Chapter 50

Robot 4.0: Developing Language and 21st Century Skills among Year Two Pupils

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ABSTRACT
In this era of global competitiveness, being able to communicate and operate effectively in English language is essential. Besides, it is equally important for teachers to embed value added elements like 21st century skills and cross-curricular elements in teaching and learning to ensure pupils are able to communicate accurately, confidently and effectively in English language. However, fewer researches have been conducted relating to the development of four language skills through qualities of fourth industrial revolution with motivation and interest of young learners as key factors. Therefore, “Robot 4.0” which comprises of a teaching and learning module for the topic “The Robot” in Super Minds is introduced in this study to help teachers to develop the four language skills and 21st century soft skills like communication, collaboration, creativity and innovation among year two pupils from two national typed schools in Johor. Pre and post-test, observation checklist and questionnaire were used to assess the effectiveness of ‘Robot 4.0’ based on ADDIE model. At the end of this study, it is revealed that the use of “Robot 4.0” has developed the pupils’ ability to communicate and operate in English language (cognitive), increased their interest and motivation to learn English (affective) also cultivated 21st century skills among pupils through the implementation of the designated teaching and learning activities in ‘Robot 4.0’ (psychomotor). It was also identified that the study has favourable effect on teachers as the innovation has lessenened teachers’ burden since the innovation is not only versatile, environmentally friendly and technology based but has also helped teachers in being a facilitator, not a sage on stage.

Key words: language skills, 21st century, primary ESL Learners, Common European Framework of Reference (CEFR)
1. INTRODUCTION

The emergence of fourth industrial revolution has increased the significance of English language’s role. Hence, there is a growing need among people of all walks of life to be able to communicate in English. Regardless, according to a survey by the EF English Proficiency Index for the year 2018, it is identified that Malaysia is in 22nd place in English proficiency ranking for non-native English speakers (Ef.Edu, 2018). This is the core reason as to why English Language Roadmap 2015-2025, Common European Framework of Reference (CEFR) and school based assessment have been introduced to produce pupils who are capable of competing globally with knowledge and competency in English. However, it was identified that most young ESL learners were only able to achieve the minimum performance level of band three while there are still pupils who achieved only band two in School Y and Z, two types of national typed schools in Johor. Among the factors identified by the researchers are lack of confidence and motivation to learn. This is supported by Zua (2008), who sees motivation as inner energy that enhances learners’ study interest which eventually helps them in performing better in it. Hence, the absence of motivation contributes to the poor language competency among young learners.

When analysed in depth, the researchers found that lack of motivation and confidence is caused by uninspiring teaching materials as well lack of authentic and non-threatening situation to use the language. Consequently, the researchers considering the dire need to develop young learners’ language competency performance standard have innovated Robot 4.0. It is a module that comprises five lesson plans with activities incorporating 21st century skills and guidelines to produce a talking robot which will be used in all the lessons. On the other hand, 21st century skills are emphasized in this module because they are equally important in acquiring and using English as these skills are essential in providing real life situations for learners to communicate and operate in English. Furthermore, 21st century skills like communication, collaboration, critical thinking, creativity and cross-curricular elements as environmental sustainability and entrepreneurship are also prized skills that young learners have to have to thrive in this fourth industrial revolution. According to Saner et al., 1994, collaborating and working effectively with others can have a lasting positive impact on individual student learning and increase social competency (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006). Hence, this paper aims to identify the effectiveness of “Robot 4.0” in developing the four language skills and 21st century skills among year two pupils.

2. LITERATURE REVIEW

Experiential Learning theory by Kolb
Experience plays a key role in a learning process whereby pupils learn better when they are able to relate with their own experience. It is called experiential learning. According to Kolb,198, p.41; knowledge results from the combination of grasping and transforming experience. To put this simply, experiential learning happens in holistic manner in which
pupils have to think creatively and critically and communicate with the others and in the end be able to achieve the dissemination phase (Knutson & Sonja, 2003) which is applying what they have learned from the experience (and what they learned from past experiences and practice) to a similar or different situation (Haynes, 2007 & UC Davis, 2011) in order for them to fully acquire the knowledge. Therefore, Robot 4.0 will definitely give a meaningful learning experience for pupils where it will aid pupils to engage in classroom activities actively and able to apply in their everyday life.

Motivational theory by Maslow
Maslow’s Hierarchy of needs is used to study how human intrinsically partake in behavioral motivation. With respect to the causes of lack of motivation, Gardner in Nunan (1999) elaborates the causes of the pupils’ lack of motivation e.g. uninspired teaching, boredom, lack of perceived relevance of materials and lack of knowledge about the goals of the instructional program. These four, as he further says, very often become source of pupils’ motivation. Uninspired teaching, for example, affects pupils’ motivation to learn. Thus, Robot 4.0 as a teaching teaching tool to improve pupils language skills as well as 21st century skills will increase pupils motivation and interest to learn.

Audio visual aids
There was a research conducted by Mohd Helmi Syazwan Mohd Zaki (2017) on the use of audio visual aids in developing pupils’ speaking skills: Malaysian context which has given positive results. Based on his research, ESL pupils found that audio visual aids to be practicable, convenient and they displayed more interest and focus during instructional processes as they believed audio visual aids could encourage them to be a better speaker. According to Daniel, 2013; audio visual aids make teaching and learning effective as well as they provide interest and inspiration and most importantly, they create language atmosphere to the learners. Moreover, according to Katherine (2009) (as cited in Idris, 2015), learning takes place effectively when the teacher sets out to provide learning situation in which pupils will learn because of his or her natural reactions of the provided materials’. Hence, audio has been inserted in the Robot 4.0 to cultivate motivation and interest among pupils and as well as to help pupils develop their language skills and 21st century skills.

3. METHODOLOGY
Robot 4.0 is implemented among year two pupils from two national typed schools in Johor based the ADDIE model (Analysis, Design, Development, Implementation and Evaluation). A total of 37 pupils were involved in the study. Pre and post-test, observation checklist and questionnaire were used to identify the effectiveness of ‘Robot 4.0’ in developing the language competency and 21st century skills among year two pupils.

In the analysis phase, researchers found that pupils had different mastery level in all the language skills. Pupils performed slightly poorly in speaking and writing as they lack confidence in delivering their ideas. Moreover, it is observed that during group
classroom activities, pupils tend to use their mother tongue to communicate. It was also noted that some of the more able pupils tend to be disengaged. Through further probing, it was identified that pupils lack motivation and interest especially the low achievers as the activities and teaching aids waned in attracting pupils to engage and enjoy the lesson. This eventually caused the pupils’ poor performance mastery.

Therefore, in order to address the problems acknowledged, the researchers brainstormed a module that should provide assistance to teachers to conduct lessons that are fun and that would require pupils to use the target language authentically and tangible interactive teaching aid that would interest the pupils to use the language. The reason for the conditions set was to ensure the three main learning styles are addressed in the intervention namely, audio, visual and kinaesthetic. Hence, ‘Robot 4.0’ was designed based on the CEFR year 2 topic 8, ‘The Robot’. ‘Robot 4.0’ is a module which consists of guidelines on creating a robot made from recyclable items and 5 lesson plans which incorporate the four language skills and 21st century skills such as communication, collaboration, creativity and active learning. In the guidelines, the researchers have explained ways teacher can play pre-recorded audio related to the skill being taught using a powerpoint courseware.

During the development phase, the contents to be played are created, tested and revised. Before the final stage, three professionals in language teaching with teaching experience of not less than five years were consulted to evaluate the innovation using a questionnaire developed from a study by Mohamad (2011) on The Instructional Material Blended with Needham 5 Phases Strategy. Following that, a pilot test was conducted to check if the module developed is valid and reliable also if it is up to task on what it is intended for. Finally, the innovation is implemented on Year 2 pupils for a duration of 2 weeks. After the module is completed, the researchers evaluate the participants' mastery of different language skills using a post test. As for the 21st century learning skills, observation checklists and questionnaires were used. Additionally, interview was conducted to gather insights of teachers and pupils about the intervention, process, and feelings to further identify the role, impact and effectiveness of Robot 4.0. Finally, the data collected is described descriptively and presented in graphic for easier comprehension.

4. RESULTS & DISCUSSION

The effectiveness of Robot 4.0 are discussed in terms of pupils’ motivation and interest, language performance and 21st century skills as they are all interrelated.

Motivation and Interest
Since motivation and interest are the driving factors in learning pupils’ motivation and interest are interpreted using questionnaires. Based on the findings, it is found that the majority of the pupils (80%) were excited to see the robot and to learn with the robot. It is supported by the observation checklists administered by teachers during the lesson as
well as structured interviews conducted after each lesson in which a pupil stated that, 'I love Robot 4.0. I am happy when teacher bring it'.

**Increased Language Competency**

In this section, pupil’s language competency is analysed using the data obtained from pupils’ performance in pre and posttests. The scores are divided into two groups, the low performance level which includes pupils achieving Band 1, 2 and 3. Whereas the high-performance level achievers are those who obtained Band 4, 5 and 6. The grouped data is then tabulated to aid interpretation. Comparing Figure 2 and Figure 3, it is evident that the number of participants with low performance has decreased whereas the number of participants with high performance has increased in the post test in all language skills.
Improved 21st century skills

The data from observation checklist and interview are coded according to themes predetermined which are creativity, collaboration, communication. Hence, the data is analysed to identify the development of 21st century skills among the pupils. Based on the analysis, it is found that the majority of pupils (81.08%) were able to participate actively in group activities. This denotes that most pupils have collaborated actively during the lesson whereas, 67.57% of pupils tried to speak in English while doing group work. It was also noted that all pupils (100%) were able to contribute their creativity through the making of robots.

Table 1 Data collected from the Triangulated Observation Checklist

<table>
<thead>
<tr>
<th>Observation Checklist Items</th>
<th>Researcher</th>
<th>Comments and Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 out of 37 pupils (81.08%) participate actively in group activities.</td>
<td>A</td>
<td>‘Pupils discuss how to go about the tasks given collaboratively.’</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>‘Pupils show positive collaboration especially when they work to complete their robot.’</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>‘Pupils divide the tasks among the group members and help one another to complete the tasks.’</td>
</tr>
<tr>
<td>25 out of 37 pupils (67.57%) try to speak in English while doing group work.</td>
<td>A</td>
<td>‘Pupils try to speak in English though not fluent.’</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>‘Pupils seek help from their friends when they want to say something but do not know how to say it in English.’</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>‘Pupils comment on other groups’ product actively.’</td>
</tr>
</tbody>
</table>
5. CONCLUSION

In this study, a humanoid robot was introduced in English class to assist the teacher in teaching and motivating pupils to get involved in learning activities. Most pupils in the three classes had positive development in language competency, attitude towards this robot and had a great interest in the robot’s performance. They were fully engaged in the lesson. The findings from this study does not just benefit pupils but it also benefits teachers as teachers can make use of the humanoid robot as a teaching assistant in the classroom as the robot can teach and repeat the language focus or structure to pupils. This would save teachers’ time since teachers can provide individual coaching to pupils who are really weak during that time.

6. RECOMMENDATION

Though the findings from the research showed that the use of Robot 4.0 has positive results on the pupils' motivation level, language competency and 21st century skills, there is still room for improvement. The robot could be modified so that it can show some movement while interacting with pupils. Besides, researchers recommend to use Robot 4.0 to teach more sentence structures and wider topics to further develop pupils' language competency. All in all, this research hopes Robot 4.0 can be versatile across curriculum or subjects.

REFERENCES