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THE DEVELOPMENT OF INTEGRATED MOBILE GAME-BASED LEARNING IN PSYCHO-B'GREAT MODULE: A NEEDS ANALYSIS

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Abstract: This research aims to identify the needs and requirements for a Psycho-B'GREAT module that includes game-based learning to be utilised by instructors to teach Chemical Composition, Metabolism and Enzyme themes to Form 4 students. Psycho-B`GREAT is a teaching and learning module that is integrated with psychology, multiple intelligence and game-based learning. This study utilised a semi-structured interview method. A total of four biology teachers from various schools in Penang were involved in this interview session. To undertake the sample selection procedure, respondents from homogenous groups who could supply various information were purposely selected. The information was gathered and analysed using thematic analysis. Five main themes were identified: (1) the importance of the topics of the Chemical Composition of Cells, as well as Metabolism and Enzymes; (2) the challenge of the topics of the Chemical Composition of Cells, as well as Metabolism and Enzymes; (3) teaching strategy; (4) the desire for improvement; and (5) technology. The findings of these five themes suggest need for developing the Psycho- B`GREAT module. Aside from the five selected themes, ideas and information gleaned from the conversations with teachers will be useful in developing the module materials. In a subsequent stage, these findings areutilised to plan and construct the module. The Psycho-B'GREAT module has great potential for improvement and can be used by biology teachers to trigger active and entertaining biology teaching for Form 4 students, according to the needs analysis conducted.

Keywords: Mobile game-based learning, basic biology theme, psychology, multiple intelligent

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INTRODUCTION

An overview of the main technologies currently used or being explored for STEM education is given here owing to the variety of opinions, rhetoric, proposals and policies relating to this field that has increased over time (Bryan & Guzey, 2020). In this regard, the Ministry of Educationof Malaysia (MOE) has made various efforts to transform education by preparing the Malaysian Education Development Plan 2013–2025 (the MEDP), which involved 11 major shifts including the use of ICT to improve the quality of learning in Malaysia. One of the primary goals of national education is to guarantee that the teaching and facilitating process are in step with the ever-evolving technological breakthroughs via the use of technology-based learning.

Accordingly, using ICT for teaching and learning, especially for STEM education, is highly appropriate as it can increase understanding among students of varied intelligence. It also aligns with the primary objective of the National Education Philosophy (NEP), which is to build persons who are academically, spiritually, emotionally, and physically balanced and harmonious based on a strong faith in and devotion to God.

Education creates a paradigm shift for a country, generating and producing world-class human capital and ultimately leading to changes in the country's progress. The better the implementation of education, the more developed the nation will become. The use of ICT in STEM education should be the main medium for making learning more interesting, enjoyable and easier to approach for students.

BACKGROUND TO THE STUDY

Needs Analysis as the Initial Phase of the Study

The objective of this study was to collect feedback from biology instructors on the module's requirements. The programme would then be developed to meet instructors' present concerns. In a module improvement study, the approach for developing and progressing a module includes an analysis of requirements. According to Richey and Klein (2007), the strength of the design and development of a module is that it may be utilised to address particular difficulties. The analysis phase of research occurs after data have been collected from the studied context and environment (Saedah et al., 2013). Therefore, before the creation of a module, a comprehensive analysis should be conducted to determine the possibility of any potential issues. The objective of the analysis phase is to identify the elements that increase the likelihood that problems may occur (Branch, 2009; Gagne et al., 2005) and to take action to resolve the problems (Branch, 2009; Gagne et al., 2005; Reinbold, 2013). The data collected during the requirements analysis phase is crucial for determining the design and production of instructional materials in the subsequent phase (Gagne et al., 2005; Shanmugam et al. 2019). In this research, a requirements analysis was undertaken at the outset of module creation to establish the optimal teaching technique for KSSM biology for enhancing students' accomplishments and attitudes and, ultimately, their multiple-thinking abilities.

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To achieve this goal, this study was performed to determine the conditions that teachers require to use a game-based method to teach biology in schools. According to Rashidah (2013), the analysis phase of research is the initial step in determining some of theelements of the target population. The target group can give helpful data for designing modulesthat will satisfy the demands of the consumers. The findings of the requirements analysis are analysed and utilised to build teaching and learning exercises during the process of creating and modifying the module structure. The enquiry into needs was carried out in this study oncethe issue had been identified, and data about the subtleties and nuances of the module were obtained from the educators. According to Richey and Klein (2007), a requirements analysis is performed to establish the product specification. Therefore, it is essential to conduct a comprehensive analysis of the needs to determine which parts are amenable to improvement so that instructors may ease their existing challenges and enhance the efficacy of their science classes. During the phases of structure and module creation, the examination phase's results and recommendations are incorporated (DeWitt, 2010). Employing the information acquired from the requirements analysis, the optimal instructional materials and teaching strategies are selected (Richey & Klein, 2007).

Theory of Constructivist and Game-Based Learning

In the mid-2010s, when the video game industry began to be popular, the development of gamification began, and gamification has continued until now. The researchers Hanafiah and Teh (2019) discussed the basic concepts of gamification and integration, as well as the role of gamification in education in general. Deterding et al. (2011) defined gamification as the use of games with design elements in non-game contexts. Furthermore, gamification promotes behavioural change (Tobon et al., 2020).

There are various definitions of game-based learning (GBL) and no agreement on one specificdefinition. Games can be categorised into two types, namely digital and non-digital games (Siong & Osman, 2018). According to Sin et al. (2013), games are only intended for entertainment, whereas ‘digital game-based learning’ aims to cultivate the skill sand improve the knowledge of players or students.

According to Wiggins (2016), GBL, in the form of digital or non-digital games, is implementedto achieve one or more learning objectives, and Muhamad et al. (2018) agree that digital games can produce skills in students that are appropriate to the twenty-first century. Wiggins (2016) stated that digital games are an option for improving curriculum-focused education and can strengthen knowledge. This is consistent with the MEDP (MOHE, 2013): the goal of education is to generate persons with the knowledge and skills necessary to thrive in life (Siong & Osman, 2018). According to Muhamad et al. (2018), GBL, or digital games used in learning, is an appropriate technique or method to help improve skills in problem-solving.

GBL is a game strategy for educational purposes. Numerous studies have shown that GBL can increase students’ interest (Bayir, 2014; Buckley & Doyle, 2016; Stringfield & Kramer, 2014; Sung & Hwang, 2013) and achievement in subjects (Bayir, 2014; Buckley & Doyle, 2016; Liu & Chen, 2013; Marti & Rubio, 2014). It can not only increase students’ enjoyment of learning but

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also enhance content mastery among them, increase their motivation to learn and change their perceptions of science (Stringfield & Kramer, 2014; Sung & Hwang, 2013) apart from improving their problem-solving skills (Sannchez & Olivares, 2011). Bakhsh (2016) stated that play is a learning method that avoids boredom in the classroom. The advantages of digital GBL are that it can make students more creative, more focused and more interested in the learning process, as well as encourages collaboration with friends through problem-solving (Khairuddin, & Mailok, 2020).

GBL using digital games is no longer a new thing (Muhamad et al., 2018). Digital game-based learning (DGBL) is a method of student-centred learning that employs educational digital games (Coleman & Money, 2019). A digital games study by Osman and Lay (2020) reported that computer games in chemistry education can provide a platform for students to practise twenty-first- century skills and, in turn, can improve their achievements in chemistry. For STEM subjects other than chemistry, the study by White and McCoy (2019) revealed that learning using games can change students' perceptions of mathematics in terms of fun, goal orientation and goal intensity. Games can also make students more active in learning and improve their inquisitive nature.

Past studies have used Piaget's theory in GBL (Plass et al., 2015, Ahmad et al., 2016). Piaget (1951) stated that children actively learn using the objects around them while playing and interacting with the environment (Ali and Mahamod, 2015; Dar, 2015). In Piaget's theory, there are four phases of cognitive development: the sensorimotor, pre-operational, concrete operational and formal operational stages (Dar, 2015). Piaget's theory isvery clear concerning cognitive development among humans with a certain level of development judged based on their thinking ability (Dar, 2015). According to Piaget, knowledge is formed in two ways, namely by assimilation and accommodation (Tri, 2015).Cognitive assimilation occurs by adaptation to the situation within the environment, while accommodation is an adaptation to the situation outside the environment (Tri, 2015). A game is very effective and not only helps students to learn vocabulary but also motivates them to engage in healthy competition and creates a cooperative learning environment (Ali & Ilham, 2015).

Constructivism theory is one of the theories widely used by researchers when conducting studies related to GBL (Krath, 2021; Li & Tsai, 2013; Qian & Clark, 2016). Students must be actively engaged in the process of information discovery for learning to be enjoyable. According to Sin et al. (2017), learning requires students to spend time and energy investigating new information connected to their present knowledge (Siong and Osman, 2018). The constructivist theory assumes that students explore new knowledge based on their daily experience or previously learned knowledge. Ah-Nam and Osman (2017) added that, in the learning process, students will interpret and make connections between new knowledge received and their existing knowledge. Students will then present the new knowledge according to their understanding. In addition, GBL activities based on constructivism theory not only can increase students' motivation and involvement in learning but also can enhance their level of mastery of multiple skills among them.

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Mobile Game-Based Learning (mGBL)

Gamification and game-based learning are elements of an innovative culture in the area of education that may enhance the quality of education in the nation. This corroborates the results of Zaman et al. (2020). The field of education needs more innovation to overcome the challenges facing educators in producing a new generation with strong thinking skills who are competitive and competent in education based on technology.

Krouska et al. (2021) and Troussas et al. (2020) stated that the use of mobile educational games with students can enhance progress in education. The development of mobile education gamesis known as 'mobile game-based learning' (mGBL) which combines mobile learning (m-learning) and education through mobile applications (Andreas et al., 2017; Chung et al., 2019; Giannakas et al., 2018) with game-based learning. mGBL refers to the use of games with educational value or software applications that use games for educational purposes via mobile devices. Nikolopoulou (2019) emphasised that control can be exercised so that mobile phone applications can be effectively used in the classroom. Students can explore on their own or in groups in this digital world, thus allowing them to increase their creativity in learning science even further.

Learning Biology via Mobile Game-Based Learning

As the number of mobile subscribers has expanded over time, the growth of mobile technology becomes a phenomenon that has been witnessed across the globe. Today's reality clearly shows that the use of mobile phones among students is very widespread. The incorporation of mobile learning into games has gradually increased in the context of education (Hakak et al., 2019). According to Thomas et al. (2014) and Dinsmore (2019), high school teachers support the use of mobile technology in the classroom as it can increase students' interest in teaching and learning. Thus, it promotes the motivation and success of students (Susilo et al., 2020).

According to Behnamnia et al. (2020), the usage of DGBL is growing. The use of DGBL technology (tablets and smartphones) has the potential to influence students' ability to develop creative and critical thinking skills, transfer knowledge, help students acquire skills in digital experiences, and foster a positive attitude toward more meaningful learning. There has been a surge in the usage of apps in numerous sectors of life, such as communication, travel, entertainment, productivity and education, as a result of the variety of smartphones accessible at cheap rates. In the last several decades, many projects have been established to employ mobile technology in educational applications (Kearney et al., 2015). In this regard, Hwang et al. (2018) support the idea that mobile learning has a positive effect on students' tendency to interact with their peers and generate more creative and critical thinking. This covers a variety of learning activities, devices, locations and times. Therefore, educators may need to develop a more flexible and effective pedagogy to support a continuous learning experience (Reimer et al., 2019).

Smooth learning can be defined as a continual or non-stop learning experience (Sharples, 2019). STEM education aims to build creativity and knowledge. The use of digital technology by students can disseminate flexible knowledge and skills (Ainley, 2010; Sharples et al., 2016).STEM

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education is the basic agenda of education. In the field of educational technology for STEM subjects and game design, mobile-based learning has widely developed in line withthe development of new technologies. This field is relatively new, which makes it even more interesting. There is a growing interest in research related to mobile games in terms of technology alone or their application in a social context. This has been assisted by the process of developing digital games to teach mathematics in a classroom setting and by the usage of cell phones as a tool that provides value to the education sector (Eichler et al., 2018).

Mobile educational games may benefit the students with an opportunity to participate in meaningful learning of relevant educational information (Liu et al., 2014). According to Brown et al. (2018), DGBL is being employed as an alternate learning tool in higher education science classes. Currently, there are various digital game formats for science learning, with various methods of implementation and evaluation. Therefore, researchers need to consider the challenges related to DGBL in science education and the appropriate strategies for overcoming these obstacles.

There is, however, a difference between advice and actual practice in schools. Although trials in schools have shown the benefits of using learning technologies such as mobile devices, they have not yet been effectively applied in schools (Bano et al., 2018). The Malaysian Communications and Multimedia Commission (2018), in the Hand Phone Use Survey (HPUS) series, found that consumers' behaviour in the digital world, especially the trend toward video and music streaming activities as well as online mobile games, are increasing. Young people love to play digital games and listen to music. Therefore, teachers are encouraged to produce and provide technology tools that can enhance students' understanding and learning (Poobalan et al., 2019).

Statement of the Problem

According to the Ministry of Education Malaysia (2013), education in the future will transform the MEDP. Within 15 years, the nation will be in the top third of international evaluations such as the Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA). This is one of the goals of the MEDP (Ministry of Education Malaysia, 2013). The TIMSS and PISA assessments are a benchmark for measuring students' mastery of mathematics and science subjects among participating countries across the world (Cordero et al., 2020).

Regarding biological subjects, in 2011, Malaysian students only managed to earn a score of 427 in TIMSS (Mullis et al., 2012). Abstract biological concepts are difficult for students to understand (Porntrai, 2015; James & Michelene, 2006; Kreiser & Hairston, 2007; Sadiah, 2008) because the methods used by teachers to generate the ideas in the students' minds are less concrete. Biology is often regarded as a boring, very complex and elusive subject sincebiological concepts may be abstract (Ramdiah, 2020; Çimer, 2012; Brian & Rosalina, 2007; Kreiser & Hairston, 2007; Sadiah, 2008). Biology is also considered difficult as it is a part of science subjects with concepts, labelled diagrams and various processes that need to be understood. It involves the study of life, the environment, the interaction between life and the environment, and the phenomena associated

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with this interaction (Nordin & Kamar, 2011; Hassan & Osman, 2016). Thus, a game-based learning approach can help with students' confidence. However, a game-based approach in the STEM field to in stil twenty-first-centuryskills is rarely seen (Siong & Osman, 2018). On the other hand, the diversity of approaches, strategies and pedagogical methods including the game-based approach, should be emphasisedin the T&L process for biology education in the classroom. However, it is a significant problem for many new instructors who lack expertise in student-centred classrooms to adopt an enjoyable games-based strategy in the classroom. In student-centred learning settings, students still need resources, assistance, direction and training to improve their knowledge and abilities (Patman & Abdullah, 2021).

Objective Of Research

This study was undertaken to satisfy the researchers' demand for information to develop a game-based module for KSSM biology instruction and learning. Before the creation and evaluation of a module, its prerequisites are determined by an analysis of requirements (Saedah et al., 2013). Consequently, the goal of the needs analysis phase is to collect data that may be utilised to develop a module that fits the needs of educators. In other words, the purpose was to define the prerequisites for a module that may be used by educators using a game-based approach to KSSM biology instruction and learning in the classroom. Based on this aim, the purpose of this study was to determine the answer to the question: What is required to develop a viable module for use by instructors using a game-based approach to KSSM biology teaching and learning in the classroom?

Teachers must meet minimum qualification criteria and assess the needs of their pupils. Guidance in the form of an instruction programme must be designed to increase teachers' understanding; teachers may then modify student-centred learning to the required standard. To reach the criterion, teachers need proper direction so they can apply adaptable game strategies (Farihah & Norawi, 2021; Jamel et al., 2019). In the scientific curriculum paper, it is suggested that instructors teach science using a variety of engaging activities and methods (MOE, 2015). The agreement does not, however, specify how this teaching and learning process should be carried out. Therefore, a requirements analysis should be conducted to determine the teaching and learning strategies that should be included in the programme.

METHODOLOGY OF RESEARCH

This research interviewed four different Ministry of Education (MOE) biology teachers from various schools using a semi-structured interview technique. Norlidah (2010), as well as Ali and Mahamod (2015), employed this technique to collect data for a needs analysis before developing a physics pedagogical module and a pre-school Malay language module, respectively. To undertake a sample selection procedure, respondents from homogenous groups who could supply various information were purposely selected. The respondents were chosen based on the fact that they were biology teachers in schools, had bachelor's or master's degrees, and had at least five years of experience in teaching. Table 1 displays the demographic details of this study's respondents:

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Table 1: Demographic Information

Respondent`s Code	Working Place	Level of Education	Teaching/Working experience (years)
T1	A1	Degree	19
T2	A2	Degree	25
T3	A3	Degree	22
T4	A4	Master	12

The interview method was tested before the real interviews took place to anticipate the questions that would give greater information. To do this, respondents who shared the same characteristics as the individuals in the research sample were interviewed to determine whether or not the questions were appropriate. Following this pilot research, the questions were simplified and improved. In the actual study, the revised questions were employed. A transcript of each interview was created after it was recorded. As soon as the interviewing and data collection phases of the actual study were completed, the researchers created the transcript and sent it to the participants for evaluation. After examining the transcript, respondents filled out an interview confirmation form to certify the interview materials. Atlas.ti version 8 software was used to evaluate the validated interview transcripts. The transcript analysis was done thematically with each respondent receiving a unique labelling code. Deductive coding methods were used to categorise, subcategorise and evaluate the data from the interviews based on the themes presented (Miles & Huberman, 2014). The flow chart for the qualitative analysis for this study is shown in Figure1.

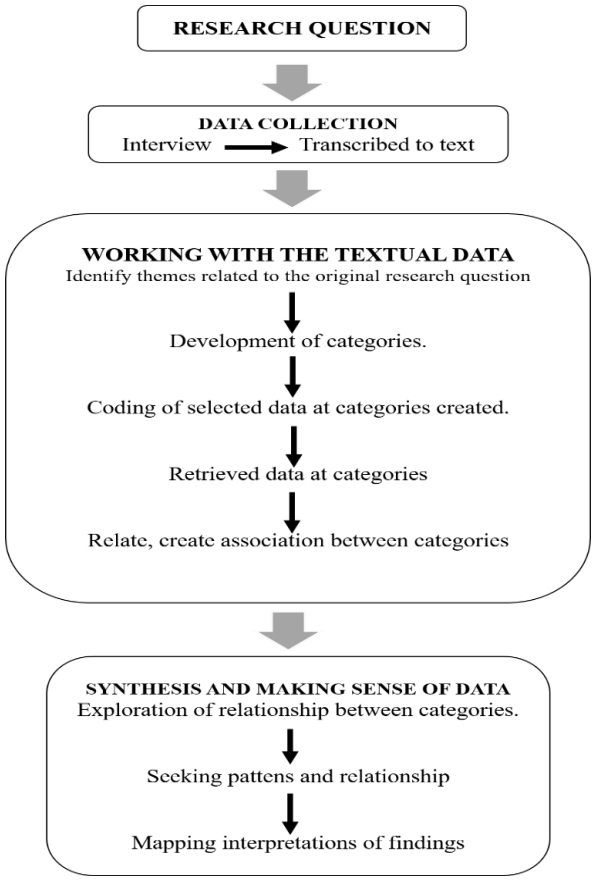

Figure 1. The Flowchart Depicting the Study's Qualitative Analysis

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FINDINGS AND DISCUSSION

Theme 1: The importance of the topics of the Chemical Composition of cells, as well as Metabolism and Enzymes

The Chemical Composition of Cells and Metabolism and Enzymes are two basic topics taught in Form 4 Biology. The two topics have three main objectives: (1) analysing water, carbohydrates, proteins, lipids, and nucleic acids, (2) understanding metabolism, and (3) understanding enzymes and their applications in daily life. The water structure and function, carbohydrates, proteins, lipids, nucleic acids, metabolism, and enzymes are introduced to explain the chemical makeup of cells and metabolism. From the interview sessions, two codes appeared concerning this theme: the importance of the chemical composition of cells and metabolism and enzymes, as well as the basic concepts and applications.

All four teachers agreed that the Chemical Composition of Cells and Metabolism and Enzymes are basic concepts that the students need to understand so that they can learn more advanced topics. This is because biology is the study of living beings, and the response of the body is an important concept that must be understood so that the students have a clearer picture as this topic is connected with others besides being required for the students to continue their studies. Quoting teacher T1, “This topic is a new thing to be learned and important because it involves metabolism with enzymes”. Teacher T2 added, “These two topics are interconnected, then pupils need to have strong chemical knowledge. Although the topics are hard for them”. In this regard, Teacher T3 agreed that this topic is important for students to continue their studies. Teacher T4 supported this statement by saying that students find it difficult to understand the topic of the Chemical Composition since it involves reactions. Students must understand chemical reactions in the body to facilitate a deeper understanding of other topics and advancewith their studies, despite the topics being difficult.

Theme 2: The challenge of the topics of the Chemical Composition of Cells and Metabolism and Enzymes

There are many challenges faced by students in learning biology. Different perspectives were stated by the four teachers on the challenges faced by biology students. Under this theme, six codes emerged: ‘the terms are difficult’, ‘diverse intelligence’, ‘less prominent’, ‘less confident’, ‘application’, and ‘student attitude’.

From the analysis, many related quotes were found that touched on the theme of ‘difficult terms’ and the theme of ‘less understanding’. As Teacher T2 said, “Students cannot describe the reaction that occurs in the body”. This statement was supported by two of the other teachers, who stated that the topic of the chemical composition is difficult for the students to understand. According to Teacher T2, students find it hard to understand the topic as they do not like chemistry. A lack of thinking skills is also a barrier to students’ mastery of this topic. Accordingto all four teachers, most students cannot apply their existing knowledge, thus making it difficult to complete the tasks given. Typically, students simply memorise sentences from their textbooks and teachers’

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notes and are unable to give further clarification in their own words using their understanding. In addition, pupils find it difficult to analyse the information provided to produce satisfactory answers. For example, Teacher 2 answered that students do not like chemistry and that he did not know their interests. He added that pupils face difficulties in explaining the chemical reactions that occurred. The students' attitudes also lead to challenges in teaching and learning about biology. For example, students are afraid to learn by showing a negative attitude towards the lesson.

Three of the teachers agreed that students' attitudes influence how they study and understand the topic. All the teachers agreed that student-centred activities such as twenty-first-century learning have the potential to strengthen students' understanding. However, Teacher T2 remarked on "the use of textbooks that have limited pages to help strengthen student understanding". Therefore, there are constraints on time and resources, meaning that the teachers failed to deliver various activities in the classroom. Teacher T2 added that teachers have to complete the teaching plan within a specified time.

Theme 3: Teaching Strategy

The responses on the theme of the teaching strategy were coded with three main codes: 'teacher-centred', 'student-centred' and 'teaching aids'.

All the teachers agreed that tools are important when teaching this topic to students. As Teacher T2 said, teachers prefer hands-on activities involving students. However, Teacher T2 acknowledged that the use of the existing textbooks limits student activities. Teacher T3 mentioned that teachers need to provide the complete material for the topic when using the model. The teachers carried out demonstrative activities to improve the students' understanding. Hence, it can be suggested that teaching aids are important. In this regard, all the teachers agreed that teachers should play a positive role in carrying out activities. Teacher T3 stated that teachers need to teach the students techniques for answering questions so that they can successfully answer questions later to demonstrate what they have learned. Teacher T2 also said that teachers need to act as facilitators for students. Teacher T2 supported the idea of having a diversity of teaching methods, such as giving examples of things that have been achieved by students during the teaching and learning process. Teacher T1 always use independent exploration approaches in group activities and then assign pupils to presentation activities. This coincides with twenty-first-century learning strategies such as 'Gallery Walk' and 'Three Stray, One Stay'. Teacher T4 supported the idea that students should be encouraged to play a role in the teaching and learning session. According to Teacher T3, the students' understanding should be tested with quiz-type questions and by answering questions that are submitted. All the teachers agreed that teachers and pupils should work together toward success to help students experience real-life situations. Through learning activities, students can apply the concepts taught and understand the real phenomena that occur in the topics of the chemical composition of cells and metabolism and enzymes.

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Theme 4: The desire for improvement

In the interview sessions, all four teachers voiced their desire to make improvements in the teaching of the chemical composition of cells and metabolism and enzymes. This desire can be summarised into two categories, namely active learning and innovation. Under the Active Learning Code, three of the teachers agreed that pupils should be encouraged to work in a group, as questions are rarely raised during teaching except during experimental activities. Submitting questions can help teachers to measure two dimensions: the students' interest and their level of understanding. Meanwhile, experimental activities and groups encourage studentsto communicate and work with their peers. As Teacher T2 said, "The instructor should also play an important role in engaging in teaching pupils while carrying out active learning tasks".

All four teachers agreed that the active involvement of all students under the Active Learning Code can enhance understanding. As one of them said, "I diversify activities to enhance students' understanding". This was supported by Teacher T2, Teacher T3 and Teacher T4 whoagreed that most students can understand the Chemical Composition of Cells and Metabolism and Enzymes through a comprehensive engagement. From the perspective of all four teachers,it seems that this chapter is very important for the students to master so that they can understand the concepts and terms of biology and apply this basic knowledge to link further topics. The main challenge faced by pupils is the illustration of biological processes, especiallythose on a molecular scale. For this reason, educators must work with different strategies andare willing to innovate in education so that their teaching would be more meaningful. However, challenges on cost and time consumption must be overcome if teaching materials are to be provided. Technical problems such as weak internet access also prevent teachers from using technology in the classroom. According to the four themes that emerged from the interviews, different teaching modules are required to ease the teaching and learning process in biology for both educators and students.

Theme 5: Technology

In the interview sessions, three of the teachers stated that they were positive about accepting technology with frequent use in teaching and learning sessions. In this regard, all the teachers stated that the purpose of using technology is to attract students, encourage understanding by enabling them to see chemical structures more clearly and give clear and realistic explanations for the student's understanding.

Discussion

This study began with a requirements analysis that generated critical data on biology teachers' current practises and views towards the use of game-based learning in secondary school teaching and learning. The instructional module's content will be prepared and decided based on the findings of the needs analysis. At this point, the potential causes of performance discrepancy and the instructors' suggestions for improvement become design and development considerations for the product. Several reasons and types of remedies for human performance issues can be found during

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the analysis stage (Gagne et al., 2005). Based on the findings, resources and instructional materials for teaching about the chemical composition of cells and metabolism and enzymes are needed. Teachers in school do not have much time to develop the instructional resources that would make their classes more engaging and entertaining. Besides, teachers are unaccustomed to new approaches to teaching and continue with their usual routines in the classroom. All four respondents agreed that mobile game-based learning is very suitable for teaching and learning in schools, but they preferred traditional teacher-centred strategies such as drills, lectures and reading from textbooks to cover large portions of the curriculum and improve students' examination results.

According to the Malaysian Teacher Standards (MOE, 2009) for Form 4 students, teachers should use a variety of techniques, methods and tactics to perform teaching and learning activities. By following a game-based approach, the instructional module to be created in this project will help teachers to enhance their knowledge and skill in teaching biology. Teachers'ability to enhance their teaching talents will, however, be determined by their motivation, which drives learners in reaching learning goals (Filgona et al., 2020).

CONCLUSION

An examination of needs requires experts to obtain information from teachers who are also the target clients for the module for the specific situation and scenario of the investigation. With regards to this study, the researchers have gathered data on the current routines followed by teachers and on their demands, to help them develop a suitable module for dealing with the current difficulties faced by educators. The results of the requirements analysis indicate that a module using a game-based approach should be developed to aid instructors in enhancing their science teaching and learning process. The findings indicate that the majority of instructors feel that a game-based approach is applicable and advantageous for pupils. Due to particular restrictions, however, teachers rarely use this method in the classroom.

The findings show that, even though they know the advantages of using game-based techniques in biology instruction, most teachers do not implement it. Educators seldom employ this approach because of factors such as a lack of resources, poor game materials, a lack of organisation and time constraints. To address the concerns raised by educators, resources in the form of modules should be produced to improve their knowledge and abilities in planning and directing biology teaching and learning that is more proficient and tailored to the requirements of the students. Good instructional materials, according to Branch (2009), are those that improve students' capabilities through improving their knowledge and skills.Considering the findings of the requirements analysis, the process of developing the module should include perspectives that help educators improve their knowledge and skills, such as approaches to meeting learning objectives. In addition, the teaching activities in this module should include characteristics that assist educators to enhance their ability to utilise instructional materials, encourage students to concentrate and follow learning activities, as well as to supervise students in small groups. The findings also indicate that instructors need resources and instructional materials in the form of

modules that explain how to teach and learn. This instructional guide should include engaging games and activities for teaching and learning, taking into account the students' level of knowledge. In summary, the module created should consider suggestions and criteria such as being simply accessible, having explanations for teachers on how to give instructional aids and having instructions for how the games are played. Teachers also suggested that this module should contain examples of daily lesson plans, ideas for game activities and explanations of various types of games. It is impossible to emphasise the significance of a needs analysis in gathering information on the content and details of the module to be developed. According to the outcomes of the research, a biology-teaching and learning module using a game-based method should be developed with the concerns and needs of instructors in mind, so that the end output becomes suitable for them. According to Gagne et al. (2005), the analysis phase finds several causes and solutions for teaching problems. As a consequence, when the requirements research process is complete, analysts should be able to choose the sort of training that will solve the challenges and provide techniques based on correct data to ensure the training is as successful as feasible (Branch, 2009). The conclusions of this requirements analysis will serve as a reference for module design and development in the subsequent phase of the improvement process. A game-based approach module for teaching and learning biology has the potential to be created and exploited by biology educators in schools, according to the findings of the needs analysis.

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