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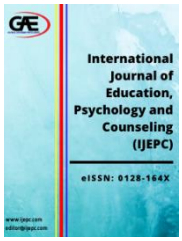

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DIGITAL LESSON PLAN GENERATION AND ITS USEFULNESS FOR SECONDARY SCHOOL TEACHERS

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Abstract:

The Ministry of Education (MOE) Malaysia directed that every teacher of secondary schools is responsible to prepare lesson plan for each lesson when teaching in a class. The paper reports the use of a prototype system by school teachers to produce digital lesson plans. The system was developed utilising the ADDIE Model. Five teachers from Kian Kok High School, Kota Kinabalu, Sabah was selected to test-run the system. They were also observed for teaching using the digital lesson plan. The results of the interview were analysed in a qualitative way. The findings showed that all the five respondents agreed the system was able to function smoothly to create digital lesson plan. Many other functions were tested and also reported to be successful. The result of the teaching observation also proved that the digital lesson plan is useful for the teachers and also able to maintain lesson plan standard fixed by the MOE. Many challenges were reported by the respondents but the researcher was only managed to attend to some of them only due to financial constraints of the grant. The research concluded that lesson plans generator that is reliable and effective must be in the online mode in a future so that users can be engaged online for more teaching resources.

Keywords:

Perceived Usefulness; Perceived Ease of Use; Satisfaction; Intention to Use; Acceptance of Technology; Digital Lesson Plan

Introduction

Teachers are responsible to do teaching with a lesson plan each time they enter a classroom as far as MOE is concerned. This directive is compulsory and teachers must arm with lesson plans,

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teaching aids and assessment activities for effective teaching and learning in classroom teaching. Without a lesson plan, teachers may be in a total loss of direction and ideas when entering a class. If a teacher fails to plan the teaching tasks, students will lose focus and concentration during the lesson. Lesson plan stated learning goals, individual or group activities, from set induction until the closing (summary) including reflection (Richards & Bohlke, 2011)

Writing digital lesson plan via technology will direct students towards quality teaching and learning outcomes (Wilfred, 2016). This is because the use of internet will improve the quality of lesson planning. Retention of knowledge, attention and motivation in learning can be achieved if a good quality lesson plan is unveiled and implemented (Ozdamli & Uzunboylu, 2014). This research will present the perceived perceptions of some teachers regarding the use of this prototype system, the lesson plan generator. The research questions are:

1. What is perceived satisfaction regarding the interfaces of the system?
2. What are your opinions regarding the functionalities of the lesson plan generator?
3. What are the challenges while using the system?
4. Is the digital lesson plan useful for the teachers in term of teaching?

Literature Review

Importance of Digital Lesson Plan

Globally, lesson plan is important for every teacher. For example, China teachers use lesson plan to measure teaching and learning and also do personal reflection after each lesson (Shen et al., 2007). It is considered as a responsibility for every teacher in China to use the lesson plan tool to achieve excellence in teaching and learning. In a university, lesson plans together with course-based reflection will enable colleagues in the same program to share thoughts, experiences and collaborate more effectively to ensure positive students' engagement and achievement. Comparatively, the Chinese teachers seriously focus on course reflections for improvement whereas the American teachers reflected only after 7 – 8 hours of teaching (Su et al., 2005). This demonstrated the importance of the lesson plans for China teachers.

The lesson planning process usually starts from the semester level until the unit level. Topical mapping in a semester is first done before the unit level's lesson plan commences. Some of the important aspects in a unit lesson plan are:

- Defining goal or learning outcomes
- Sequential steps of teaching or inputs by the teacher from set induction up to the activities of the students
- Evaluation (assessment) for students
- Reflection

In this research, preparing lesson plan is done using the same practice and approach with the help of the technology tool. Teachers will be encouraged to prepare digital lesson plans. According to Aslina et al. (2014) whose study focused on a similar lesson plan system named SmartLP, revealed that digital lesson plans produced by a company system saved more time than those doing it manually. Digital lesson plan is actually the same as the face-to-face lesson plan but it is in digital format which can be stored on an online platform, CMS/LMS etc. or if

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offline mode, stored in a localised computer Server or installed software that has a database (Bomar, 2014). In this research, the offline system was chosen due to limited grant funding. The offline database system that can be installed to any localised computer Server.

Having a digital lesson plan benefitted teachers in many ways in an education 4.0 environment (Ahmad Sugianto, 2020). For example, resources from internet such as activities required for 21st century skills, higher order thinking and creativity are widely available on the web. The implementation of a good quality digital lesson plan will create effective teaching and learning outcomes (Bialik & Fadel, 2015). Therefore, teachers are encouraged to use digital lesson plan as much as possible.

Jason (2019) in his study of 100 social science teachers revealed that technology integration, for example using various digital tools such as multimedia, YouTube, digital lesson plan, etc. provided a significant impact on the output of teaching. Other researcher such as Misra (2010) also agreed that the process of input and output in education must be planned carefully. For example, teaching activities which represents the inputs are highlighted in the teacher's digital lesson plan. The measure output will be student academic performance in term of quality. Therefore Misra (2010) concluded that the appropriate methods to use technology in teaching and learning will increase teachers' productivity in term of quality.

Research Methodology

Method

This research is qualitative in nature. It uses the interview method for data collection. According to Shaughnessy et al. (2011), an interview involved discussion with the respondents and deeply explore a specific topic to collect information. Interview is often used to assess thoughts, opinions, feelings and perceptions on any behavioural construct (Gravetter & Wallnau, 2015). This research employs the group focus interview to collect data from the respondents.

The measurement of the use of lesson plan by teachers in teaching will involve interview with them after the class observation. Conclusion will be drawn whether they comply with standard MOE guidelines on teaching and learning in term of the main components in the generated lesson plan.

Based on the analysis conducted to the lesson plan, there were 6 items or components on the lesson plan that will be observed namely learning outcomes, teaching materials (BBM), set induction, stages of teaching, stages of learning or student activities and reflection. These are the basic components listed by the MOE for KSSM syllabus in Malaysia. The score for the respective components observed are listed in the observation form as the following:

Table 1: The Teaching Observation Form (Score Sheet)

Core component	Items observed	Score (%)
Lesson planning	Learning outcomes	10
	Teaching material (BBM)	20
	Set induction	5
	Use of BBM	10
	Teacher-student interaction	15

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Teaching process	Learning development	15
	Class management	10
	Closing	5
Teacher's characteristics	Personality, manners, etc.	5
Reflection	Reflection	5
		100%

Sample

The implementation of this prototype system was being influenced by the on-going Covid 19 pandemic declared by the World Health Organisation in February 2020. Consequently, travels restrictions and movement control were implemented by the government which affected the education sector badly. Due to this factor, only five teachers were selected for a trial run of the prototype system.

The test-run was designed to ensure all functionalities of the system run smoothly to generate digital lesson plans. All the respondents attending a briefing to demonstrate the step-by-step approach to create a lesson plan using the system. The researcher allowed a 1-month trial for all the respondents. At the end of month, the researcher conducted the interview to gather data on the respondents' satisfaction for the system including identifying issues related to the system.

Instrument

An interview protocol was prepared for the purpose of data collection. The group focus interview questions focused on perceived satisfaction and functionalities of the system, challenges faced and the usefulness of the digital lesson plan for teaching.

Data Analysis

The interview will produce qualitative data. Interview transcripts were prepared for analysis. The results will be reported in the findings section.

Development of The Prototype System

The ADDIE Model is used in the development of this prototype system. The five phrases of ADDIE are namely analysis, design, development, implementation and evaluation phrases. In the analysis phrase, some teachers from the secondary schools were interviewed by the researcher. These teachers were masters of education (by coursework) students in UMS. They were interviewed on the various aspects and stages of writing lesson plan writing and its challenges. These initial analyses and understanding of lesson plans helped the researcher to prepare the data flow diagram and data structure of the database of the system.

In the design phrase, the produced data flow diagram (DFD) helped to counter-check data flow issues. After a few rounds of discussions, the data structure or data dictionary for the database was finalised. After analysing the initial feedbacks from the teachers, the researcher prepared a data flow diagram (DFD) and the data structure for the database was finalised. The lesson planner system has two tables in its database namely "tbllessonplan" and "tblpersonal". The two tables serve as the main sources for the database to generate lesson plans for the teachers.

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In the development phrase, the researcher must identify a database management system (DBMS) for database development. This research is limited in term of grant funding and therefore the online database method (DB) cannot be considered because even the cheapest system that can be developed by a software house is estimated to be around RM50,000 (including the hosting for the online DB). As a result of the financial constraint, the researcher used DBMS system from MS Access that is part of the MS Office software that was officially subscribed by UMS. Although MS Access has its limitations but it can still host a DB that is on an offline mode. After three months of development, the final version of prototype system was finally ready.

In the implementation phrase, the lesson plan generator was tested in May 2022. Five teachers from Kian Kok High School, Kota Kinabalu were selected for the purpose. After the test-run, the teachers used the digital lesson plans in the classroom. They were observed for teaching and interviewed for perception on its usefulness. This will reported in the findings section. Analysis in the findings will yield results for the evaluation phrase of the ADDIE model.

Findings and Discussion

After the five teachers from Kian Kok High School, Kota Kinabalu test-run the prototype lesson plan generator, they attended a focus group interview. The results of the interview will be highlighted in this section. The following is a screenshot of the main menu of the system (Figure 1).

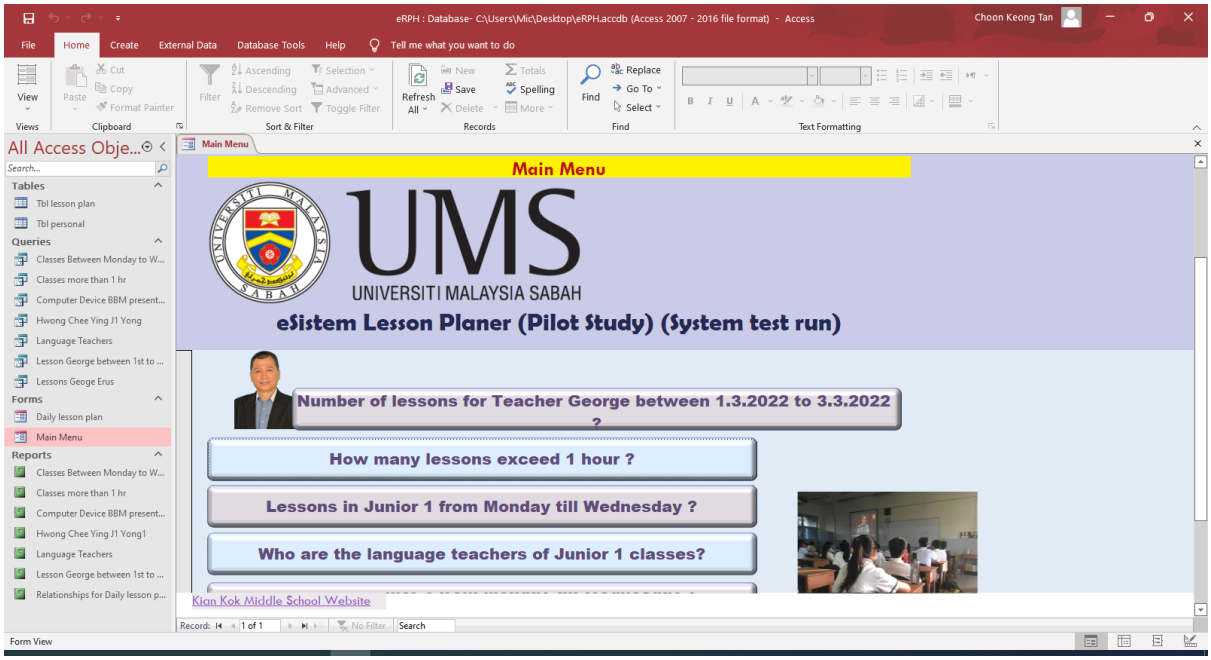

Figure 1: The Main Menu

The system was tested for the following functionalities:

- Data input session
- Lesson plan generator
- System sort functions: lesson plans according to date, time or subject, etc.

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Research Question 1: Satisfaction with The System

The five respondents answered the first interview question "What is perceived satisfaction regarding the interfaces of the system?" Four respondents answered "Yes" with some positive comments. The 1st and 2nd respondents agreed that "the interfaces and functions were user-friendly" because they can be clicked easily from the main menu. However, the 4th respondents commented that "if the main menu can be re-arranged to see button such 'key in data', 'generate lesson plan', 'print lesson plan', etc. it will be better."

The researcher noted the comments of respondent number 4. The system will be maintained and re-programmed to upgrade the main menu.

Research question 2: Functionalities of The System

The respondents were asked "What are your opinions regarding the functionalities of the system?". The functionalities of the system refer to the following:

- Data input session
- Lesson plan generator
- System sort functions: lesson plans according to date, time or subject, etc.

Figure 2 displays the screen shot for inputting data for generating lesson.

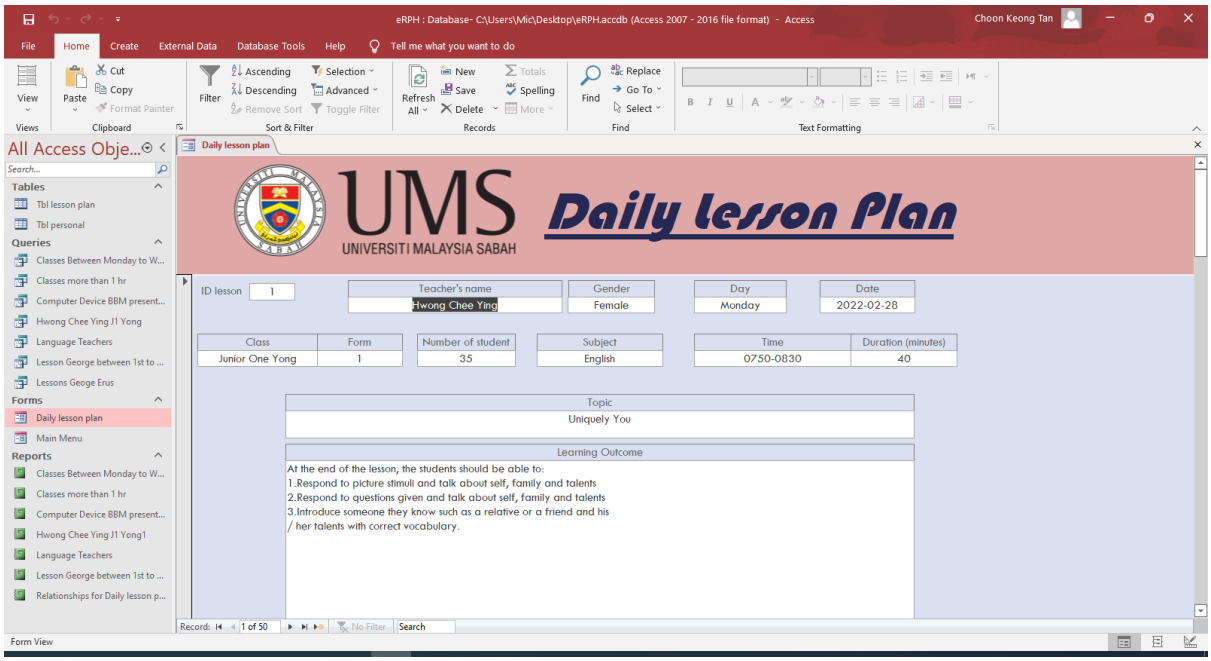

Figure 2: Form for Keying In Data for The Lesson Plan

All the five respondents agreed that the input form of the system is easily to use. However, they admitted that a huge amount of data is needed to be inputted into the system. Respondent 3 commented "We are already burdened with so much of administrative work besides teaching; it's difficult to find extra time for this job". The 5th responded said this: "If the MOE really needs to implement this system data assistant is needed". The 1st responded however was more accommodating, and commented "Although more time is needed to key in each lesson plan but the outputs can be everlasting before it can be stored for future references". The teachers said they to plan the needed data (resources) much earlier before the data input session. For each

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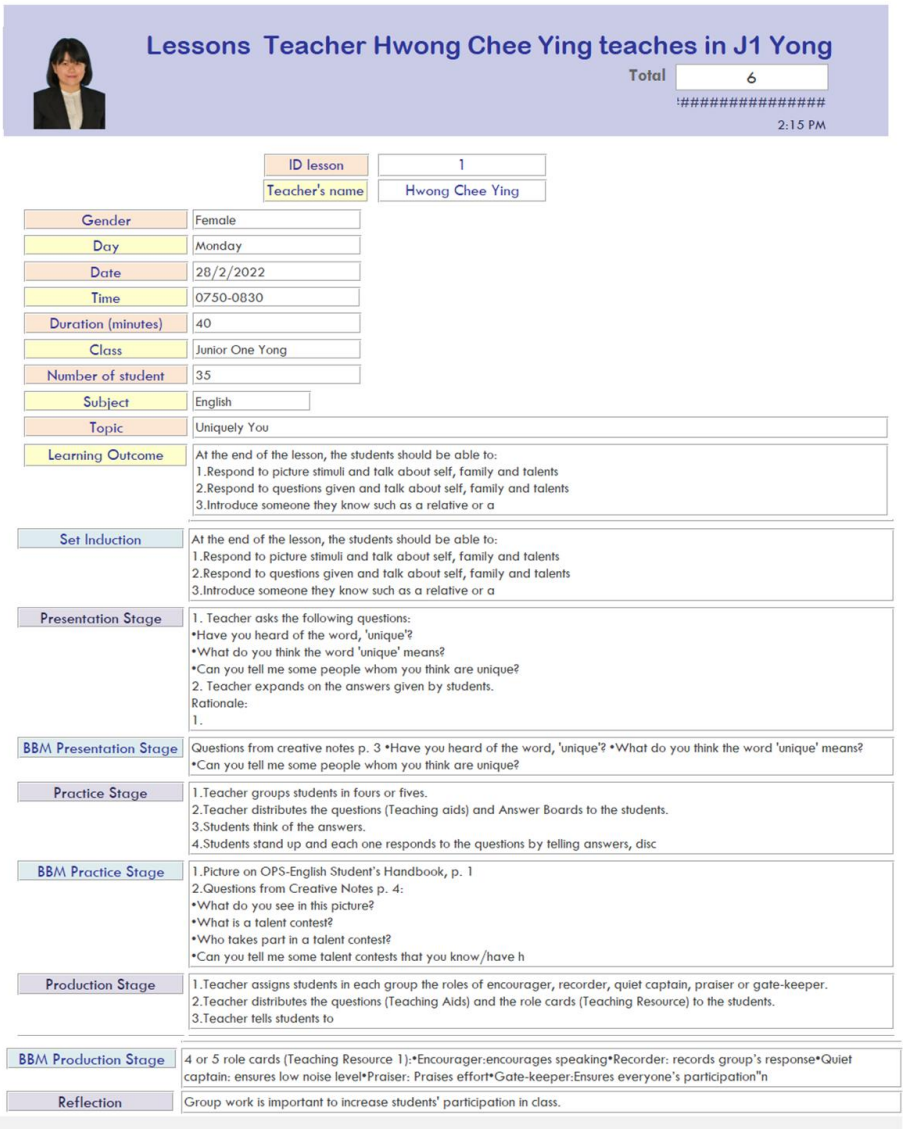
lesson plan, if data is readily available to the teachers, an estimate of 15 minutes is needed to complete all the fields. Therefore, the researcher agreed with the respondents that data input for the system is very time consuming although this finding is in contrast with the findings of Aslina et al. (2014) which stated digital lesson plan took less time to produce if a system is used.

Figure 3 shows a sample lesson generated by the system. The lesson belonged to one of the respondents (Respondent 5) whose name is "Teacher Hwong".



Lessons Teacher Hwong Chee Ying teaches in J1 Yong

Total 6

2:15 PM

ID lesson	1
Teacher's name	Hwong Chee Ying
Gender	Female
Day	Monday
Date	28/2/2022
Time	0750-0830
Duration (minutes)	40
Class	Junior One Yong
Number of student	35
Subject	English
Topic	Uniquely You
Learning Outcome	At the end of the lesson, the students should be able to: 1.Respond to picture stimuli and talk about self, family and talents 2.Respond to questions given and talk about self, family and talents 3.Introduce someone they know such as a relative or a
Set Induction	At the end of the lesson, the students should be able to: 1.Respond to picture stimuli and talk about self, family and talents 2.Respond to questions given and talk about self, family and talents 3.Introduce someone they know such as a relative or a
Presentation Stage	1. Teacher asks the following questions: •Have you heard of the word, 'unique'? •What do you think the word 'unique' means? •Can you tell me some people whom you think are unique? 2. Teacher expands on the answers given by students. Rationale: 1.
BBM Presentation Stage	Questions from creative notes p. 3 •Have you heard of the word, 'unique'? •What do you think the word 'unique' means? •Can you tell me some people whom you think are unique?
Practice Stage	1.Teacher groups students in fours or fives. 2.Teacher distributes the questions (Teaching aids) and Answer Boards to the students. 3.Students think of the answers. 4.Students stand up and each one responds to the questions by telling answers, disc
BBM Practice Stage	1.Picture on OPS-English Student's Handbook, p. 1 2.Questions from Creative Notes p. 4: •What do you see in this picture? •What is a talent contest? •Who takes part in a talent contest? •Can you tell me some talent contests that you know/have h
Production Stage	1.Teacher assigns students in each group the roles of encourager, recorder, quiet captain, praiser or gate-keeper. 2.Teacher distributes the questions (Teaching Aids) and the role cards (Teaching Resource) to the students. 3.Teacher tells students to
BBM Production Stage	4 or 5 role cards (Teaching Resource 1):•Encourager:encourages speaking•Recorder: records group's response•Quiet captain: ensures low noise level•Praiser: Praises effort•Gate-keeper:Ensures everyone's participation"n
Reflection	Group work is important to increase students' participation in class.

Figure 3: Sample Lesson Plan Generated by The System

All the teachers were satisfied that the system was able to generate the lesson plans after keying in all the data. They were also delighted to know that the system allows each lesson plan to be printed. They commented this will help them fulfil the lesson plan responsibility required for each teacher that is enforced by MOE. This finding is similar to findings by Aslina et al. (2014) which mentioned that a computerised lesson planner made teaching easier. This is because lesson plans can be displayed digitally if not printed on hard copy and usually teachers can

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teach at ease with the help of other ICT tools beside the produced digital lesson plans.

The system is also able to provide other functionalities such as sorting lesson plan according date, time or teachers as well as printing reports. For example, the system is able to display the number of lesson plans for teachers according to specific time or date. Figure 4 shows an example of the sorting functionality of system. The result showed that between 1st of March and 3rd of March 2022, there were 11 lesson plans recorded in the system.

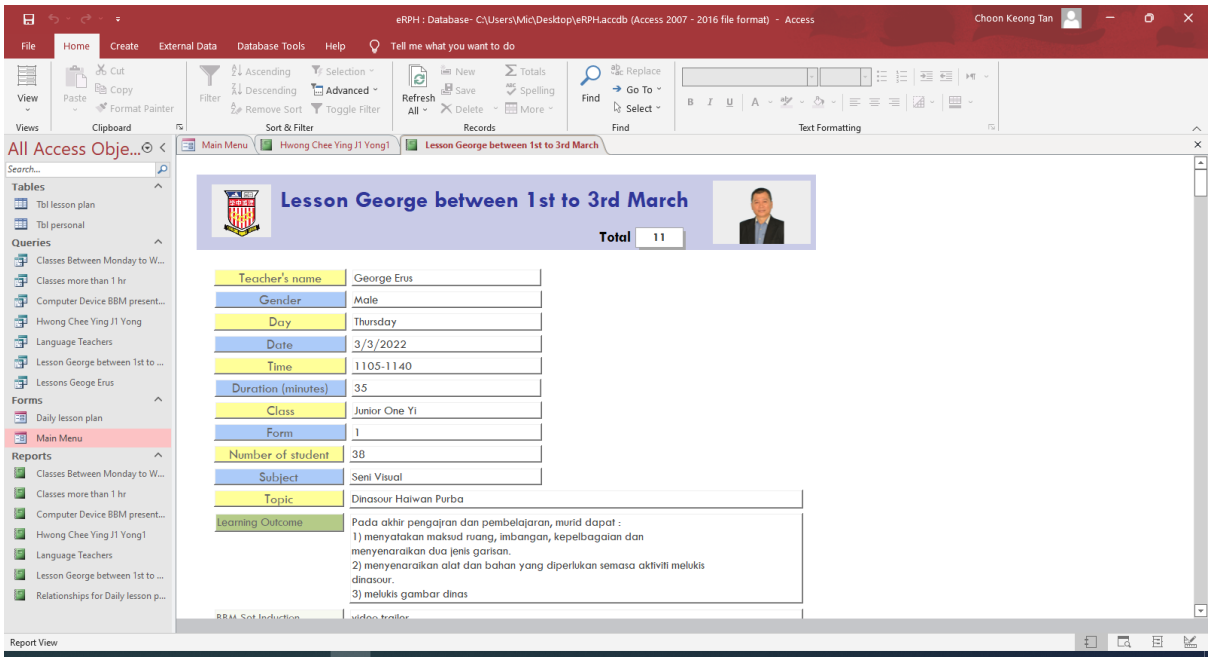

Figure 4: Lesson Plans Sorted According to Date by The System

Another example of sorting in term of teachers by the system is for example by subject teachers. Figure 5 shows the result of the sort according to subject teachers, example language teachers. It showed there were 30 lesson plans recorded by the system for language teachers of Junior 1 classes.

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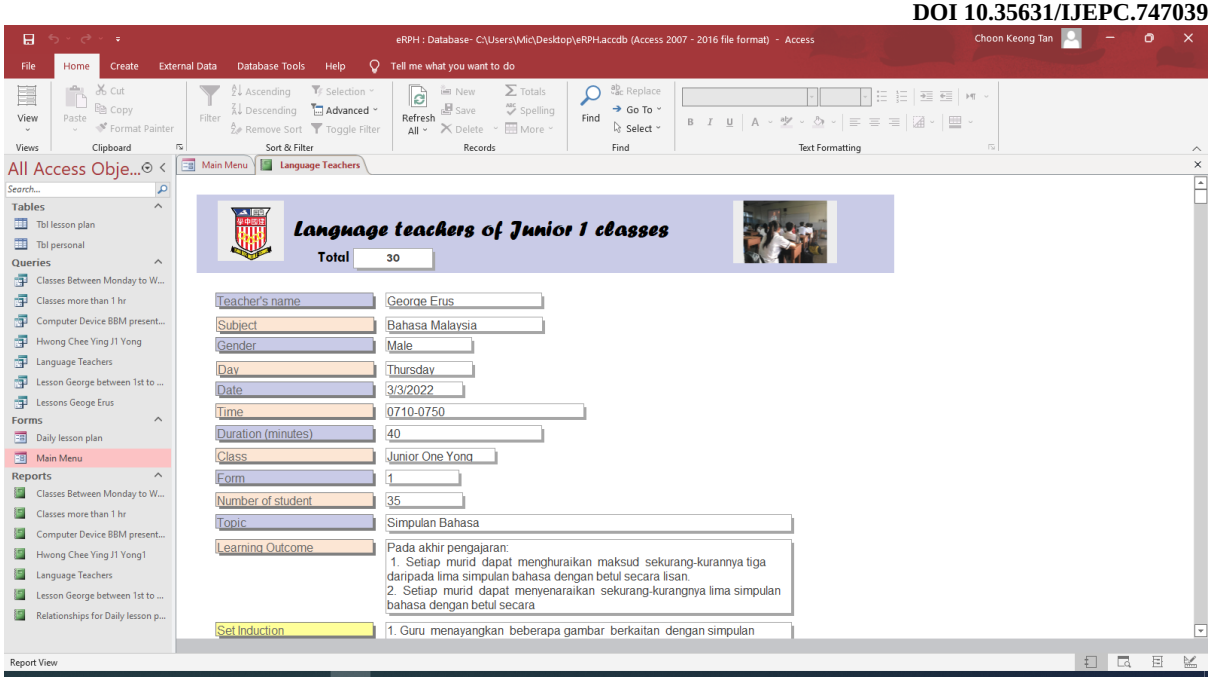

Figure 5: Lesson Plans Sorted by The System According to Subject Teachers

Generally, all the respondents' satisfaction on with the functionalities of the system were good. This finding is in agreement with other researchers (Shroff et al., 2011; Zacharis, 2012). These researchers stated that good quality system will enhance users' readiness to use the system. In addition, all of respondents commented the system was smooth sailing without much technical error. For example, each output with a click of a button took less than 3 seconds to generate an output. It can be considered as almost "immediate response". Every respondent responded with "thumb up" as far as functionalities of the system is concerned.

Research Question 3: Challenges of The System

The respondents gave views on some of the challenges when they were asked "What are the challenges while using the system?". The respondents' answers and feedbacks were analysed and showed in Table 2.

Table 2: Challenges and Solutions for System

No.	Challenges	Solution
1	Respondent 1 and 3 complained that "Two forms are used to key in data for the lesson plan. Can they be combined?". They also commented that too many textboxes were used.	The researcher managed to combine the two forms into a single form utilising the "database relationship feature" and thus reduce the number of textboxes by 30%.
2	Respondent 5 complained that the offline version (this present version) is less user-friendly because results from the database of each individual computer needs to be re-combined back into a single DB.	No action was taken because it had been stated earlier that due to insufficient funding to this grant the online version could not be developed.
3	Respondent 1 and 2 complained the main menu of the system is lacking in term of creativity.	The researcher will redesign the main menu to include UMS logo, school logo, related graphics, etc.

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4	Respondent 3, 4 and 5 voiced database security issue as there is no password required.	The researcher will reprogram the system to include password for entering the system.
5	Respondent 5 was worried if many schools are involved in the project later on, the database will not be able to cope with the amount of data.	The researcher responded that no action will be taken due to insufficient funding and unable to use corporate DB. As a result, the decision to continue with MS Access DB will be retained until the limitation is reached. Estimation: MS Access is able to accommodate 2000 users only (educational licence).
6	Respondent 2 voiced out copyright issue. Who owns the copyright? The user or UMS? She said many users will refuse to provide data due to this problem.	The researcher's response was there is no solution in sight. As this is an UMS research, UMS retains the copyright to all the data therefore there is no action taken for this complaint.

Research Question 3: Usefulness of The Digital Lesson Plan

The five teachers were observed for their teaching based the digital lesson plans generated by the system. Each teacher chose a lesson for teaching. The researcher observed the lesson using the Teaching Observation Form for scoring shown earlier in Table 1. Every respondent scored an average of 83% with the lowest observation score at 78 and highest at 91.

After the teaching observations, the teachers were interviewed on the usefulness of the digital lesson plan. Respondent 2, 3 and 4 responded positively stating that although inputting data for lesson plan generating was tedious but they enjoyed the digital output because the lesson plan can be displayed online for the view of the students. They said this enhanced greatly the input-output process of teaching because students know in advance what will be discussed and the type of preparation needed. This result was similar to Ahmad Sugianto (2020) findings where he said language teachers using the lesson plan yield good output in teaching.

On whether they will use the system in the future, all the five respondents answer "Yes". This proved that the general acceptance of the lesson plan system in term of usability and usefulness. On whether the lesson plan output of the system complies with standard MOE guidelines on teaching and learning, the answer is "YES" as shown in Figure 3. All the components required by the MOE are displayed by the system. Automated system similar to this will enhance teacher's productivity greatly (Ahmad Sugianto, 2020). Other researcher such Jason (2019) also agreed that ICT integration starting with digital lesson plan aided by other ICT tools for teaching will produce positive student performance. This will ensure productivity of teachers improved because digital lesson plans ensures more efficient teaching in term of resources planning and time saving (Misra, 2010).

In conclusion, the researcher is satisfied with the outcomes of the test-run of the prototype lesson plan generator. After reviewing all the feedbacks, the system was evaluated and corrected to the best the researcher can accommodate. According to Wilfred (2016), if a system did not do maintenance, in the end users' satisfaction and perceptions on the system will diminish. However, this system maintenance is a real challenge because the fund was this project is limited.

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Conclusion

Based on the respondents' comments in this research, it proved that the prototype lesson plan generator is useful and has huge potential in helping the users in digital lesson plan creation. All of them were happy and hope for the continuation of the system to be implemented in more schools to gauge its usefulness.

All the findings proved the prototype system can be maintained as a reliable system for teachers to generate lesson plans. As Pena-Ayala et al. (2014) mentioned, a system that is fully supported by users must be upgraded to maintain its good quality to ensure its long run and usability. Therefore, the researcher would like to recommend this system to be used widely by school teachers. Due to its limitations regarding the scale of the system which is offline mode, the researcher recommends further study and improvement to the system. The university (UMS) must embark on a new project to upgrade this system to the online version to maintain its visibility and usability. This will enable more teachers from Sabah and the whole of Malaysia to enjoy using the system.

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