I-BIODIVERSITY WITH INAQ (I-BIODI) : E-LEARNING PLATFORM FOR FOUNDATION STUDENTS IN UNIVERSITI SAINS ISLAM MALAYSIA

Halimaton Sa'adiah Ariffin[i], Aiza Azrin bt Mohd Zain[ii], Noorrezam bin Yusop[iii], Nur Ilyana Ismarau Tajuddin[iv], Nurasyikin bt Abd Rahman[v] & Siti Khadijah bt Togin[vi]

[i] (*Corresponding author*). Guru Tamhidi, Pusat Tamhidi, Universiti Sains Islam Malaysia. halimaton@usim.edu.my

[ii]Guru Tamhidi, Pusat Tamhidi, USIM. aiza@usim.edu.my

[iii] Senior Lecturer, Faculty of Information and Communication Technology, UTeM. noorrezam@utem.edu.my

[iv] Lecturer, Pusat Tamhidi, Universiti Sains Islam Malaysia. nur_ilyana@usim.edu.my

[v]Guru Tamhidi, Pusat Tamhidi, Universiti Sains Islam Malaysia. nurasyikin@usim.edu.my

[vi]Guru Tamhidi, Pusat Tamhidi, Universiti Sains Islam Malaysia. ctkhadijah.togin@usim.edu.my

Abstract

The use of information and communication technology in the world of Education continues to develop various strategies and patterns. In higher education, e-learning is gaining more impact in teaching and learning that can be practiced in many ways. The advantages of developing and implementing e-learning in education increased learning effectiveness and flexibility, and much easier for teachers and students. Biodiversity is one of the Biology's topic that need a lot of reading to be memorize by students. This innovation aims to develop a web-based system by using wix.com known as Interactive Biodiversity with INAQ (i-BioDi). INAQ is the Integration of Naqli and Aqli, also included to the related contents with the interactive learning memorizing tools such as mind maps, videos, and games. This website will be used as a hub for the biology subject for foundation students in Universiti Sains Islam Malaysia (USIM). While we acknowledge the importance of memorizing at this level of study, we have tried to focus our approach more toward understanding and explaining the rationale underlying many concepts of Biology. This website can also become a suitable reference for Malaysian Matriculation Programme, Sijil Tinggi Persekolahan Malaysia (STPM), and A-Level as well as any other pre-university Biology course. In this innovation, the Rapid Application Development was adapted as the development methodology. By using this interactive learning website, it will be more enjoyment and can helps the students to memorize using the interactive learning tools, learn and study the contents of the topic with element of INAQ.

Keywords: Web-Based System, Interactive, Biology, Biodiversity, Rapid Application Development, Naqli and Aqli Knowledge.

INTRODUCTION

E-learning, short for electronic learning, is a revolutionary educational approach that harnesses the power of digital technology to deliver engaging and effective learning experiences. It encompasses a wide range of online tools, platforms, and resources that

facilitate learning and skill development beyond the confines of traditional classrooms. With the rapid advancement of technology, e-learning has become an integral part of modern education, revolutionizing how people of all ages access and acquire knowledge (Donahoe et al. 2019). E-learning platforms have revolutionized the landscape of education by offering a wide array of benefits that contribute to enhanced learning experiences and opportunities (Affouneh et al. 2020). E-learning takes many forms, including interactive multimedia presentations, video lectures, simulations, virtual labs, online quizzes, and discussion forums. These tools not only enhance the learning process but also cater to different learning styles, ensuring that information is comprehensible and engaging for a wide range of learners (Jaafar et al. 2022).

One of the foremost advantages of e-learning platforms is their inherent flexibility. Learners can access course materials, lectures, and resources at their own pace and convenience, accommodating various learning styles and schedules (Jaafar et al. 2022). This convenience is particularly valuable in today's fast-paced world where individuals juggle multiple commitments. Moreover, e-learning platforms transcend geographical barriers, enabling students to engage with educational content from virtually anywhere. This accessibility fosters inclusivity, making education available to those who may have faced challenges attending traditional in-person classes due to distance or other constraints.

The interactive nature of e-learning platforms further engages learners through multimedia elements such as videos, simulations, and interactive quizzes. This dynamic approach not only enhances comprehension but also caters to diverse learning preferences (Affouneh et al. 2020). Additionally, e-learning often promotes self-directed learning and critical thinking as students take more responsibility for their education, navigating through modules and engaging actively with the material. E-learning platforms also allow for efficient tracking and assessment of progress. Instructors can monitor individual performance and adjust teaching strategies accordingly, while learners can gauge their own advancement and areas for improvement. Furthermore, collaborative features, such as discussion boards and virtual group projects, facilitate peer interaction and knowledge exchange, simulating the social aspect of traditional classrooms and nurturing a sense of community among learners.

In essence, e-learning platforms offer a dynamic and accessible approach to education, catering to the diverse needs of modern learners. Through their flexibility, interactivity, inclusivity, and cost-effectiveness, these platforms empower individuals to embark on personalized learning journeys, shaping a more versatile and adaptable educational landscape.

However, e-learning also comes with its own set of challenges, such as ensuring equitable access to technology, maintaining engagement and motivation in a virtual environment, and addressing issues related to assessment and authenticity.
It's essential to keep in mind that the landscape of e-learning is continually evolving, so some of these challenges might have been addressed or changed since then. Nonetheless, here are some common issues:

- **Technical Issues**: Technical problems can impede the learning process, especially for students who do not have access to reliable internet connections or suitable devices. Those in some rural areas are not even connected to the national grid. This limits access and usage of e-learning resources for biology students within the college and outside. (Lauratu, 2021)

- **Digital Literacy:** Students and even some educators might not be adequately familiar with the digital tools and platforms used in e-learning, leading to difficulties in navigating the online environment and utilizing available resources effectively. (Supratiwi et al., 2021).

- **Lack of Hands-On Experience:** Biology courses often involve hands-on laboratory work and discussions that can be challenging to replicate in an online setting. The absence of physical interactions and face-to-face discussions may hinder students' ability to engage deeply with the subject matter. Students may miss out on critical learning opportunities without direct access to lab equipment and experiments. (Aung & Khaing, 2016)

- **Engagement and Motivation:** E-learning may require higher levels of self-motivation and discipline, and some students may struggle to stay engaged and focused without the structure of a traditional classroom. (Esra Meşe, 2021)

- **Limited Interaction and Engagement**: E-learning platforms can sometimes lack the interactivity and engagement needed to keep biology students motivated and interested. Passive learning experiences, such as reading static texts or watching videos, may not be sufficient to fully grasp complex biological concepts. (Atmojo & Nugroho, 2020; Purwanto et al., 2020; Putri et al., 2020).

- **Assessment Challenges**: Effective assessment is crucial for evaluating student understanding and progress. Creating reliable and fair assessments in an online environment can be difficult, and there is a risk of cheating and plagiarism. (Gillett-Swan & Jenna, 2017)

- **Content Quality:** online learning becomes boring. Although online learning is meant to provide a solution to the boredom of classroom-based learning, this is not always the case. Many e-learning courses consist of never-ending texts followed by a long list of multiple-choice questions that fail to engage students. More than e-learning, it feels like e-reading. (Sari, 2021)

- **Motivation and Time Management**: Self-paced e-learning can require strong self-discipline and time management skills. Some students may struggle to stay motivated without the structure and accountability of traditional classrooms.
(Zhu, M., Bonk, C. J., Berri, S. ,2022)

Addressing these issues requires a combination of technological solutions, pedagogical adjustments, and supportive policies to ensure that e-learning in biology courses is effective, equitable, and engaging for all students. Educators and e-learning platforms are continuously working to address these issues by implementing innovative technologies, improving content quality, and enhancing interactive features. Additionally, the integration of virtual labs, simulations, and real-time collaborations can help to bridge the gap between traditional and online biology education.

Literature Review (Previous Research)

Research by Nurlia Zahara & Rizky Ahadi (2022) implemented of e-learning as a media for biology learning by high school teachers in bireuen district. The study focuses on the integration of e-learning into biology education by high school teachers in the Bireuen District. The aim is to investigate the implementation of e-learning as a teaching tool in biology classrooms. The research likely includes examining the attitudes, challenges, and experiences of teachers as they adopt e-learning methods. The findings could offer insights into the effectiveness and feasibility of using digital platforms for biology education in this specific region.

Research by Almareta and Paidi (2021) discusses the application of a Learning Management System (LMS) in the field of biology education, specifically focusing on its role in facilitating collaborative learning among biology teachers. The study explores how these educators integrate the LMS into their teaching methods to enhance collaboration and shared learning experiences. The finding shows Moodle can be used by teachers for collaborative learning with the interaction between the teacher and students through the system on Moodle. Forms of learning biology using Moodle, namely quizzes, exercises, group discussions, distribution of teaching material so that there is a collaborative interaction between teachers and students or collaboration fellow students.

Research by Rizqa (2021) examines the impact of technology on biology education, both during and after the pandemic. It discusses the challenges and opportunities associated with using technology to teach biology, highlighting its evolving role in the educational landscape. The study underscores the importance of adapting to technological advancements to enhance biology teaching methods and explores the potential benefits and hurdles in this context. The result explains that teachers have been implementing synchronous learning by using various video conference platforms and asynchronous learning using various types of LMS. Teachers also use various learning media, especially to help them conducting laboratory work.

Applying the integration of Naqli and Aqli (INAQ) in online biology learning can offer several advantages for students who share the Islamic faith or are interested in incorporating ethical and moral perspectives into their scientific studies. Islamic teachings emphasize the concept of creation as a sign of Allah's wisdom and power. Studying biology from an Islamic perspective can lead students to marvel at the intricate design and complexity of life, fostering a deeper appreciation for the natural world. Many biological topics raise ethical dilemmas, such as genetic engineering, cloning, and animal testing. Incorporating Islamic values can enrich discussions on bioethics by introducing alternative viewpoints that stem from religious teachings (Hezefa, 2022). In this study, we chose Biodiversity topic for our website because this topic is very important to be taught. According to Jalil & Mat Sharif (2018), knowledge of the Biodiversity is one of the factor that will influence university students' awareness of Biodiversity conservation. This topic is also integrated with INAQ as it will make students become more responsible to take care of the environment. This is supported by Abdillah, Effendy & Saribanon (2023), who stated that modern science and Islamic teaching on nature conservation have positive impact on the practical level.

Overall, e-learning helps eliminate barriers of communication, provides efficacy of knowledge, and qualifications via ease of access to a huge amount of information. Thus, this research focuses on the development of a web-based system known as i-BioDi to enhance the learning process and skills in biology field for foundation student at Tamhidi Centre, Universiti Sains Islam Malaysia.

METHODOLOGY

i- BioDi was developed using the Rapid Application Development (RAD) approach, utilizing in the Wix.com platform. The primary advantage of the RAD methodology provide its ability to swiftly complete projects, making it an appealing option for developers operating in fast-paced environments such as software development. RAD places emphasis on minimizing the planning stage while maximizing prototype development that is achieveable and called a accleration pace.

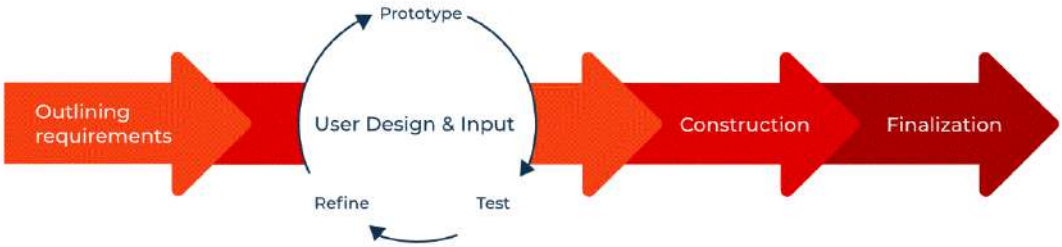

Figure 1: Rapid application development (Source: Creatio.com, 2022)

Figure 1 illustrates the RAD model adapted from creatio.com, consisting of four phases namely 1) initial planning (outlining requirements), 2) user-oriented design and input, 3) construction, and 4) finalization. First, during the initial planning phase, engineers and analysts collaborate to define the system's objectives and gather requirements from client stakeholders. This step aims to address the needs of these stakeholders. Next, in the user design phase, users work alongside systems analysts to craft models and prototypes that accurately depict all system functions, inputs, and outputs. This stage involves software engineers communicating with systems analysts to refine requirements, enabling users to understand, modify, and ultimately approve a functional system model. Subsequently, in the construction phase, programmers take the lead in system programming, encompassing application development and coding. Finally, the initialization phase marks the creation, construction, and deployment of the new system. This phase is also referred to as the finalization phase, during which all components are prepared for use.

RESULTS AND DISCUSSION

The website was developed by using wix.com. Wix is a website builder with easy-to-use tools which enable users to quickly create an online presence via a drag-and-drop interface. Additionally, elements of the interactive tools, such as online laboratory, videos, quizzes, and games will also be incorporated on the website.

i- BioDi will be able to be used in helping students to acquire sufficient biodiversity knowledge in line with the requirements provided by universities. The user interface design gives a visualization of the users interaction with the system. The developed interactive i-BioDi website is easy to access, understand, and use in order to facilitate the e-learning process. i-BioDi is a user-friendly website containing interactive notes, animation, virtual experiment, quizzes, and games for each topic. These interactive tools will help the students to memorize the the contents for each sub topic with fun learn. The combination of these activities can enhance the learning patterns of students.

Figure 2 shows the homepage of i-BioDi platform. This homepage provides the main contains i-Biodiversity information. This homepage also has menu page that

guide student to select the type of kingdom that student prefer to study. The name of kingdom in i-BioDi namely, kingdom of Monera, Protista, Fungi, Plantae, and Animalia.

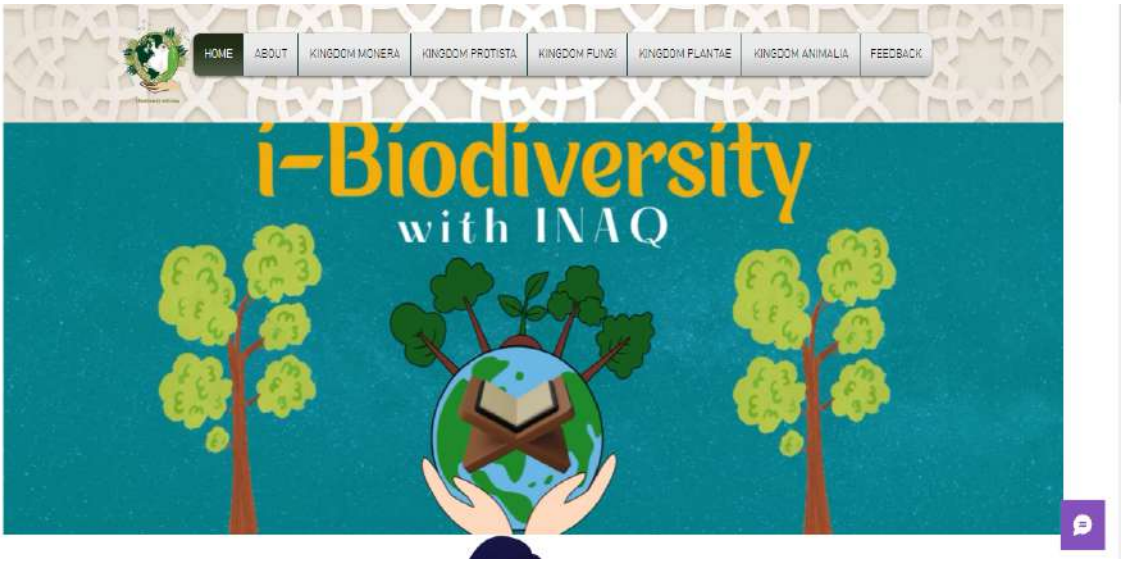

Figure 2: The homepage of I-BioDi

As shown in Figure 3 , students can make real interaction with the Biology lecturers in Tamhidi Centre, Universiti Sains Islam Malaysia through chatting or email.

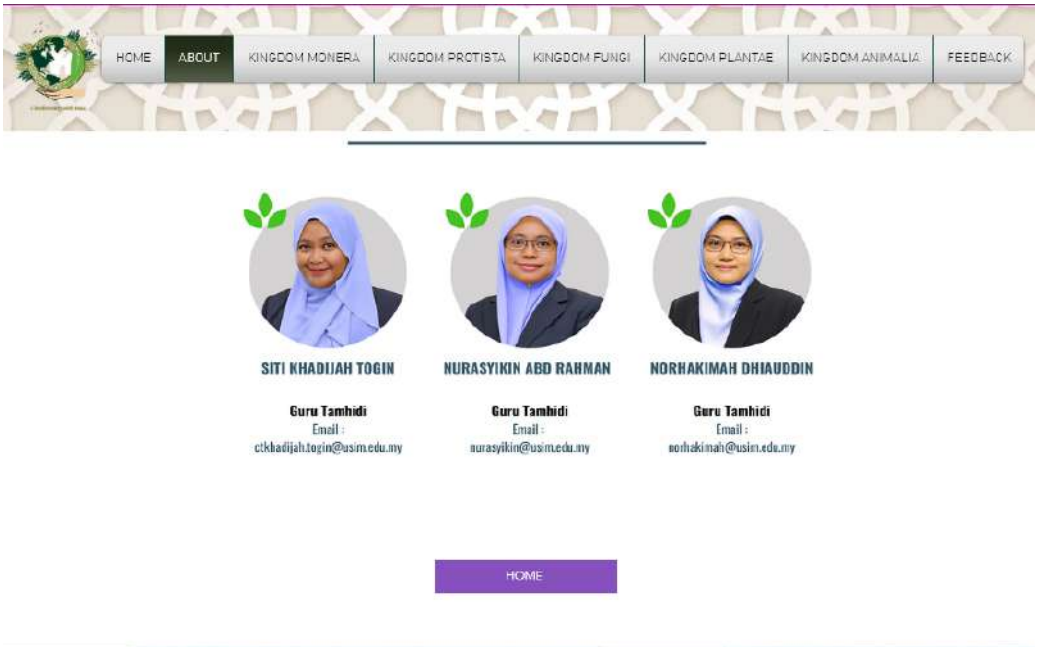

Figure 3: Real interaction with the Biology teachers

Figure 4 shows the flipsnack that provides information for biodiversity. This flipsnack is interpreted in slideshow visualization so student can view in slideshow view.

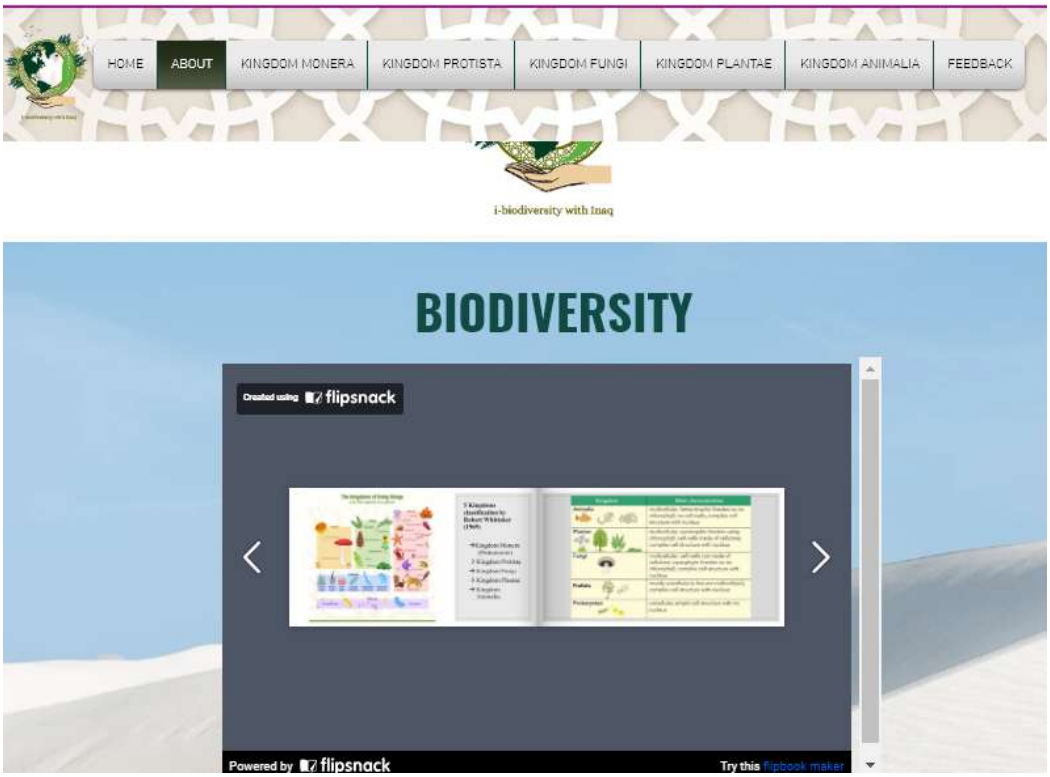

Figure 4: i-BioDi Flipsnack

Figure 5 shows the feedback that allows users give feedback regarding their opinion using this i-BioDi website. The purpose of this feedback is to get their perception of this tool.

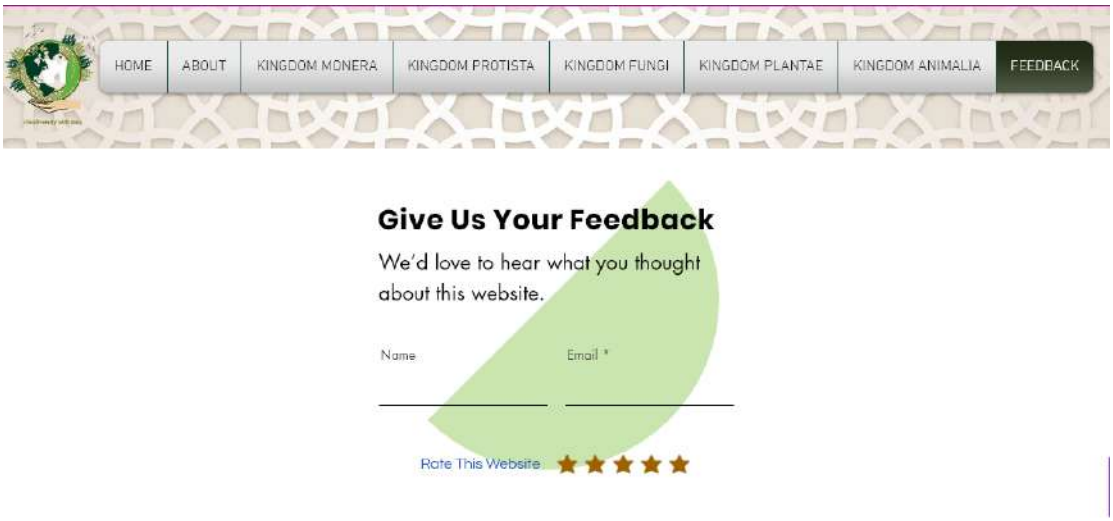

Figure 5: Feedback form

Figure 6 shows the Kingdom Monera page. This kingdom provides the INAQ element which is to accomplish our objective of our research to provide INAQ in Biodiversity topics. All the kingdoms for each menu page are integrated with INAQ elements.

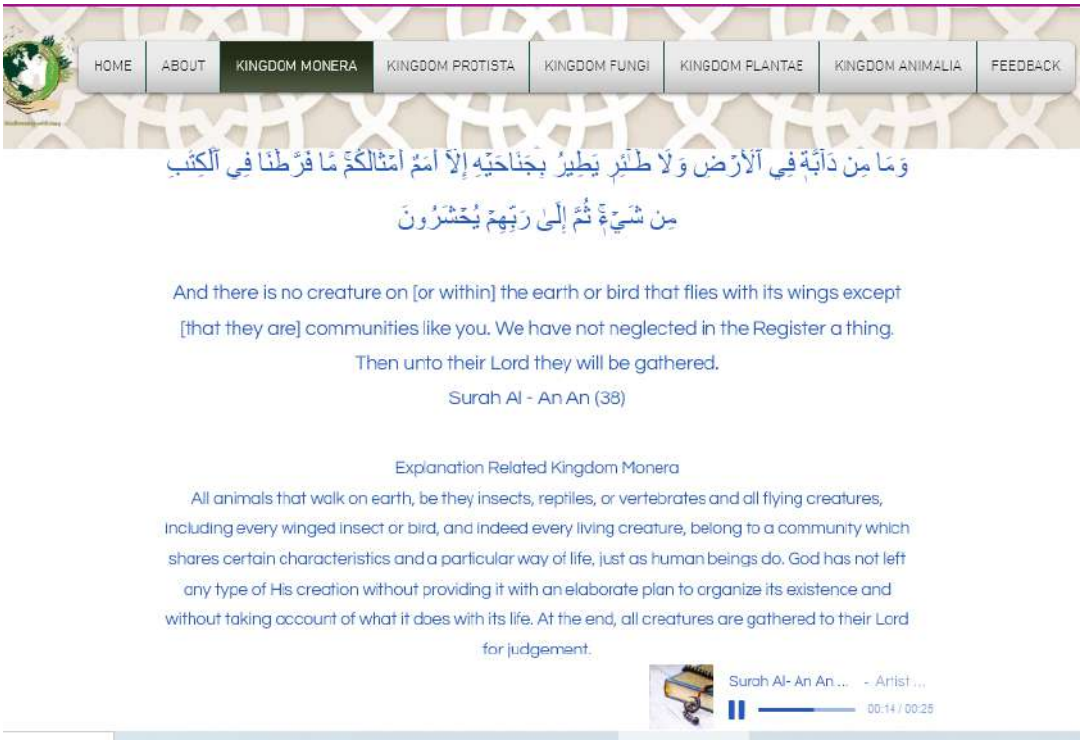

Figure 6: INAQ Element

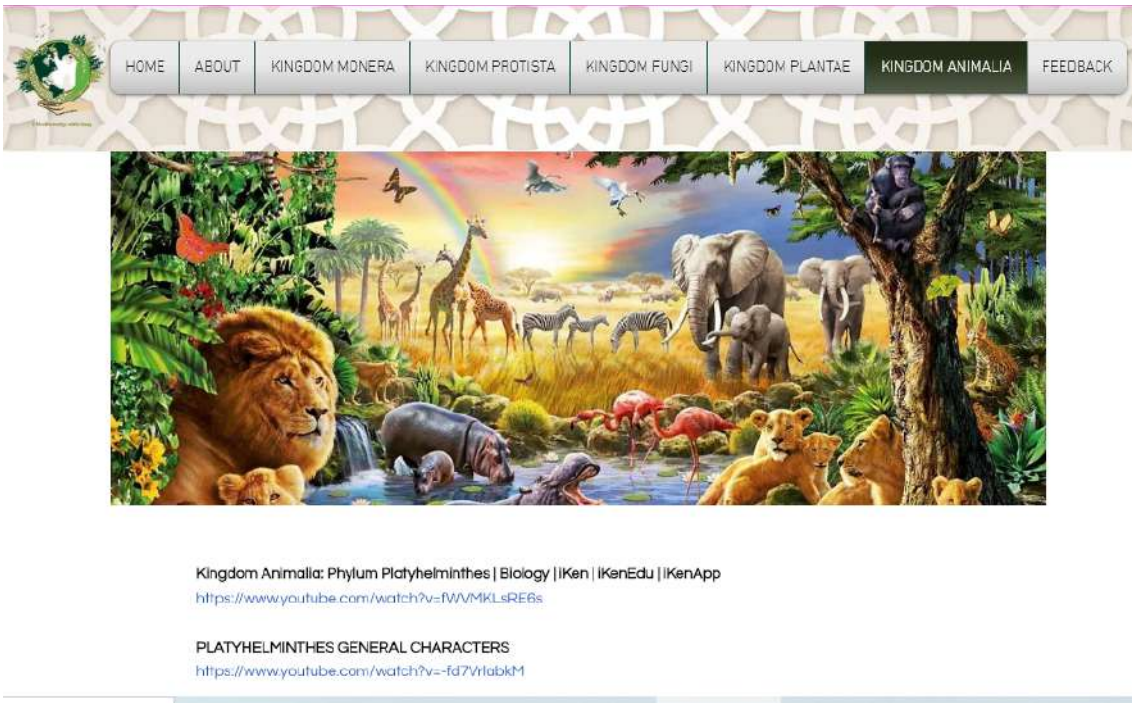

Figure 7: Kingdom Fungi

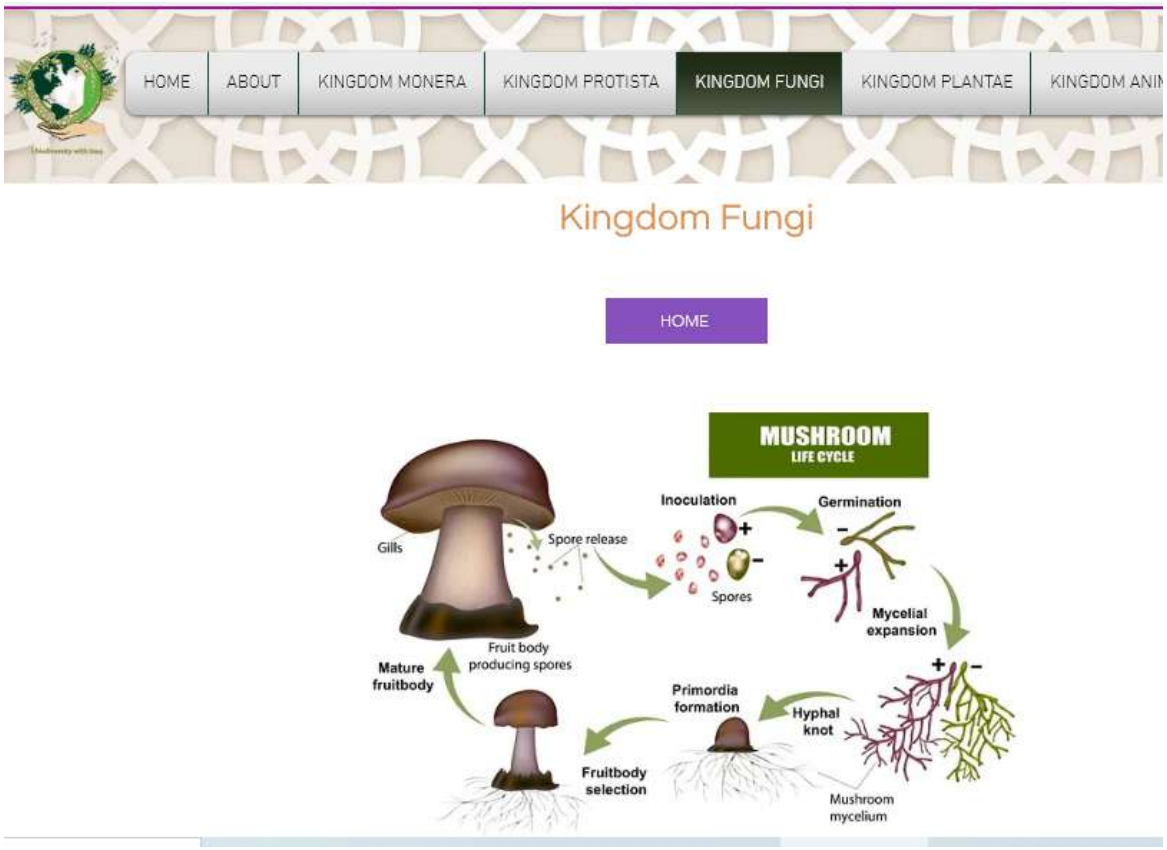

Figure 8: Kingdom Fungi

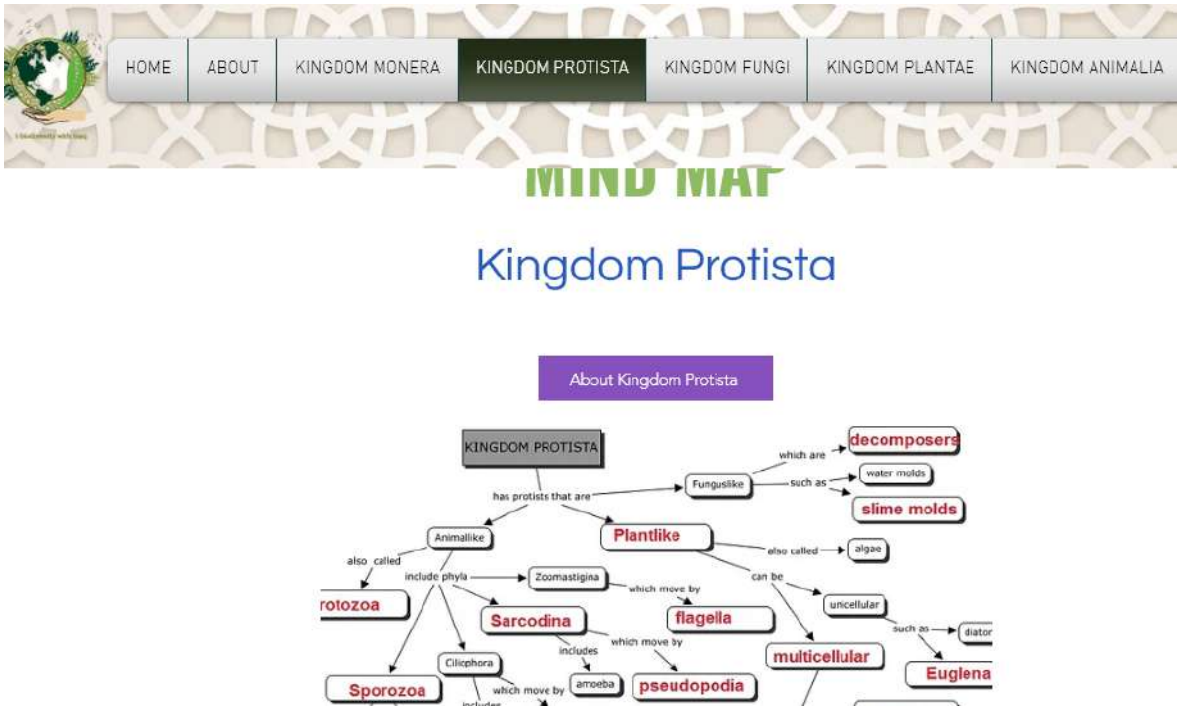

Figure 9: Kingdom Protista

Figure 7,8 and 9 show the information that illustrated for each kingdom, which have descriptions of kingdom, related diagram, and also provided with the mind map for each kingdom.

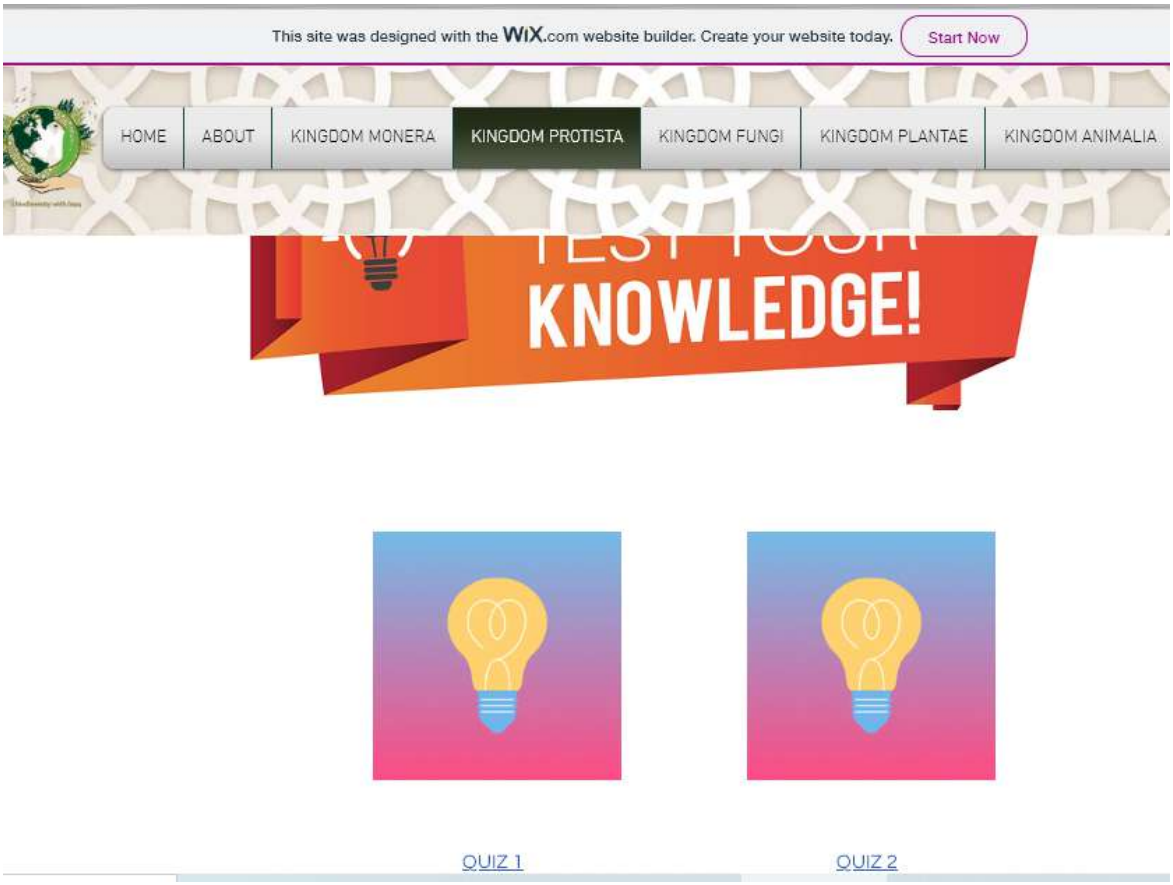

Figure 10: Online Quiz

Figure 10 shows the online quiz provided. Students can do their self-learning practice to test their understanding. There are several quizes were created of each kingdom.

Thus, the uniqueness of the i-BioDi website comes from the integration of naqli and aqli elements related to Biodiversity, which is one of the topic for Biology subject offered at foundation level in Universiti Sains Islam Malaysia. Naqli reveals the source of knowledge that comes from the Quran and Sunnah whereas aqli is a conventional knowledge. The combination of both elements can help to instill islamic values while learning Biodiversity through i-BioDi. This website can also become a suitable reference for Malaysian Matriculation Programme, Sijil Tinggi Persekolahan Malaysia (STPM), and other pre-university biology course.

CONCLUSION

In higher education, e-learning is gaining more impact in teaching and learning that can be practiced in many ways that could increase learning effectiveness and

flexibility, and much easier for teachers and students. Especially in Biodiversity is one of the Biology's topic that need a lot of reading to be memorize by students. Therefore, the purpose of this study to develop a -web-based system using wix.com. To realise this objective, the methodology of Rapid Application Developed (RAD) were developed. Thus, the i-BioDi were implemented that are provide the contents with the interactive memorizing learning tools such as mind maps, notes, videos, quiz and games. This i-BioDi developed to be use as a hub for biology foundation level students in Tamhidi Universiti Sains Islam Malaysia (USIM) and as reference Malaysian Matriculation Programme, Sijil Tinggi Persekolahan Malaysia (STPM), and A-Level that is to improve their memorizing for biology term. Thus, this i-BioDi could be beneficial among foundation student as well as to learn and study the INAQ contents that will be value added in their learning journey.

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