the significant differences in the test scores before and after the use of *Class Dojo*.

ii) Engagement of MSL learners

In order to investigate the level of participants' engagement in the MSL class using *Class Dojo*, the data collected through 'Dojo Points' achievement, pupils' attendance, and observations were compiled together with transcripts from the pupils' self-reflective journals. The data were gathered, analyzed, and classified into five categories: i) participants' attendance, ii) task completion, iii) participants' Mandarin usage, iv) participants' behavior, and v) participants' perception of *Class Dojo*.

a) Attendance

Analysis of participants' attendance was tabulated (Table 2). The statistics revealed that 24 out of 30 MSL participants (80.00%, n=24) came under the category of >100 percent (Figure 5). These MSL participants attended the regular MSL classes as well as extra classes which were scheduled on other days. A small percentage of the participants (16.67%, n= 5) were within the 75 percent –100 percent range. Only one of the new participants (3.33%, n=1) had an overall attendance rate of less than 75 percent.

Table 2

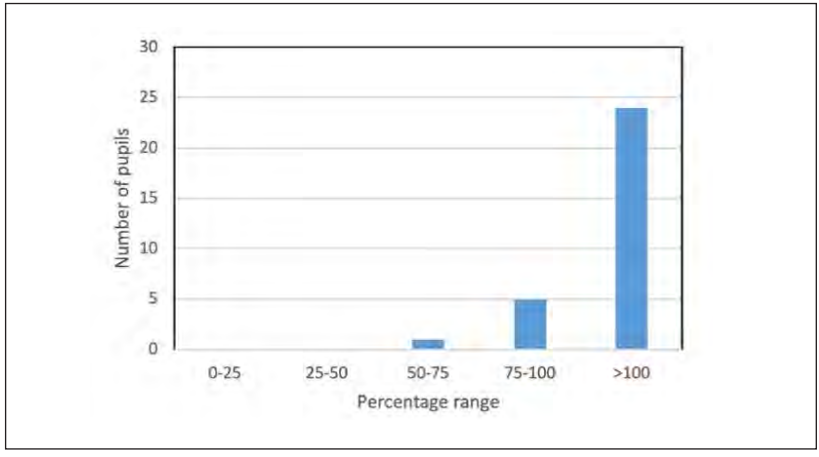
Analysis of Participants' Attendance

	%	N
Participants' attendance	0 – 25 %	0
	25% – 50 %	0
	50% – 75 %	1
	75% – 100 %	5
	> 100	24
	Total number of participants	30

* >100 indicate pupils who attended extra classes.

Figure 5

Participants' Attendance



b) Task Completion

The participants' task completion shown in Table 3 was divided into four categories: i) completed all given tasks (16.7%, n=5), ii) mostly completed all given tasks (36.7%, n=11), iii) completed some given tasks (30.0%, n=9) and iv) hardly completed any given tasks (16.75%, n=5) (Figure 6). The results showed that a majority of the participants were able to complete the assignments given by the teacher through *Class Dojo*. Participants were given individual assignments to complete in class even though they were also allowed to complete them at home. One of the assignments given to the participants was to create a video about the day's weather. Participants were encouraged to apply what they had learned in class, and there was a particular Mandarin sentence to be mastered: "jīn tiān qì zěn me yang? 今天天气怎么样？" How is today's weather?), which must be included in their video recording. Participants were very excited and some of them even stayed back after class to complete the task. However, some of the participants were unable to complete their task due to the fact that they did not have internet access and mobile phones at home. They were only able to complete some of the assignments as they relied on the school's desktop computers with limited functions (e.g., camera and video functions).

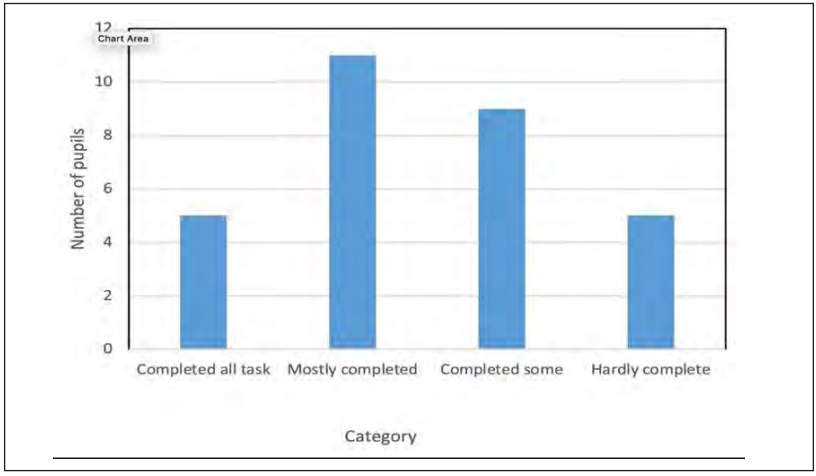
Table 3

On task – Frequency of Participants' Completion of Given Tasks

	Category	N	%
On task	Completed all tasks	5	16.7
	Completed most tasks	11	36.7
	Completed some tasks	9	30.0
	Hardly completed any task	5	16.7
	Total number of participants	30	100

Figure 6

Task Completion by Participants



c) Mandarin Usage

In terms of the initiative taken by the participants to speak and write in Mandarin after the implementation of *Class Dojo*, almost half of the class (46.7%, n=14) attempted to communicate in complete Mandarin sentences with the teacher while in class or after class (Table 4).

Table 4

Activities Involving Speaking and Writing Mandarin

Activity	Total number of pupils	N	%
Speaking in Mandarin	30	14	46.7 %
Writing in Mandarin	30	10	33.3 %

The pupils tried to converse with the teacher using simple sentences in Mandarin such as "nǐ chī bǎo le ma? 你吃饱了吗？" (Have you eaten?), "wǒ è le。我饿了。" (I am hungry.), " nǐ chī shén me ? "你吃什么？" What are you eating?, "wǒ yào shàng cè suǒ " 。我要上厕所。" (I want to go to the toilet) and "kuài diǎn！快点！" (Quickly!). Although these sentences were simple conversational sentences, the pupils managed to pronounce the Mandarin words accurately without the teacher's assistance. Some of the participants who were shy and never

spoke Mandarin in class before the launch of *Class Dojo*, tried to say these simple sentences in order to gain more badges.

One-third of the participants (33.3%, n =30) tried to write in Mandarin by using the writing tool in *Class Dojo* (Table 4). Some of them even tried to type in Mandarin with the help of their teacher (Figure 7). One of the participants tried to type "wǒ jué dé hǎo wán 我觉得好玩 " (I think it is fun) in Mandarin using the "*han yu pin yin* 汉语拼音" keyboard. Meanwhile, another participant used Google translation to find out the Chinese character for "yǔ 雨 "(rain) and "xuě 雪 "(snow). They also attempted to write the Chinese characters they had learned such as "yī 衣" (cloth) "kāi zhāi jié kuài lè 开斋节快乐" (Selamat Hari Raya)"yǔ 雨"(rain) "mǎi 买"(buy), and "tiān qì 天气"(weather) after using *Class Dojo*.

Figure 7

Samples of Participants' Writings

d) Participants' Behavior

The participants displayed positive behavior such as helping others, which were all tracked and recorded on *Class Dojo*. The data revealed that a majority of the participants frequently assisted their friends and the MSL teacher in class (Table 5). The frequency of participants helping others was classified into four categories, namely: always helping others (23.3%, n=7), mostly helping others (23.3%, n=7), sometimes helping others (40.0%, n=12), and hardly helping others (13.3%, n=4) (Figure 8).

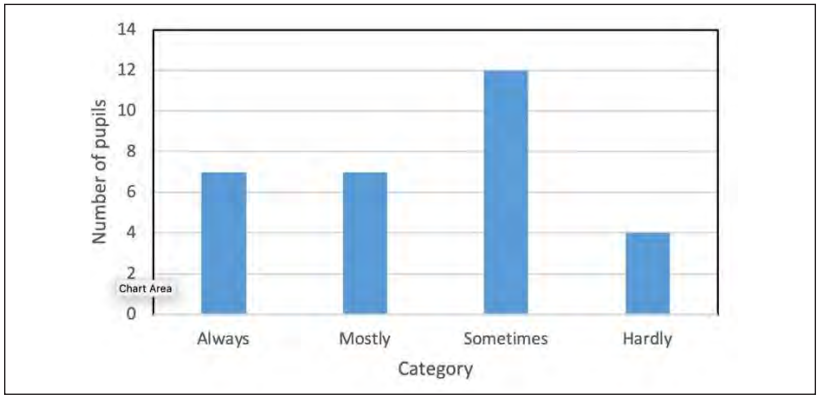
Table 5

Frequency of Participants Helping Others

	Category	N	%
Helping others	Always	7	23.3
	Mostly	7	23.3
	Sometimes	12	40.0
	Hardly	4	13.3
		30	100

Figure 8

Frequency of Participants Helping Others



e) Pupils' Perception of Class Dojo

At the end of the study, participants were asked to answer the question "How did you feel after using *Class Dojo*?". Responses from the pupils' self-reflective journal were collected, analyzed, transcribed, and grouped into four main themes (Table 6), namely: i) having fun, ii) happy, iii) willingness to learn Mandarin, and iv) difficulties faced.

Table 6

Pupils' Perception of Class Dojo

Theme	Example of quote	Frequency (%)
Having fun	"Having fun in Mandarin class." (P8) "Mandarin class is the best and fun." (P5) "I am having fun using *Class Dojo*." (P25)	15 (50.00)
Happy	"I am very happy in class." (P15)	4 (13.33)
Willingness to learn Mandarin	"I want to learn more." (P15) "I like Mandarin and I want to learn." (P16) "I like Mandarin because I can use *Class Dojo*." (P22)	6 (20.00)
Difficulties faced • No network and mobile devices	"I can't access *Class Dojo* at home because I do not have a computer." (P23) "I do not have a handphone." (P7) "No internet access." (P13)	5 (16.67)
• Difficulty in using application	"I am having problems typing in Mandarin using *Class Dojo*." (P27)	

Total number of participants, n=30

Most of the participants claimed that they were happy (13.33%, n=4) and having fun (50.00%, n=15) using *Class Dojo*. A small number of participants (20.00%, n= 6) expressed their willingness to learn more about the language using *Class Dojo*, but a few participants (16.67%, n=5) expressed their disappointment at being unable to access the application after school, since they did not have internet access at home. Despite the difficulties they faced while using *Class Dojo*, the participants still held a favorable attitude towards the application. Almost all of the participants considered the lessons to be very interesting. They expressed a strong desire and keenness to learn Mandarin and to attend the MSL classes. The responses in the pupils' self-reflective journals revealed that they not only provided answers to the assignments, but used terms and phrases which they had learnt on their own. The participants also used journals, drawings, and video recordings to comment on their own portfolios. The participants always gave positive feedback whenever they found *Class Dojo* to be interesting. Their perception of *Class Dojo* in the MSL class suggested that *Class Dojo* had increased their interest in studying Mandarin.

DISCUSSION

The present study aimed to investigate whether there was a difference in MSL pupils' Mandarin language achievement after using *Class Dojo*

application and the engagement of pupils in the MSL class when using the application. The mean scores of the pupils' post-test in Mandarin had improved significantly after using the gamification application, *Class Dojo* in the MSL class. This study found that *Class Dojo* had a positive effect on Mandarin language achievement in the MSL class. Participants who were shy and never spoke Mandarin in class before the launch of *Class Dojo* attempted to converse in Mandarin throughout the use of *Class Dojo*. They wanted to gain more points so that they could upgrade their avatars. Gamified elements such as avatars, points, ranking, and badges enhanced the participants' engagement and learning outcomes (Fishman & Deterding, 2013; Smiderle et al., 2020). The pupils were initially drawn to the gamification's game-like design in their attempts to achieve their goal, and in the process of earning gamification points they had improved their Mandarin skills. The pre-test and post-test results indicated that the pupils' Mandarin language achievement had increased significantly following the implementation of *Class Dojo*. This is consistent with the findings of past studies which showed that gamification applied in the classroom not only improved pupils' academic achievement but also enhanced pupils' level of engagement (Dindar et al., 2020; Orhan-Goksun & Gursoy, 2019). The pupils scoring highly on the gamification app brought about positive affirmation as they were able to achieve higher academic grades (Pechenkina et al., 2017).

Pupils were highly motivated to attend the MSL class as they could earn more points in *Class Dojo*, and the majority of them were willing to come for extra classes to learn Mandarin. The pupils' intrinsic motivation had been activated by the gamification application, as they focused on the goal of finishing a task derived from their involvement (Malone & Lepper, 1987). They were willing to spend time and put in effort to complete the tasks assigned to them, while they actively participated in the activities during the MSL lessons. Engagement has been tied to the amount of energy expended on various tasks and activities (Alsawaier, 2018). The pupils' effort in finishing the task, as well as their willingness to speak in Mandarin, demonstrated that they were engaged in the use of *Class Dojo* during lessons. The pupils developed positive behavior such as helping others, while striving to earn points to enhance their grades in *Class Dojo*. Pupils who are behaviorally engaged are more likely to adhere to behavioral norms such as attendance and participation, and are less likely to engage in disruptive or negative behavior (Fredericks et al., 2004). The pupils

were also found to have developed a positive attitude over time in their use of *Class Dojo* in the MSL class, claiming that it made the class more engaging and enjoyable. Emotional involvement, as defined by SDT, means that emotionally engaged pupils will exhibit affective responses such as interest, enjoyment, or a sense of belonging (Fredericks et al., 2004). Due to the aforementioned findings, we can conclude that the pupils were actively engaged in the MSL class due to the implementation of *Class Dojo*. Hence, it is believed that *Class Dojo* is effective in boosting academic achievement and increasing engagement among pupils in completing given tasks, including participation, communication, and enhanced enthusiasm in learning MSL.

CONCLUSION

The findings have proven that gamification (*Class Dojo*) has been successful in enhancing the engagement of primary pupils in the MSL classroom and increasing their academic achievement in learning Mandarin. Thus, gamification can be used as an effective classroom management system as its elements enable self-directed learning and self-evaluation, which allow learners to find out for themselves the extent of their progress. Parents can be involved and stay connected with the teacher by following the activities in *Class Dojo*. The changing styles of learning has led educators to employ the new trend (Hummel, 2020), in order to achieve a broader learning outcome, while making the required philosophical and conceptual adjustments. Despite facing issues with internet connectivity and access to the application, learners were positive about the gamification activities (Orhan-Goksun & Gursoy, 2019).

This study has several limitations. *Class Dojo* was only applied to Year 4 primary pupils enrolled in one MSL class. Sampling bias may be present in the findings, as the pupils who participated in the research were selected via convenience sampling. Another limitation is the lack of previous studies in this research area, as literature review is an important aspect in a study. Previous research on the use of gamification in learning MSL in the Malaysian context is rather scare. This study could gain more credibility if supported by qualitative data, for example, an interview designed for qualitative research. Further research could be conducted to investigate the impact of gamification in teaching other subjects and in different language contexts.

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