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E-LEARNING TOOL ADOPTION: PERSPECTIVES FROM ECONOMICS AND CHEMISTRY STUDENTS IN INTERNATIONAL AND MALAYSIAN PRE-UNIVERSITY EDUCATION

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Abstract:

Nowadays, higher learning institutions apply various types of online teaching practices. These changes are necessary to concentrate on preparing students with proper communication skills, critical thinking skills and teamwork skills which are requirements to ensure employability. The purpose of this research is to obtain feedback from students on the use of E-Learning tools to assist them to engage better in their learning. The sample size for this study consisted of 200 International and Malaysian pre-university students who were studying Economics and Chemistry. Students' learning experiences were measured using survey questionnaires. The study found that students were more engaged and motivated in their learning with the use of these E-learning tools. In carrying out this research the ARCS model was employed. Based on the ARCS model, findings indicated 85% of the Economics students were more attentive due to the use of the tools and 79% found the use of E-learning tools were relevant. Besides, 85% of students studying Economics were confident in the subject and 66% were satisfied with their learning from the use of the E-Learning tools. As for Chemistry students, 89% indicated that they were more attentive in class and 69% found the E-Learning tools to be relevant. In addition, 70% students studying Chemistry indicated that they were more confident in their learning while 47% were satisfied with the use of E-Learning tools.

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Keywords:

E- Learning, E- Tools, Teaching And Learning, Motivate, Pre-University, Economics, Chemistry

Introduction

The use of E-learning tools has become essential in the delivery of knowledge to students. Due to the pandemic, students learning preferences has changed from the conventional method (teacher centred) to teaching methods which are more interactive. It is known that nowadays, students learn better and show more interest in their studies with the use of E-learning tools such as kahoot, jamboard, blooket, online quizzes and others. E-learning is growing as a promising tool for continuous learning, allowing students to access materials at any time and from any location in the world (Cicchetti & Succi, 2022 and Aziz, Hashim et al. 2019). In today's learning environment it is important that lectures are carried out in an interactive manner whereby students are the active learners with the aid of E-learning tools.

As we know, education is an important tool for sustainable development. Thus, it is necessary to integrate major sustainable development challenges into teaching and learning. To promote long term sustainability, it is important to engage in interactive teaching and learning strategies to encourage students to change their attitude towards learning (UNESCO 2022).

The purpose of this research is to examine the usefulness of these E- learning tools in engaging students in their classroom learning. This research also aims to investigate whether international and Malaysian pre-university students who are studying economics and chemistry are motivated to learn through the application of E- tools. The research questions addressed are:

Do students enjoy learning when using these E-learning tools?
Do students engage better in learning through the use of these E-learning tools?
Do these E-learning tools motivate students to score better in their assessments?

Literature Review

Technology is playing an important role especially in the 21st century to not only professionals, cooperate sectors but to the students and educators as well. The used of basic technology devices has been an important teaching and learning tools in the schools and varsities. Technological devices such as electronic learning (e-learning), mobile learning (m-learning) and digital learning (d-learning) has been helping educators and learners to obtain more advantages from the online platforms that were created using the internet access. The e-learning has been an alternative to the traditional learning in education system. On the other hand, the m-learning has been the combination of both traditional learning and e-learning which allows students to access learning materials and resources at remote area away from classes, (Rashid & Asghar, 2021) education access**.**

E-Learning Definition

Electronic learning or commonly known as E-learning in education is not new anymore and are much more flexible tools for the knowledge delivery at universities. E-learning is an easy way to support one individual learning strategies and to set structural achievements by using

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the internet (Kolloffel & Eysink, 2020). Platforms were available to be access at any time anywhere if students were connected to the internet.

E-Learning Application at University

The method of e- learning allows students to access their assignments or any other activities or even assessment from home or anywhere (Mao et. al., 2020). Students were able to access online courses via the use of technologies such as mobile phones and laptops if internet is available.

E- Learning Evolution

The technology enhancement especially in numerous teaching and learning tools has given a significant impact to the teaching and learning practices at the universities (Smith & Uzuegbunam, 2020). There were various technology aids with multiples properties and characteristics developed for the past one decade to enhance the teaching and learning pedagogies and models (Singh & Mukherjee, 2021).

E-Learning Benefits at University

The used of mobile phones and laptops in varsities has open a new method of teaching and learning. According to Lydia et al., 2023 and Alenezi et. al., 2022, suggested conducting courses using e-learning system as this method would be e-learning system would also save time and energy for students who are facing transportation or physical disability.

E-Learning Adoption

E-learning were widely adopted in many universities and higher education learning system across the world (Alzahrani & Amir, 2020). Many sofwares have been developed and platforms have been created to improve the learning experiences through e-learning. Some of the e-learning include the Kahoot, Educlipper, Thinglink, TED-Ed and Class Dojo (Chauhan et. al., 2021).

E-Learning Tools

There are various online teaching tools available for educators to enhance a more interactive and exciting learning environment such as kahoot, blooket, quizziz, online quizzes and many more (Chauhan et. al., 2021). Educators need to be more innovative and creative to make the learning and teaching more effective for students. To engage students in an effective teaching and learning environment, online learning tool.

E-Learning Positive Impact

Based on numerous studies, e-learning have significant impact on teaching and learning achievement (Dhawan, 2020). According to Nicol & Macfarlane-Dick, 2021, there were variety of feedback from the educators and learners that the post task engagement using e-learning have positive and excellent effects.

E-Learning Feedback Concept

By using the e-learning tools, students were able to get the feedback of their work at the end of the task. Students get to view their marks immediately and can improve are scores by trying again the questions assigned to them. Educators were able to set the questions on certain platforms and design the task based on how they want it to be. These create a flexible way of teaching and learning styles. Educators can set task like multiple choice questions, short answer

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questions, true or false questions and many more to enhance learning assessments (Ramos et. al., 2022).

Theoretical Framework

In this new era, most students lack motivation in studying as they are influenced by the digital world. They would rather spend time playing with their gadgets than pursuing their academic studies. In addition, the transformation from high school education to pre-university studies has also become challenging for some students as they are unable to cope with this. As such, learning using the traditional approach becomes boring and monotonous. Thus, it is necessary to introduce changes in teaching and learning approaches to ensure that students these days are interested in pursuing their higher learning education. One approach to ensure the students are engaged in their learning is through the use of online learning tools. The use of these online learning tools is expected to make students learn better and to become independent learners.

In carrying out this research, the ARCS motivation model was used, which is a motivational design process to assess the motivation of students to use the online learning tools. The ARCS model, developed by John M. Keller, is a motivational design framework that focuses on four key components: Attention, Relevance, Confidence, and Satisfaction (Ithnin et. al., 2023). According to Keller (2016), the attention component comprises a broad range of research on subjects including interest, boredom, and associated issues like sensation seeking, curiosity and excitement. The convenience of use is classified under the Attention category while usefulness is grouped under the Relevance category. As stated by Keller (2016), students' perceptions of how well the needs of the teaching match their objectives, work with their preferred learning styles, and connects to their past experiences are all significant factors in determining the relevance of the material.

The third component of the ARCS model is confidence which is important in ensuring the success of the learners' academic achievement. The use of E learning tools provide confidence to the students in studying their subjects. When students have high levels of confidence, it will facilitate their learning, skills and abilities (Hew Hu et al., 2020). In order to increase the level of satisfaction amongst students, learning process can be stimulated or reinforced (Keller, 2008). According to Ithnin (2023), the level of satisfaction can be viewed as a motivating element that might make students feel more encouraged to use E-Learning resources.

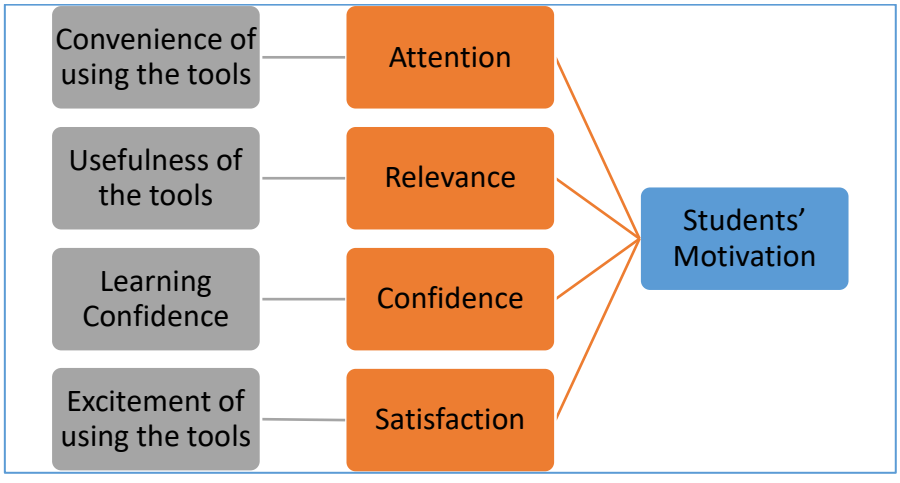

Figure 1: ARCS Students' Motivation Model

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The ARCS model can be applied to the context of E-learning tools to enhance the effectiveness of students' engagement in classrooms. Thus, the use of online learning tools in classrooms were more frequently implemented by the Chemistry and Economics teachers. These E-learning tools such as kahoot, quizzes and blooket were utilised upon completion of each topics for the respective study areas. Besides these tools were also used during revision to prepare the students for their respective assessments. The adaptation of E-learning tools managed to attract and sustain the learners' attention. In addition, students also begin to see the relevance of their learning when they use these E-Learning tools. The immediate feedback obtained when using these E-Learning tools provides confidence to students and ensures that the learning objectives are achieved. Overall, the students gain satisfaction as it creates a positive learning environment.

Methodology

This research focuses on international and Malaysian students who are enrolled in a pre-university programme at a private higher learning institution in the Klang Valley in Malaysia. The respondents consisted of International and Malaysian students who were enrolled in Chemistry and / or Economics subjects. These respondents consisted of semester 1 and semester 2 students.

The lecturers teaching the two subjects incorporated a blended learning approach which involved teaching the lesson and employing various E-learning tools such as kahoot, blooket, jamboard, online quizzes and others to test their understanding upon completion of each topic. The structure this pre-university programme requires students to bring their own device for classes. This ensured the smooth implementation of E-learning tools during the lessons. According to Çetin and Solmaz (2020), the bring your own device (BYOD) model, whereby students bring their own devices will lead to new creative methodologies and this would help to overcome the problems arising in classroom management.

Since the structure of the pre-university programme involves the use of E-Learning tools, it was important to obtain feedback on students' perception on the use of these tools. The research questions were designed based on the objective of understanding how students studying Economics and Chemistry felt about using these E-Learning tools. The first research question was designed to obtain feedback if students were enjoying their learning. This would indicate that student's attention is captured and they are engaged in classroom learning. The research also intended to study if students found relevance in the use of these tools and were the tools convenient to use. This led to the construction of the second research question Do students engage better in learning through the use of these E-learning tools? Finally, the research intended to identify if student's satisfaction in using the E-Learning tools which led to the third question Do these E-learning tools motivate students to score better in their assessments?

Data Collection

The total sample size for this research was 200 students and the participants were chosen based on how well they fit the parameters of the research questions and aims. The sample of 200 respondents consisted of 100 respondent who were Economics students, and another 100 respondents were Chemistry students. To protect the respondent's privacy, their identity was kept confidential. Data was collected via google forms using a five Likert scale questionnaire which were divided into Part A and Part B. Part A of the questionnaire was to collect demographic characteristics of the respondents such as age, nationality and subjects enrolled.

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On the other hand, Part B of the questionnaire was to collect information on their preferred E-learning tools, the ease of using the E-learning tools, the usefulness of the E-learning tools, their confidence of using the tools and others. The link for the survey was given to the respondents during class time and they were given about 10-15 minutes to complete the form. The table below provides sample of questions which were developed to collect information from the students.

Table 1: Sample of Questions to Collect Data

Questions	Category
I found it easy to use these E-learning tools	Attention
The topics taught in class were more interesting using these learning tools	Relevance
I found the E- learning tools effective in making me understand the lessons	Confidence
My grades have improved after using the E learning tools	Satisfaction

Demographic Information

From the data collected, the demographic information of the students was presented according to subjects in the table below:

Table 2: International and Malaysian Students Demographic Information for Economics

Economics				
Age			**Nationality**	
18 years	**19 years**	**Others**	**International**	**Malaysian**
54%	**13%**	**33%**	**21%**	**79%**

Based on the Figures above, for the subject of Economics, 54% of the respondents were 18 years of age, 13% were 19 years and 33% consisted of others. From the sample of 100 respondents for Economics, 79% were Malaysian students while 21% were International students.

Table 3: International and Malaysian Students Demographic Information for Chemistry

Chemistry				
Age			**Nationality**	
18 years	**19 years**	**Others**	**International**	**Malaysian**
47%	**25%**	**28%**	**15%**	**85%**

As for Chemistry, 47% were18 years of age, 25% were 19 years and 28% consisted of others. There were 85% of Malaysian students and 15% were International students.

Types of E-Learning Tools

The use of E-Learning tools is essential in getting students to engage in their learning. In the past, most students were very receptive to the conventional method of learning which consisted mostly of a one-way interaction in the classroom. However, with the introduction of learning technology, students are more receptive when there are various E-Learning tools used to

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enhance their understanding. They learn to be more interactive in class. E- Learning can be defined as instruction delivered on a digital device such as laptop, computer or smartphone which aims to support learning and skills which is relevant to work performance (Clark & Mayer, 2023). According to Almarabeh et al., 2020 E-learning is the technique of getting access to the online teaching and learning resources using information and communication technologies. The chart below presents the types of learning tools used during classes throughout the semester according to the respective subjects.

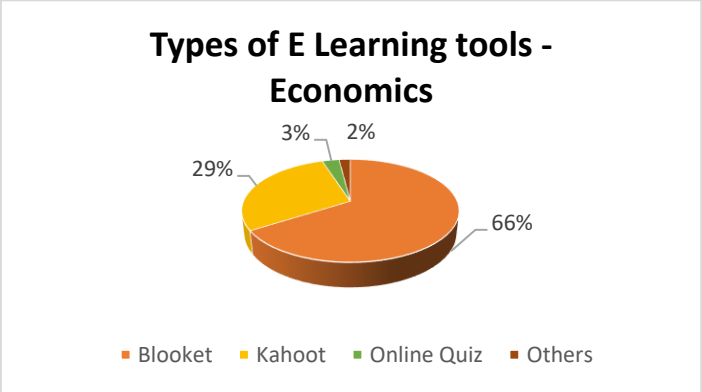

Figure 1: Types of E-learning Tools Used by Economics Students

It was discovered that 66% of students studying Economics preferred blooket, 29% selected Kahoot while 3% and 2% of the students liked online quizzes and others respectively.

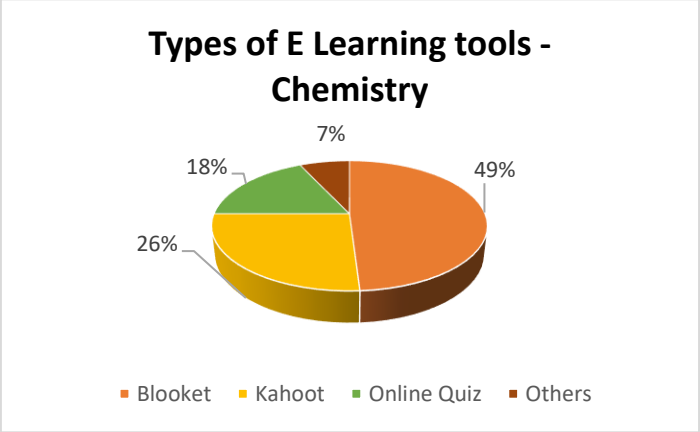

Figure 2: Types of E-learning Tools Used by Chemistry Students

As for Chemistry students, 49% preferred the use of blooket while 29% liked using Kahoot. In addition, 18% were interested in online quizzes and 7% of the students preferred other online tools used. A brief description of the E-Learning tools used in Economics and Chemistry classes is provided below.

- Blooket

Blooket is a web-based quiz game platform which can be played as a team or solo. Teachers can create question sets and start the games while the students can join the game by using the code generated. Students use their devices to respond to questions in real time. There is a wide

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range of game modes to choose from, providing visually pleasing games to play during class time.

- Kahoot

Kahoot is a game-based learning platform which consist of multiple-choice quizzes that is generated by the user. As stated by Chen & deNoyelles 2020, kahoot temporarily transforms the classroom into a game show whereby the teacher becomes the host, and the students are the competitors. This game-based learning makes learning more interactive and fun for students.

- Online quiz

These online quizzes are carried out through the m-learn platform whereby students are given between 5 to 10 minutes to answer the questions. The students get to know their performance for the quiz immediately and they can check for the correct answer if they have gotten an answer wrong. Some of these quizzes could involve watching a video before answering the questions.

- Others.

Other tools such as jamboard, quizziz were used during the class. However, these tools were not frequently employed in class. For example, jamboard is a tool available through Gmail whereby the teacher can create open-ended questions and post the link to the students in class. Students can respond to the questions and their identity is anonymous.

These variety of E-learning tools have made classroom learning more engaging for the students and the teachers. Students are more alert and responsive during the lessons. Throughout the semester the teachers teaching Chemistry and Economics noted that students themselves would request to play these online games during the class time as they feel that the use of e-tools has led them be more engaged with the subjects.

Findings and Discussions

This section will discuss the detailed findings of the analysis on students' perceptions regarding the use of E-learning tools. The findings have been divided into three sections which are students' satisfaction, relevancy and confidence level. Students' satisfaction level was evaluated based on the students' enjoyment in using the e-learning tools and the convenience that e-learning tools provided. Relevancy was measured by the usefulness of the tools in enhancing students' learning. Confidence level was measured based on how confident the students are in using these tools. For every category, the findings have been presented based on the subjects as well as according to nationality by subjects.

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Satisfaction (Enjoyment Of Using The Tools)

By Subject

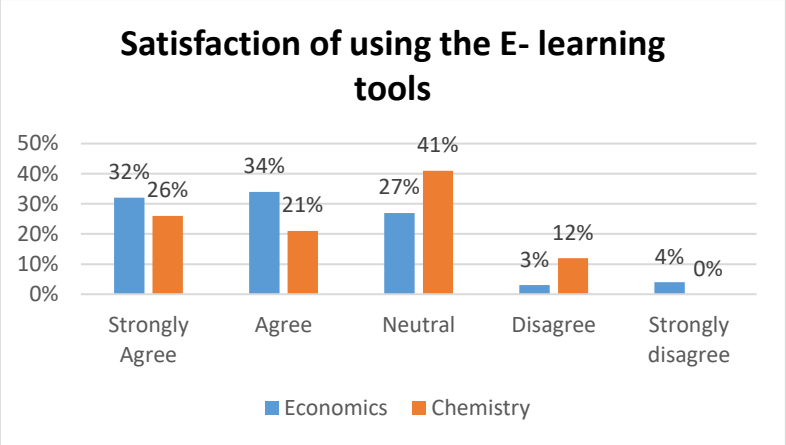

Figure 3: Satisfaction of Using E-Learning Tools for Economics and Chemistry Subjects

From the data obtained 66% found their grades have improved after the use of these E-learning tools for Economics. On the other hand, for Chemistry, 47% were agreeable that there was an improvement in their grades with the use of these tools. This indicated the satisfaction students obtained from the use of these E-learning tools. The access of using the E-learning tools anywhere with the internet availability has created the satisfaction for the students to learn more using the E-learning tools which in lined with the programme policy to bring your own devices to campus. The E -learning not only allows them to learn in class but also to access any task given from anywhere in the campus or off campus.

By Nationality

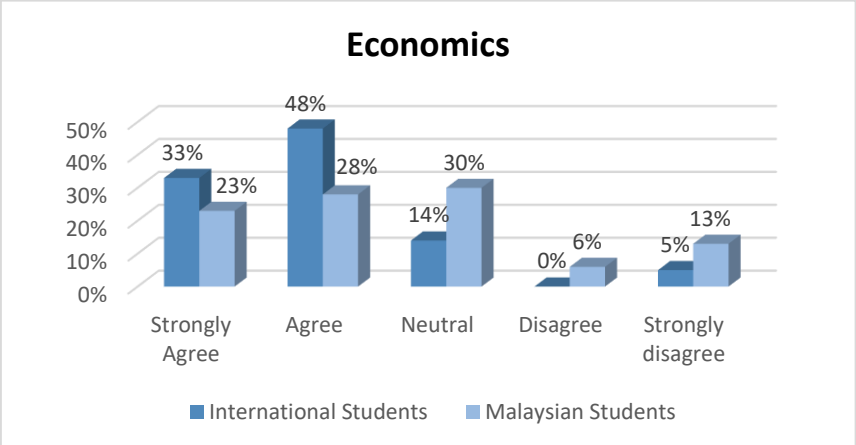

Figure 4: Satisfaction of Using E-Learning Tools for Economics Subject by Nationality

From the bar chart, 81% of International students studying Economics indicated an improvement in their grades with the use of these tools while 51% of Malaysian students were

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satisfied. Students were able to conduct their assignments or task given from remote area even if they were happened to be not in campus due to any emergency leave.

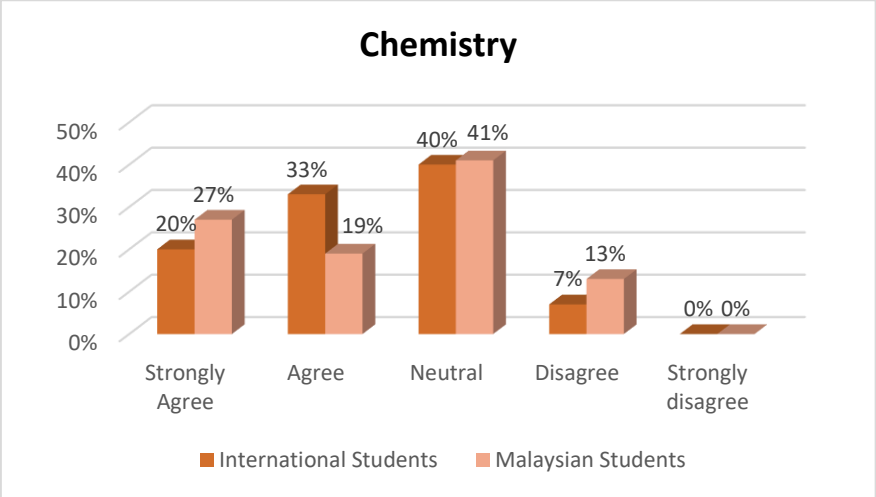

Figure 5: Satisfaction of Using E-Learning Tools for Chemistry Subject by Nationality

As for Chemistry, 53% of International students and 46% Malaysian students indicated indicated strongly agree and agree that using E-learning tools have help them to improve their grades with the use of these E-Learning tools. It motivated them to experienced different E-learning tools during the learning process even though if they were away from the campus. E-learning tools for Chemistry subject not only allow the students to do attempt quizzes and various types of open-ended questions but also allows them to online practice the laboratory skills by using E-learning tools.

Attention (Convenience Of Using The Tools)

By Subject

The ease of using the E-learning tools was able to capture the attention of the students during the lessons held in class. The figure below shows the ease of using the tools by the respective subjects.

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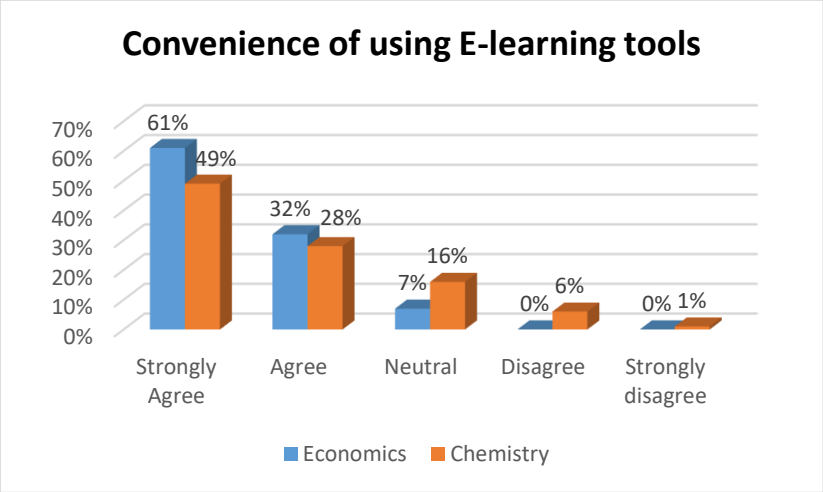

Figure 6: Convenience of Using E-Learning Tools for Economics and Chemistry by Subjects

The data collected indicated that 93% of Economics students and 89% of Chemistry students found the E-learning tools convenient to use. The ease of using these tools assisted the lecturers in retaining student's attention in class. This led to a better class engagement for the two subjects. The results obtained indicated that students were more interested in the subjects as the lecturers were able to capture and retain their attention in class. Students found the short response questions, true-false questions, multiple choice questions and arranging the correct order of answers were easy to be attempted via their mobile phones or laptops. These captured the student's attention in class. Nevertheless, the E-learning tools has created an opportunity for the Chemistry and Economics students to experience formative online evaluation through free online assessment tools that were widely available on the internet.

By Nationality

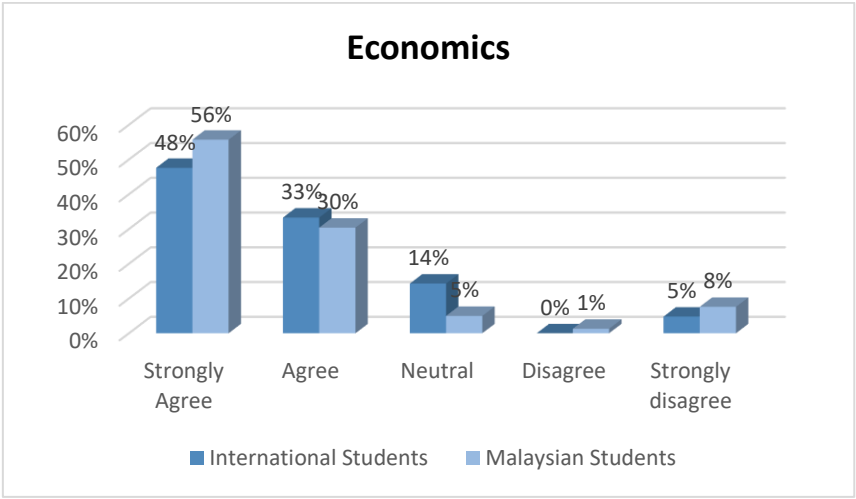

Figure 7: Convenience of Using E-Learning Tools for Economics Subjects by Nationality

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In terms of segregation by nationality, 81% of International students found the E-learning tools convenient to use while 78% of Malaysian students were comfortable with the use of these tools for Economics subject.

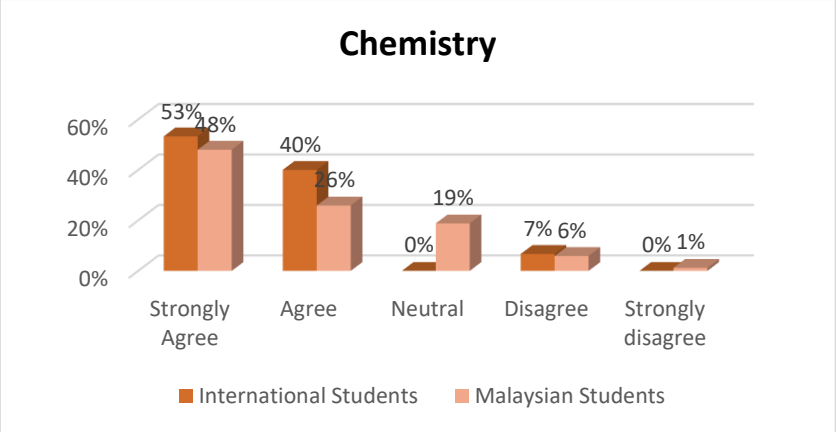

Figure 8: Convenience of Using E-Learning Tools for Chemistry Subjects by Nationality

Findings showed that 93% of International students and 74% of Malaysian students studying Chemistry were comfortable using these E-learning tools such as blooket, kahoot and others. Overall, in comparison for both the subjects, International students found the use of these tools more convenient compared to Malaysian students. The used of E- Learning tools had been widely applied in other countries earlier than Malaysia could be one of the reasons of high international students' percentage comfortable using E-learning tools for

Relevance

By Subjects

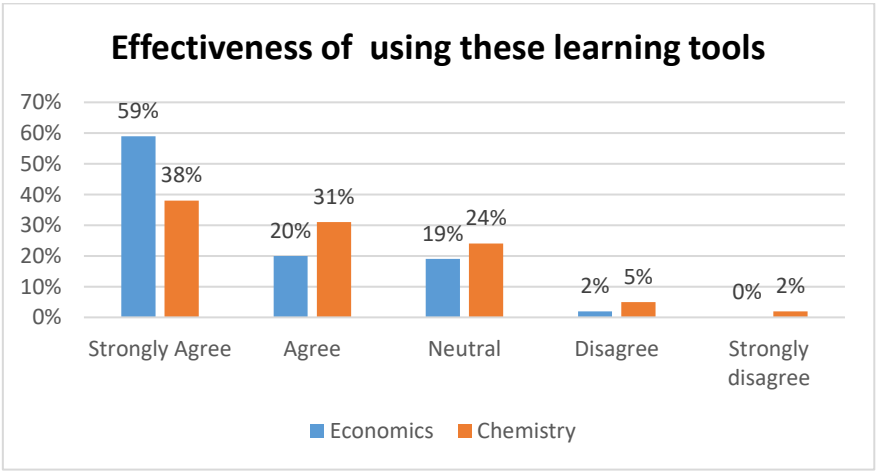

Figure 9: Effectiveness of Using E-Learning Tools for Economics and Chemistry by Subjects

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Based on the relevance of using these tools, 79% of Economics and 69% of Chemistry students found that the tools were effective in helping students understand the topics. The use of these tools led to students understanding the theories, concepts and diagrams better for Economics. As for Chemistry, students were able to understand the experiments better and found relevance to the concepts that they have been studying. Students indicated that they understood the experiments or diagrams better through the use of E-learning tools. The revolutionary innovations of modern teaching methods where experiments could be done via simulations and concepts can be delivered via videos has tremendously captured students' interest in learning using online tools.

By Nationality

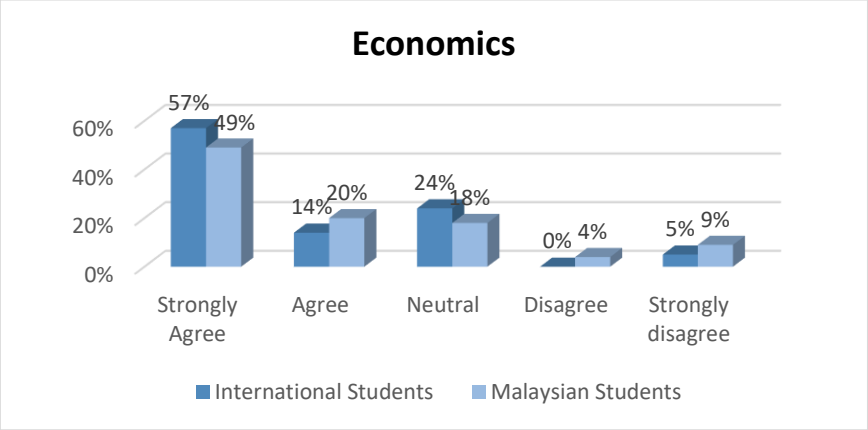

Figure 10: Effectiveness of Using E-Learning Tools for Economics Subjects by Nationality

For Economics, 71% of International students and 69% of Malaysian students found using these tools to be useful in enhancing their learning. They were able to see the relevance of the theories and concepts through the use of technology.

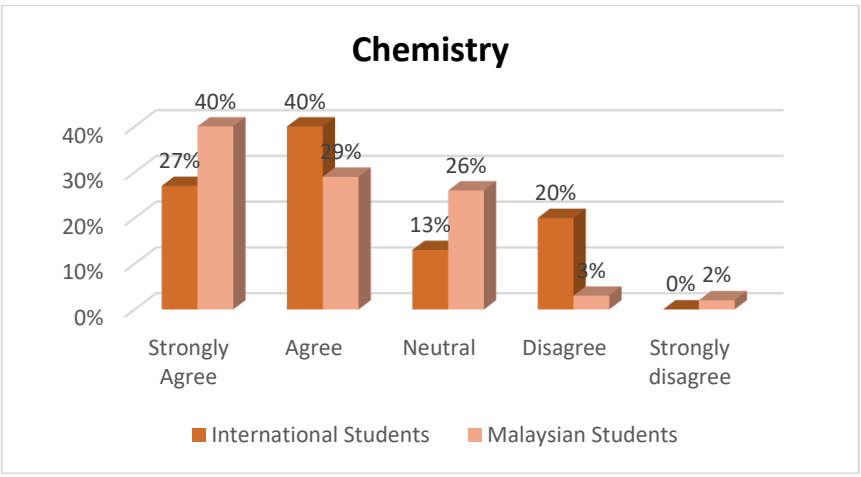

Figure 11: Effectiveness of Using E-Learning Tools for Chemistry Subjects by Nationality

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In terms of Chemistry, 67% of International students and 69% of Malaysian students indicated the use of these tools had help them understand the experiments better. Overall, both Malaysian and international students felt that learning using E- learning tools were relevant and reliable at this era where gadgets were one of the important tools to enhance education system. It captured a better interest in learning the subject of Economics and Chemistry.

Confidence

By Subjects

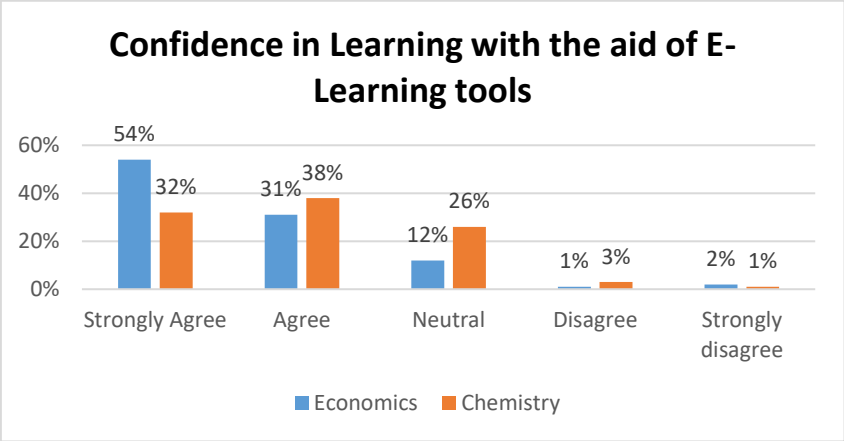

Figure 12: Confidence of Using E-Learning Tools for Economics and Chemistry by Subjects

Findings showed that students gained confidence in learning the subjects with the use of the E-Learning tools. This can be seen whereby 85% of Economics and 70% of Chemistry students were more confident in approaching the subject after using the tools. By using these tools, students were more confident in answering questions during their tests and completing their assignments as they were able to retain their knowledge learnt better. Students were more motivated to learn and increase their participation in class as well. The repetition of topics delivered using innovatively online learning tools created a better concentration and understanding during the class lesson. The positive motivation and confidence that were developed among students has created a tremendous change in the perception of learning using online tools.

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By Nationality

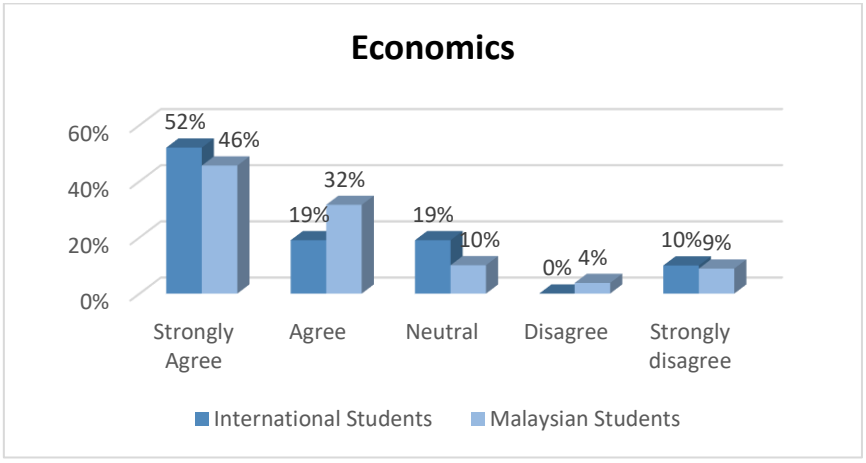

Figure 13: Confidence of Using E-Learning Tools for Economics Subjects by Nationality

Based on the confidence analysis, 71% of International students and 78% of Malaysian students were confident in learning Economics. This was because of the effectiveness of using the E-Learning tools which gave them a better understanding on the subject matter. The quizzes and videos were like a revision on what they had learnt.

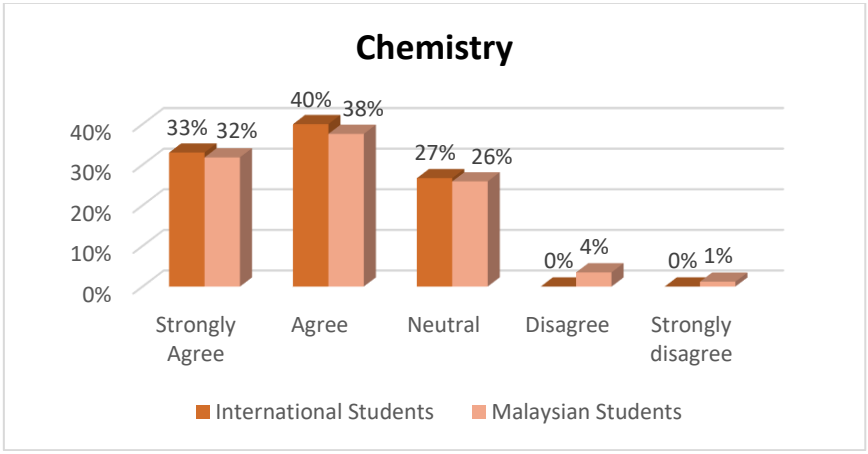

Figure 14: Confidence of Using E-Learning Tools for Chemistry Subjects by Nationality

The findings showed that 73% of international students and 70% of Malaysian students were confident in using e-tools with Chemistry subject. This was due to these tools which gave students the opportunity to do revision upon completion of the subject.

Conclusion

Overall, the study shows that E-Learning tools have enhanced students learning leading them to be more engaged in class. These tools have helped students with their formative learning. There was more interaction in class and an increase in student's participation as most students were excited to attempt the quizzes and answer questions using their laptops and mobile

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phones. It gave students a sense of connectivity as they were able to learn using their gadgets and not just using the conventional method.

Limitations and recommendations

There were some limitations in carrying out this study as the research was only restricted to semester 1 and 2 students who are studying Chemistry and Economics. Besides, the study only focused on one pre-university programme and was carried out for one semester only.

In future a more in-depth study could be carried out by expanding the research to other pre-university programmes. In addition, the study could also focus on one cohort of students who have progressed from semester 1 to semester 2 to show if there has been a significant improvement in their exam results.

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