



26-29 SEPTEMBER
2022



**THE INTERNATIONAL
CONFERENCE**
on **Social Sciences**
and **Humanities**

Re-Humanizing the Society:

**The Role of Social Sciences
and Humanities in Nation
Building**

**The International
Conference on
Education (ICE) 2022**

PROCEEDINGS

In conjunction with

**The International
Conference on Social
Sciences and Humanities
(TICSSH) 2022**

27 – 28 SEPTEMBER 2022

Theme:

**Education for 21st
Century Learning**

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Message from the Director of TICSSH 2022

TICSSH 2022 is the first international conference organised by the Faculty of Social Sciences and Humanities (FSSH) which looks at the role of social sciences and humanities in the society. Through this conference, we would like to engage with all of you in an open and constructive dialogue on the current issues tackled in these fields, resonating the theme of this conference, Re-Humanizing the Society: The Role of Social Sciences and Humanities in Nation Building. Social Studies and humanities as a discipline strive to fill national objectives thereby leading to national development.



The International Conference on Education (ICE 2022) is one of the conferences that was held in collaboration with TICSSH 2022. The delegates in this conference are uniquely placed to discuss, highlight the key points, trends and put forward their reforming thoughts in this extensive field. We hope that this conference would greatly facilitate the pooling together of our research expertise and resources, planning of our research priorities and coordination of research programmes and projects. In this way, social scientists can contribute more meaningfully through transferability of knowledge across contexts and provided inspiration to the network that is shaping the direction of one of the most important fields of social development.

My gratitude to all of you who participated in the conference and shared your ideas, research outcomes and views with our audience. Thank you for your participation. My appreciation also goes to the organizing team of ICE 2022 who have worked very hard to put together a memorable and successful conference. Kudos to all of you.

Until we meet again in the future, stay safe everyone.

ASSOCIATE PROFESSOR DR. HADINA HABIL

Director
TICSSH
2022

Message from the Manager of ICE 2022

Assalamuuaaikum wmt. wbt. and Good Day.

It is a great pleasure for the International Conference on Education 2022 (ICE 2022) Organizing Committee to welcome all keynote speakers, presenters, and participants to the ICE 2022.

This virtual conference is in conjunction with the International Conference of Social Sciences and Humanities (TICSSH) 2022, organised by the School of Education and the Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia as well as the collaboration with the Faculty of Education, Yusuf Maitma Sule University, Kano State, Nigeria.

The conference main theme is Education for 21st Century Learning and a wide range of very interesting sub-themes that related to education, which were curriculum development and evaluation, teaching and learning, assessment and evaluation, policy and system in education, management and administration, teacher training, counselling and psychology, Technical Education and Vocational Training (TVET), educational technology, and issues across the fields of education.

My gratitude is expressed for His grace and blessing, giving opportunity to the School of Education of the Universiti Teknologi Malaysia in providing platform for the academicians, trainers, social researchers, postgraduate students, and industries to share their knowledge, thought, and research findings for the national education development.

Special thanks are dedicated to all committees of the conference organizer and involvement of others in various forms of contributions in making the conference success.

ASSOCIATE PROFESSOR DR. SARIMAH ISMAIL

Manager

ICE

2022



ABOUT ICE 2022

The International Conference on Education (ICE) 2022 is in conjunction with the International Conference on Social Sciences and Humanities (TICSSH) 2022 and organised by the School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia.

Theme:

Education for 21st Century Learning

Sub-themes:

Curriculum development and evaluation, teaching and learning, assessment and evaluation, policy and system in education, management and administration, teacher training, counselling and psychology, Technical Education and Vocational Training (TVET), educational technology, and issues across the fields of education.

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GEOGEBRA SIMULATIONS WITH POEE WORKSHEET AS A TOOL TO TACKLE MISCONCEPTIONS OF GEOMETRICAL OPTICS AMONG MATRICULATION STUDENTS

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ABSTRACT - Geometrical Optics (GO) has given birth to various tools in certain fields, especially communication and medicine. It is crucial to master the GO in pursuing the advancement of technology, especially in the Internet of Things (IoT) era. Nevertheless, student claimed that GO is a difficult topic for them to understand. However, it is one of the core topics in physics. Based on the current data by the Ministry of Education, only 7% of matriculation students attained full marks in GO during the final examination. In this regard, this study aims to use GeoGebra simulation and POEE worksheet as a tool to overcome misconceptions as well as to increase students' conceptual understanding of geometrical optics in Malaysian Matriculation College. A four-tier geometrical optics test will be used to identify students' conceptual understanding of the topic of geometrical optics among 2022/2023 matriculation students. A quasi-experimental design with pre-test and post-test, which enabled the researcher to investigate the effectiveness of using the GeoGebra simulation on students' conceptual understanding of geometrical optics. The data will be analyzed and interpreted to determine whether the students had misconceptions, did not understand, or understood the topic.

Keywords: Geometrical Optics; GeoGebra simulation; POEE approach; technology

1. INTRODUCTION

Geometrical optics is said to be obscured and difficult (Ghalili & Hazan, 2001, Uwamahoro et al., 2021) their misconceptions have become a central issue (Mboniyirivuze et al., 2022). Students have a limited understanding of light phenomena, due to the abstractness of the GO topic and related to the instructional tools and strategies used by teachers (Ndihokubwayo et al., 2020). GeoGebra simulation became a trend for visualization, facilitating exploration interactively, encouraging students to actively participate in the learning process (Sariyasa, 2017; Murni et al., 2017). However, it was rarely being used in physics education (Halim et al., 2021) since it is firstly designed for mathematics education; and the use of GeoGebra alone does not significantly affect students' conceptual understanding (Arbain & Shukor, 2015). Meanwhile, Predict, Observe and Explain (POE) is a powerful pedagogical strategy (Mamun, 2018) for eliminating students' misconceptions (Furqani et al., 2018) by giving an opportunity for students to be actively involved in constructing their knowledge (Alfiyanti et al., 2020). Thus, this study will use the GeoGebra simulation associated with the extended POE strategy with an additional explore (E) phase, namely POEE-GWs. The POEE approach will be designed as a worksheet that contained GeoGebra simulation link will guide students across the four stages. These are: a) engages students in predicting and justifying phenomenon (*predict*); b) observation through simulation (*observation*); c) explore other phenomena by changing a few parameters (*explore*); and d) justify and draw a conclusion from the result of simulation as well as their hypothesis (*explain*).

2. OBJECTIVES

This study will investigate the effectiveness of using GeoGebra simulation and the POEE approach to eliminate students' misconceptions in topic geometrical optics between students taught using GeoGebra simulation and the POEE approach (POEE-GWs) with students taught using POEE approach only.

3. METHODOLOGY

This study employed Mixed Method, Explanatory Sequential Design by Creswell (2011). The population for this study is matriculation students in Malaysia, while the sample is students from Kolej Matrikulasi Melaka. For quantitative data collection, a quasi – experimental approach will be employed where a four-tiered geometrical optics test (FTGOT) adapted from Derya Kaltakci (2012) is the instrument to identify students' misconceptions and conceptual understanding that will be test to both control (C) and experiment (E) groups. Data obtain from this test, in the form of students' scores, will then measure using homogeneity test and t-test. In the qualitative phase, observation protocol and interview protocol will be used. Classroom Observation Protocol for Undergraduate STEM (COPUS) instrument, by Smith et al. (2013) will be descriptive analyzed specifically focusing on "Students are doing" for 50 minutes to explore how POEE-GWs increase conceptual understanding. Meanwhile, the students with extreme significant difference from the pre-test and post-test will be interview to assess the effectiveness of using POEE-GWs in topic geometrical optics. The data will be transcribed and analyzed using thematic analysis according to the model described by Braun and Clarke (2006).

4. CONCLUSION

Previous research supports the idea that integrating GeoGebra simulations with a set of learning strategies could enhance students' conceptual understanding. The use of GeoGebra simulation alongside with POE approach as a tool to eliminate students' misconceptions. This research aims to investigate how POEE-GWs eliminate students' misconceptions in topic GO.

5. IMPLICATION

This study implements the combination of GeoGebra simulation and extended POE strategy (White & Gunstone, 1992) into a new learning strategy, namely POEE-GWs. POEE-GWs shifts the traditional teaching method to student-centred learning. This comprehensive POEE-GWs as learning strategy on science concepts by integrating: inquiry questions (Chin, 2006, Craig et al., 2004, Ge et al., 2004) and the discovery-learning model (Abdisa, & Getinet (2012); Gunawan, Kosim, & Lestari, (2020). It also contributes to studies exploring the nature of pedagogical support that promotes students' active engagement in the constructs of cognitive and 21st-century skills (Widya et al., 2019).

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A SURVEY ON PROBLEMS FACED BY TEFL TEACHERS IN DEVELOPING PRACTICAL KNOWLEDGE IN PRE-SERVICE TEACHER EDUCATION IN CHINA

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ABSTRACT - It is widely accepted that practical knowledge, which facilitates the development of teaching competence, lays a solid foundation for teaching competence and professionalization. However, it is underestimated and marginalized in the current arrangement of courses in teacher education in China. The theme of the paper is to reveal the problems faced by pre-service TEFL teachers in such a context and their expectations for a change in the future. Questionnaires were employed to explore the views of 64 randomly chosen participants among sophomore student teachers in China West Normal University in China. The results from the survey suggest that most students feel that they have a low level of competence in mastery of knowledge of language teaching, the strong influence from student teachers' former English teachers' instruction in secondary school, the lack of video-cases in developing student teachers' teaching competence, the lack of practice with guidance from the experts and the lack of intimate knowledge of students in primary school and secondary school. The findings illuminated the problems faced by TEFL teachers in pre-service teacher education and showed us the possibility and necessity to combine video-case observation with lesson study to form a new teacher training mode in which theory and practice are closely allied.

Keywords: problems; practical knowledge; preservice teacher education; countermeasures

1. INTRODUCTION

Practical knowledge is the first concern to strengthen the teachers' teaching competence in pre-service teacher education. Educators wrongly believe that effective teaching is primarily a matter of applying theories to practice (Lampert, 2010; Zeichner, 2010; Holland, Evans, & Hawksley, 2011). However, everyday teaching involves more complex and better decision making with consideration of multiple, competing demands and assessment of possibilities within the prevailing circumstances than the one-way action of applying theory to practice (Black and Halliwell, 2000). And this practical knowledge which derives from the constant process of exploration, reflection, rectification and creation through ones' teaching experiences or reflections on one's own or others' teaching behaviors is the guarantee of the teaching efficiency (Freeman, 2016).

However, the courses related to English education in China are marginalized in normal universities and the practical knowledge is ignored or at least neglected in the present courses arranged for College English Major. Scholars examined the curriculum of normal universities carefully and found that the language knowledge and skills are overemphasized and the development of practical knowledge is biased against (Zou, 2009; He, 2015; Cheng, 2021). Although the research revealed the unproportionate arrangement of courses at normal universities, the attitudes of student teachers are not studied systematically to disclose the problems faced by them and their expectations in an ideal teacher education program. Thus, it is significant to study the student teachers' views towards the courses which aim at the development of practical knowledge and their suggestions for the possible change in the future.

2. OBJECTIVES

- i. To investigate the problems of developing student teachers' practical knowledge in normal universities in China.
- ii. To explore student teachers' expectations in innovating the teacher education program in developing their practical knowledge.

3. DATA/METHODOLOGY

In order to find out the problems of developing student teachers' practical knowledge in normal Universities in China, a questionnaire survey is used to investigate into 64 sophomore students' views (4 male student teachers and 60 female student teachers in their fourth semester of undergraduate study) who are chosen randomly from the 278 students majoring in English Education in grade 2020 in China West Normal University.

The questionnaire adopted in the present research is composed of 9 close-ended questions and 3 open-ended questions to explore the student teachers' attitudes in the aspects of their mastery of language teaching theories, the source of influence on their conception of language teaching, their ability to teach language knowledge and language skills, the attitudes towards the use of video-cases and practice opportunities and their attitudes towards the experts' guidance in the practice teaching. The data includes both quantitative data and qualitative data collected from 64 valid questionnaires.

The quantitative data were keyed into the computer and analyzed through SPSS 27. The qualitative data were stored as a small corpus in the computer and were dealt via thematic analysis.

4. RESULTS/FINDINGS

Based on the quantitative and qualitative analysis of the data, the problems are mainly the low level of competence in mastery of knowledge of language teaching, the strong influence from student teachers' former English teachers' instruction in secondary school, the lack of video-cases in developing student teachers' teaching competence, the lack of practice with guidance from the experts and the lack of knowledge of students in primary school and secondary school.

According to the data collected from open-ended questions in the questionnaire, the difficulties student teachers mainly face are the lack of systematic learning of theories, the lack of practice opportunities, inability to connect theories with practice and a lack of knowledge of students in secondary schools.

It is noticed that there are mainly eight types of suggestions to innovate teacher education courses, among which the use of cases and practice are the most urgent ones for the large proportion of students who are demanding for the change.

5. CONCLUSION

In the future teacher education program, student teachers need more opportunities to do practice teaching with guidance, to familiarize themselves with students in primary and secondary schools at different levels and to make good use of video-cases in pre-service teacher education. The video-cases are not only placed online for student teachers' self-directed learning but to guide them to observe, reflect and discuss in community. It is also necessary to combine video-case observation with lesson study to form a new teacher training mode in which theories learning and practice are to be closely associated.

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DESIGNING AND IMPLEMENTING ACTIVE LEARNING OF FAMILY LAW THROUGH POLICY MAKING EXERCISE

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ABSTRACT - Family law is rapidly growing with a substantial number of family lawyers advocating for their clients in family disputes. The family law syllabus is generally taught in a traditional manner whereby students learn the law and complete coursework or final examination. Active learning is a far cry as far as teaching family law is concerned. This concept paper proposes an active learning design for family law through policy making exercise meeting the UK Professional Standards Framework (UKPSF) criteria. Policy making is an integral part of family law development and inevitable for family-lawyers. The proposed design and implementation of policy making exercise will enhance students' knowledge and understanding of family law, and develop skills such as communication, negotiation and critical thinking. There is a lack of research in this area which necessitates a closer look at design and implementation processes. The lesson plan proposed in this study is designed based on the Design-based Research (DBR) framework having the participants (students) as co-designers. The lesson plan is for a single session of debate on policy making in an area of Family Law. The proposed design has been implemented in a pilot study which has been peer reviewed using the UKPSF criteria. The peer review provides that the design is well-structured and meets the UKPSF criteria. The review suggested improvements to the plan to enhance the student learning experience and ease implementation.

Keywords: Family Law; Policy Making; Active Learning; Debate; Designing and Implementing Teaching Plan

1. INTRODUCTION

Family Law is an emotionally-charged module because the subject matter is personal and emotional (Langston, 1995). Students, who may choose to become future family-lawyers need to be trained to understand the sensitivities and issues surrounding families, how family law and policy affect people in their day-to-day life, and how they can play a meaningful role in contributing to the society.

Future family lawyers need to understand societal context in which the practice takes place. Knowledge and skills are necessary to understand the depth of issues surrounding families and how the law develops and being operationalised in the best interest of people. Policy making and continuous development of law is paramount in family law. It is crucial that family law is taught in light of developing different perspectives and understanding policy-making (policy, law and social sciences) through active learning.

Past research shows the importance of restructuring family law teaching (O'Connell, & DiFonzo, 2006). The difficulty in restructuring and designing a comprehensive family law teaching is multi-fold bearing in mind the range of disciplines involved in making it a success (Schepard & DiFonzo, 2011). Policy-making exercise is a fraction of restructuring family law teaching. This concept paper aims to explore a design and implementation plan for policy making exercise in a classroom setting.

2. OBJECTIVES

The objective of this research is to design a lesson plan for policy making exercise for family law through debate and implementation plan meeting the UKPSF criteria.

3. METHODOLOGY

There are 2 separate processes that are involved, firstly, the designing process and secondly, the implementation process. The designing process proposes to use the Design-based Research (DBR) as the methodological frame to design the lesson plan, and at the implementation process, a qualitative study is proposed to be conducted as action research to collect data on the effectiveness of the design.

The Design-based Research (DBR) as the methodological frame focuses on understanding the context through analysis and exploration, designing effective teaching and learning methods and making meaningful changes for the subjects of the study (Barab & Squire, 2004; Collins, 1992). The subjects of the study (students) are treated as co-participants who contribute towards the design and bring the research forward for future improvements. It is based on a cyclic process which requires reflection and redesigning. Recently the DBR has been gaining popularity as an educational design in e-learning research (Tinocha et al, 2022).

At the implementation process, action research is proposed to be conducted aiming to design inquiry and build knowledge to solve practical problems in designing and implementing active learning of family law by studying the effectiveness of the design. Data is proposed to be collected through peer-review using UKPSF criteria and student feedback (through survey i.e. pre and post exercise questionnaire and interview). For the purposes of the pilot study, only peer review was obtained and discussed below.

4. RESULTS AND DISCUSSION

Design has 3 stages. At Stage 1, students identify the problem, research, formulate reasonable and realistic solutions, select the best workable solution, design a plan, communicate the proposal, negotiate with other teams and implement (Asay and Curry, 2003). In Stage 2, students discuss, debate and negotiate the policies and come up with an agreed policy outcome. The debate process is peer reviewed. Stage 3 is peer review discussion. Peer review is based on UKPSF criteria evidencing three dimensions of practice: core knowledge(K), areas of activities(A) and professional values(V). Table 1 provides the findings of the peer review.

Table 1. Peer Review Findings Based on UKPSF Criteria

Prompts	UKPSF	Strengths	Areas for Development
Introducing the session to the students	A1	Facilitator clearly briefed the flow of the session.	None
Planning, structure and organization	A1	Well planned. Students were given the materials in advance so that they could prepare.	None
Content	A2	Various related laws were included in the context.	Demos of such proposal processes could be shown prior to students' activity.
Methods and approaches	A2	Group proposal presentation and discussion, followed by Q&A and negotiation process.	None

Delivery and pace	A2, A4	Well facilitated. Ample time was given for presentation and discussion.	Break time is needed during the session. Facilitator could remind the presenters to stick to the time allocated.
Student participation and engagement in learning	A4	Overall, it was good. Most students actively participated in discussion and could pinpoint each other's proposal.	Facilitator could engage the few quiet students to contribute to the discussion.
Use of learning environment	A4	Moot court provides the right setting for the activity.	Could ask the presenter to stand up when they speak, to draw attention and prevent them from reading from the laptop.
Assessment and evaluation	A3, A5	Whole class discussion after presentation to clarify the ideas. Post-it for writing feedback for the session.	None

Knowledge of:	√ or X
K1 The subject material	√
K2 Appropriate methods for teaching and learning in the subject area and at the level of the academic programme	√
K3 How students learn, both generally and in the subject/disciplinary areas(s)	√
K4 The use and value of appropriate learning technologies	x
K5 Methods for evaluating the effectiveness of teaching	√
K6 The implications of quality assurance and quality enhancement for academic and professional practice with a particular focus on teaching	√
Professional Values	
V1 Respect individual learners and diverse learning communities	√
V2 Promote participation in higher education and equality of opportunity for learners	√
V3 Use evidence-informed approaches and the outcomes from research, scholarship and continuing professional practice	√
V4 Acknowledge the wider context in which higher education operates recognising the implications for professional practice	√

The peer review showed that it meets the UKPSF criteria and students were able to

engage, learn and demonstrate critical thinking and communication skills through the debate. The review highlighted the well-structured lesson plan, facilitation by the lecturer and active participation by students as some of the strengths of the design.

5. CONCLUSION

In conclusion, the design and implementation of the policy making exercise is effective in meeting the UKPSF criteria. It achieves learning outcomes and promotes student engagement. The finding suggests that a well-structured design is helpful for active learning through policy making exercise. It is interesting to note that despite being a student-led active learning activity, the facilitator plays an important role in ensuring the smooth implementation of the exercise.

This concept paper is an initial step in designing and implementing policy making exercise. Following the DBR model, it will continue with the re-designing process upon further analysis and evaluation.

6. IMPLICATION

This research and exploration in designing and implementing active learning of family law through policy making exercise encourages a positive shift from traditional teaching and learning style of passive or teacher-centric teaching to a more student-led active learning style. It not only enhances the students' learning experience, but at a larger scale may contribute in creating market ready graduates.

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THINKING SKILLS FOR AGRICULTURAL LECTURER AT VOCATIONAL COLLEGES

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ABSTRACT - The issue of agricultural education is a great challenge for educators in the field of agriculture, specifically to enlighten teaching in vocational colleges. One of the aims of curricular reforms is developing critical thinking in schools and seems to be that the lecturer would somehow have the required knowledge and capacity to teach critical thinking successfully as envisaged in educational policies. This is because a lecturer is seen as central to effecting change, a lecturer that can employ critical thinking in life will be able to engage the same value into their students. Therefore, education today can be used to change the image of agriculture. The aim of this study is to determine the construct and sub-construct of higher order thinking skills (HOTS) for agricultural lecturers at vocational colleges. Higher order thinking skills require both cognitive skills and dispositions. Lecturers of agriculture are urged to provide explicit instruction in higher order thinking skills to teach how to transfer knowledge critically to students. This study used a qualitative method where expertise was interviewed to answer research objectives. Thus, in order to transfer HOTS, the lecturer should be infused with the construct and sub-construct that contribute to the development of HOTS in subject taught.

Keyword: Higher order thinking skills; Agriculture education; Technical and Vocational Education Training (TVET)

1. INTRODUCTION

Agriculture's transition to the industrial revolution 4.0 should be handled seriously in early education. Thus, knowledgeable and skilled lecturers in the field of agriculture are a remarkable asset in any of its education programs. One of the aims of curricular reforms is developing critical thinking in schools and seems to be that lecturers would somehow have the required knowledge and capacity to teach critical thinking successfully as envisaged in education (Kadir, 2017). Moreover, Agriculture education is an eye-opener towards a new transformation of agriculture in Malaysia. To fulfill the industry revolution 4.0 needs, future workers should have certain criteria to accomplish. These include soft skills, technical knowledge, and critical thinking skills. According to (Hanif, 2017) it is necessary to integrate critical thinking skills into pedagogical teaching methodologies specifically for youths. Therefore, agriculture lecturers should prepare themselves first to produce future graduates that are eligible to compete and cooperate with the evolution in the agriculture field. As it was also highlighted in (Sulaiman, et. al., 2017), (Kager, et. al., 2022), (Branigan & Donaldson, 2020) that lecturers must possess critical thinking abilities in order to assist all students in the classroom. Therefore, the aims of this study are to determine the construct and sub-construct of higher order thinking skills for agricultural lecturers at vocational colleges. Higher order thinking skills is a complex of thinking, it is said that HOTS is always interchangeable with critical thinking, creative thinking and problem solving (Lewis & Smith, 1993), (Wang, (2017).

2. OBJECTIVES

The objectives of this research are to:

- (a) To determine the construct of Higher order thinking skills (HOTS) for agricultural lecturer at vocational colleges in Malaysia
- (b) To determine the sub-construct of Higher order thinking skills (HOTS) for agricultural lecturer at vocational colleges in Malaysia

3. METHODOLOGY

The qualitative methods are designed to assess the problem research regarding lecturer's higher order thinking skills. Besides, the interview would help researcher to get clearer elements of HOTS for agricultural lecturers which aim to answer the objective research. This research using qualitative methods and researcher conducted an interview with expertise that has background in agricultural educational field and higher order thinking skills.

For sample selection reasons, it is critical that the population be properly determined. The sample selection for the interview is purposive sampling as researcher recruit experts who can provide in depth and detailed information about the phenomenon under investigation. The chosen expertise are experts in the field of higher order thinking skills as well as having an agricultural background. The experts also have experience in vocational education and they have been in the industry for more than five years. The structure for the interview is semi-structured and open-ended questions.

Audio of the interview has been recorded through devices used, mobile and laptop. The data is then analyzed to find scales that may exist in current instruments or to generate categories of data using Atlas.ti. Atlas.ti is used as it is suitable for qualitative research analysis. Furthermore, this software is able to analyze and organize unstructured text, audio and its ability to playback for audio and video files so that interviews can easily be transcribed in Atlas.ti.

3. RESULTS AND DISCUSSION

In the vocational college nature, it is necessary that an agriculture lecturer is able to demonstrate the knowledge and concept of the subject taught and employ the HOT skills. Align with (Anderson et al., 2001) where analyzing is a type of activity that involves the ability to compare, examine, criticize, and the facts are made into a systematic concept, then evaluating is an activity that involves the ability to manage decisions and conclusions based on standards established through assessment criteria based on learning objectives to be achieved, and creating is a cognitive process that involves the ability to realize new concepts or products, emphasizing creative thinking in synthesizing information into a more comprehensive form and the complex includes planning, formulating and creating.

Table 1 Sub-construct of HOTS for critical thinking skills, analyze cognitive process

Cognitive	Sub-construct	Description
Analyze	Identify	Able to identify students' levels of thought before beginning every new topic
	Analyze	Able to analyze which skill of HOT needs to emphasize in topic taught
	Organize	Able to organize systematically lesson plan of targeted HOTS for topic taught
	Visualize	Encourage to learn through observation and senses for each topic to assist in meaning-making among students (field-trip, experiment, outdoor class)

Question	Questions ask should followed level of cognitive processes (from low level to high level questions)
Differentiate	Includes questions in the forms of difference into the topic learn
Distinguish	Includes question in the forms of situational to develop student's higher order thinking skills
Attribute	Recap and discuss what was taught on the previous topic and its relationship to the new topic (in every session)

Table 2 Sub-construct of HOTS for critical thinking of cognitive evaluating

Cognitive	Sub-construct	Description
Evaluate	Checking	Check whether approach/strategy employed has HOTS element
	Verify	Verify each teaching method used able to deliver HOTS
	Criticize	Argue every teaching materials to achieve outcomes for topic taught
	Select	Select activity based on targeted skill in the topic taught
	Monitor	Monitor student discussion during learning session
	Aware	Integrate agriculture real-world reality into assessment given to student
	Facilitate	Always facilitate students during practical class
	Supervise	Conducting a systematic evaluation to improve teaching delivery
	Evaluate	Evaluate each assessment given and able to make follow-up action
	Reflection	After finishing the lecture, reflect on each lesson plan.

Table 4.3 Sub-construct of HOTS for creative thinking of cognitive creating

Cognitive	Sub-construct	Description
Create	Community	Active discussion and changing information among agriculture lecturer
	Communication	Actively practice two way communication (lecturer-student) during learning session
	Examine information	Critically examine information before bring it into practice
	Technological knowledge	Able to follow up on agricultural technologies in the industry.
	Discuss	Having classroom discussion session will motivate students to create creative agricultural products
	Planning	Design lesson plan that allow students to experimental their creative ideas
	Open-minded	Being open to students idea to bring topic learn into creative form
	Produce	work together with students to create new agricultural product or system
	Support	Give support to student's idea (advice, guidance)
	Collaborate	Involves collaboration with real agriculture industry regarding topic taught

Contribute Encourage students to contribute to the society (practices)

Table 4.4 Sub-construct for problem solving skills

Construct	Sub-construct	Description
Problem solving skills	Observation	Classify what is the issue arise
	Identify	Identify possible solution for the issues
	Explore	Explore possible solution for the issues
	Justify	Able to explain the selected solution chose
	Generate	Use the techniques decided to solve the problems
	Sympathy and empathy	Take account the effect towards nature

As an agricultural lecturer in a vocational college, to have a balance of higher order thinking skills applied during the teaching session does have some difficulties. To have enough skills of critical thinking and creative thinking enable ones to have better quality of thinking. Furthermore, the goals of thinking process are to solve problems. This is due to the constant process of analyzing, evaluating, and as an output several solutions come out as a result of thinking. In order for agricultural lecturers to achieve higher stage in cognitive process in delivering the teaching, they should recognize the learner. During a class, agricultural lecturers could integrate HOTS questions based on the student's capability. Agriculture lecturers could analyze and evaluate their lesson plan so that every student has a chance to have changes in thinking, be able to think critically, and be able to make good judgment.

Therefore, as an agricultural lecturer at a vocational college one should be able to identify which part in agriculture topics needs to have a HOTS element. Since vocational college is to prepare students to become highly skilled workers, agricultural lecturers should have competency on how to apply HOTS at different levels. In other words, lecturer knows to use suitable strategy to apply specific skills based on the topic.

Besides, agriculture lecturers are able to evaluate their cognitive process where it involves the ability to manage decisions and conclusions based on standards established through assessment criteria, assignments based on learning objectives to be met (Rozi, A. et. al, 2021). Always think and argue with what to teach? How to deliver? What type of assessment need to use? are found necessary. Curriculum planning, setting learning goals or objectives, creating learning activities, and creating assessments or evaluations are among the duties (Deller, 2019). The main goal of creating a learning system for HOTS is to reduce lecturer control and increase students' active participation in the learning process. Hence, there will be more chances of HOTS transferring in the classroom. Moreover, the construct and sub-construct in line with (Casati, 2020) highlighted the characteristic of agricultural lecturer should secure such as (1) concerned about students, (2) properly plans education, (3) effectively evaluates student achievement, (4) well-versed in agriculture and (5) communicates well with others.

4. CONCLUSION

According to (Sa'dijah C. et al., 2021) lecturers' instructional design for HOTS consists of three major components: (1) encouraging learners to participate in non-routine problem-solving activities; (2) facilitating the development of analysis, evaluation, and creative abilities; and (3) encouraging learners to acquire knowledge.

Agricultural lecturers might become unduly reliant on the curriculum provided. Nonetheless, agriculture lecturers can provide HOTS by carefully organizing the lesson plan and understanding how to project essential questions in the subject presented throughout the session. Furthermore, including real-world agricultural issues into evaluations will help expose lecturers and students to HOTS.

5. IMPLICATION

Higher order thinking abilities may not be as vital to agricultural lecturers at vocational colleges since they are more focused on teaching and producing skilled employees. However, it must be acknowledged that HOTS are still required for the development of human cognition, which will eventually lead to national growth. Therefore, a competent agriculture operative should also possess HOTS in order to deal with agricultural changes and challenges in the future. Consequently, the construct and sub-construct of HOTS highlighted in this study would greatly assist agricultural lecturers in recapping and structuring their material to be HOTS oriented.

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A SYSTEMATIC REVIEW OF RACIAL TOLERANCE IN EDUCATIONAL CONTEXT

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ABSTRACT - It is vital to understand the development of racial tolerance because tolerance is frequently mentioned as something necessary for individuals and societies to develop. However, tolerance is multidimensional, multi-aspects, multi-dimensional, and vulnerable to certain situations. The definitional issues around tolerance are complex, and methods of measuring tolerance in any one study very often cross definitional boundaries. For these reasons, this research conducts a thorough literature analysis to compile data on racial tolerance in educational context. The review adapted the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines in reporting systematic reviews and meta-analysis. Thirty-three studies were synthesized to explore racial tolerance in education context. The findings show that the nature of the link between racial tolerance and education context appears to be influenced by factors including institution, educators, peers, instruction practices and educational setting.

Keywords: Race; Tolerance; Racial Tolerance; Education

1. INTRODUCTION

Tolerance is an imperative word that ought to be borne in the mind of a multi-racial, multi-religious, multicultural, and multi-linguistic society, Fakhrai (2012). Studies have demonstrated that the expressions of tolerance keep on changing according to space and various contexts. Everyone finds themselves choosing who, over what and in which situation that they will demonstrate tolerance. It indicates that it will never be able to develop a universal knowledge of the structure of tolerance since it is multidimensional, multi-aspects, and vulnerable to certain situations, Nazri and Mansor (2014). It is important to highlight that tolerance is required not only for the existence of the problem in the country, but also for whether the younger generation has sufficiently developed abilities in good cross-cultural and interracial connections, Rezida and Mirzatilla (2016). Higher Education Institution which serves as an agent of social-mobilisation is said to be the most appropriate environment to develop tolerant people since it is the students who are the more progressive, organised, intellectually and creatively developed part of the youth. However, racial knowledge will be more complex during youth due to the increased cognitive thought ability. In these circumstances, it is very important to identify the formation and development of racial tolerance of students in education context.

2. OBJECTIVES

Specifically, it asks:

- i. What are the pathways through which education leads to racial tolerance?
- ii. What is the relationship of institutions, educators, peers, instruction practices, educational setting within race communities and their development to tolerance?
- iii. What policy implications arise from the literature evidencing racial tolerance?

3. METHODOLOGY

The PRISMA Protocol was applied for the selection of relevant publications. The PRISMA process contains four steps: identification, screening, eligibility, and inclusion. Racial Tolerance, Racial tolerance and Education were the two primary terms employed in the identification step. Additionally, inclusive and exclusive standards have been established for gathering information that truly satisfies the study's goals. The following are the inclusive and exclusive criteria that were applied: restricting the year for article search such that only current articles from 2000 to 2019 are searched for; use article references to hunt down and collect papers that are pertinent to the study's goals; only English-language publications will be accepted. Search sources include a range of journals, theses, conferences, and reports. At the initial identification step, 594 publications were discovered across six databases, "Sage", "Springerlink", "Scopus", "Web of Science", "Jstor", and "Google Scholar". There are some overlapping or irrelevant results even if certain criteria were defined in order to search for similar articles. The article abstracts were examined through various screens, and any irrelevant ones were then disqualified from being included in this study's analysis. At last, only thirty three studies were included and synthesised to explore racial tolerance in education context.

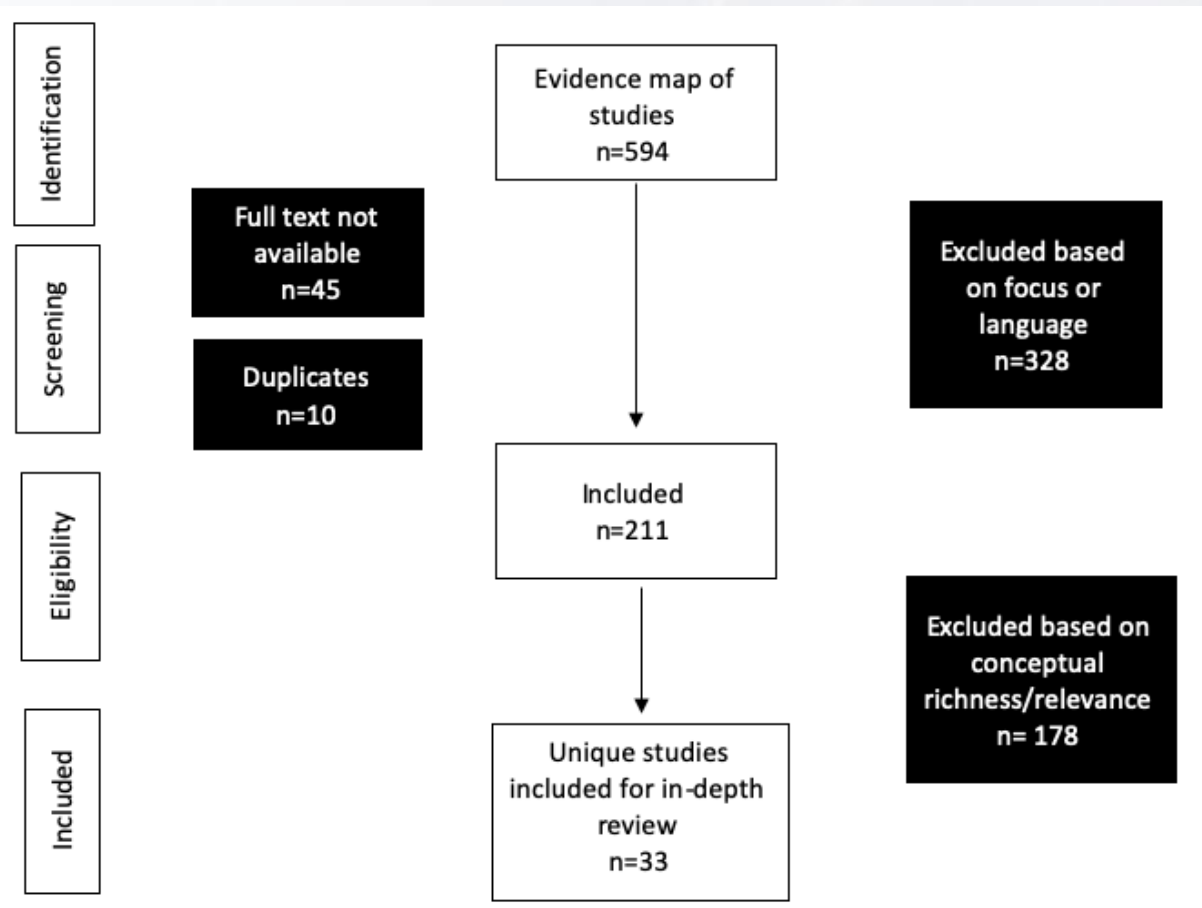


Figure 1: Data collection using PRISMA Protocol

4. RESULTS AND DISCUSSION

Institution (n=9)	Educators (n=4)	Peers (n=6)	Instruction practices (n=8)	Educational setting (n=6)
implement safeguards	Sensitive to cultural differences		Cooperative learning	equal educational opportunities
structural diversity	Teaching nonviolent conflict resolution explicitly	Openness	Understanding the sources of ethnic identification	national service program
race shape student faculty interaction	Inaction in confronting racist views	Multiculturalism	Multicultural education	different type of school
			Citizenship, Religious & History education	Freedom of speech
			Patriotism knowledge and practices	
			Sports	

Figure 2: Meta-themes by racial tolerance topic

There are five overarching meta-themes emerged across studies focused on a range of factors that lead to development to racial tolerance. First, research found that structural diversity in an institution has a direct positive effect on students' interracial friendship regardless of students' racial backgrounds. Several studies developed this concept and suggested that administrators at institutions must start explicitly stating that "racist behaviors" will not be permitted and that offences will be dealt with harshly if they are sincerely worried about the existence of minorities among their student bodies, Noormaizatul Akmar *et al.* (2020). One of the biggest problems that institutions confront today is cultivating a sensitive faculty and encouraging civility and tolerance among students. When institutions are poorly managed and structured, the people are divided, which might have severe effects on the entire country. An environment where people are discriminated against or singled out due to their skin colour or race can lead to a variety of issues, including poor academic performance, low self-esteem, and even school dropouts. Second, research shows that educators who were sensitive to cultural differences would contribute to the development of more tolerant students. Teachers may promote tolerance and acceptance by teaching nonviolent conflict resolution explicitly, which is based on respect for the other person's needs, fears, wants, and worries, which are recognized as being as genuine as your own. One issue should be concerned is that teachers' inaction in confronting racist views contributed to the institutional and systemic persistence of the intolerance issue. Third, it has been discovered that intergroup friendships and interaction are associated with the acquisition of more tolerant viewpoints, such as multiculturalism. Cross-ethnic friendships during childhood and adolescence may result in the development of crucial perspective-taking and empathic skills that are transformed into a more open and understanding view in the long run because contact effects do not only concern attitudes and behaviours towards the target outgroup but frequently generalise to attitudes towards other groups (even non-contacted) in different contexts, Titzmann and Jugert (2019). Fourth, most research suggests that instruction practices are the best way to instil tolerance values. Effective teaching such as cooperative learning and active learning can fosters multicultural awareness, racial toleration, and maximal learning, Egginton (1980). Tolerance is also promoted via curricular models like citizenship education and religion education. Further research revealed that teaching history

in schools is viewed as the key building block for realising racial tolerance as well as for maintaining the harmony and racial integration of multi-racial society, Ahmada et al. (2010). Fifth, educational setting where school is suggested to be funded adequately, fairly, and integrated racially and socioeconomically (Hall, 2013). The provision of more scholarships and the creation of an academic environment that encourages free speech were among the recommendations made by young people for improving the educational system. This is because being comfortable with the surrounding environment could influence their level of racial tolerance and this was reflected in their willingness to interact and collaborate with students from different ethnic communities.

5. CONCLUSION

Malaysia's racial diversity has prompted policymakers to worry about two quite distinct ideals. They recognize the need of promoting racial tolerance for those with various cultural backgrounds; however, they worry about the consequences of increasing diversity on social cohesiveness. The emergence of a negative view of a particular race group is extremely dangerous in the student population because graduates from universities, who shape Malaysia policy for the foreseeable future, may also advocate for interracial cooperation. Thus for tolerance to work and coexist in society, this review concluded that there needs to be a mutual effort by all parties and stakeholders.

6. IMPLICATIONS

This systematic review focus on the education context is believed to give new insight to identify the pathways through which education leads to racial tolerance. Besides, this study shall explain why and how education context has an effect on racial tolerance of the students, either as a development or barrier factors. Moreover, the findings of this study have consequences for institutional practices, particularly in terms of the effect of institution microenvironments and the role of education in developing students across all moral development and attitude reformation criteria. These include policy and programmatic concerns both within and beyond the classroom.

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EFFECTIVELY PROMOTING DATA-DRIVEN LEADERSHIP AMONG EDUCATION LEADERS

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ABSTRACT - The school leader's role has become more challenging and complex. Principals face demands that request them to adapt continuously. Leadership demands need to be met in an era of continuous change, which is becoming harder and harder each year with the new challenges faced by school leaders. As a result, school leaders must utilize data from national accountability measures and other data resources accurately and appropriately in order to improve student achievement and progress. However, school leaders have access to various data resources. Not enough insights are gleaned from this data, creating a gap that is very clear when we see how school leaders benefit from the available data sources. This illustrates the importance of making educational leadership programs more relevant to data-driven leadership models. This research uses a scoping review method, which is a qualitative research methodology. The researcher scoped relevant published papers based on criteria to explore what is known from existing literature. This scoping review will follow the described steps by the Joanna Briggs Institute (Munn et al., 2022). Through scoping the literature, the researcher determined a group of factors and themes about the best resources and practices implemented by school leaders and successful projects in achieving data-driven leadership. Thus, these factors could effectively promote data-driven leadership among education leaders and can help to mind the gap. Future research should be conducted to gain a more comprehensive understanding of all the factors worldwide which affect this process, including a more diverse literature data set.

Keywords: Data-Driven Instruction (DDI); Data-Driven Decision Making (DDDM); Data-Driven Leadership; Scoping review.

1. INTRODUCTION

The school leaders' role has become more challenging and complex. According to Hoyle et al. (2005), school leaders have had access to a vast amount of data recently, but more insights should be gleaned from this data, creating a noticeable gap when we see how school leaders benefit from these data sources. Moreover, school leaders, teachers, and parents have issues and dislike how data is used in education, as stated by Selwyn (2018). Data now is creating a heavy burden on students to achieve results based on national data or anticipated worldwide results but not their actual level, which is transferred to teachers and school leaders. However, data is increasingly woven into the education system, showing how much positive effect it can have when used mindfully and insightfully. This illustrates the importance of making educational leadership programs more relevant to data-driven leadership models. Data-Driven Leadership was defined by Corsair (2017) as a commitment to using data to connect businesses with their customers, drive measurement and accountability, and guide resource allocation. Thus, this research is essential to discover how to effectively promote data-driven Leadership among education leaders and gather information about the best resources and practices used to achieve this goal from successful programs and schools. Also, school leaders should be taught how to experiment and learn from local and international real-life data to meet their schools' specific needs.

2. OBJECTIVES

The research objectives are:

- a) To scope literature for the main themes that corresponds to achieving data-driven leadership.
- b) To effectively promote data-driven leadership among education leaders.

3. METHODOLOGY

The qualitative Research Method used in this research is scoping review, the researcher scoped relevant published papers to explore what is known from existing literature about the main themes and points needed to achieve data-driven decision making (DDDM) and Data-driven instructions (DDI), this scoping review follows the described steps by the Joanna Briggs institute Munn et al. (2022), where the first step is to setup a protocol that pre- defines the research objective and the methods that will be used, secondly stating research objectives and questions clearly, thirdly, scoping existence literature following a set of established criteria, fourthly, the researcher searched more than one database, such as, Google scholar database, fifthly, the researcher conducted level one screening, which means screening the titles and the abstracts, sixthly the researcher moved to level two screening, where the researchers screened the full text of the chosen papers from the previous step, seventhly, the researchers chart the collected data and then presented the collected data in the form of a table, Eighthly, the collected qualitative data will be coded and organized into themes so then they can be represented and analyzed, this will lead to the ninth step, where the researcher reached to interpretations and conclusions that can be shared with education leaders and government agencies. The researcher considered ethical aspects of research when conducting data collection through the process of analyzing data up to the point of sharing conclusions and recommendations, such as, scoping high quality literature, being bias when collecting data, and lastly sharing results.

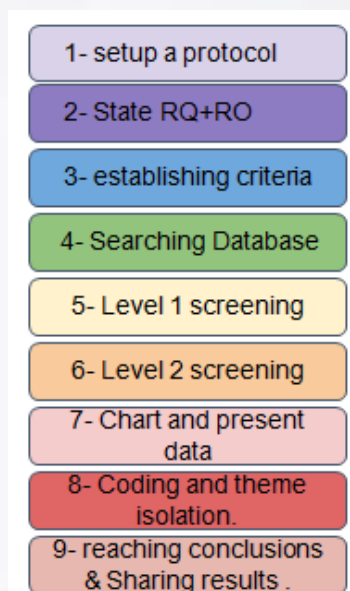


Figure 1. The Scoping review steps.

Number	criteria	Range
1	Date of publish	2017-2022
2	Publication Type	Books, indexed published papers.
3	Subject	Data-Driven Leadership in education
4	Paper Language	English only.

Table 1. The criteria used to include and exclude scientific papers used in your review

4. RESULTS AND DISCUSSION

Scoping the literature has revealed that improving data-driven leadership and achieving a data-driven environment applies to implementing certain factors and themes stated and discussed in the scoped literature. These aspects can be categorized into the following main points: First, improving school leaders' and teachers' capacities in data collecting, analysis, and interpretation, which could be achieved through professional development opportunities and data-centered coaching programs that can be delivered through school instructional coaches. Secondly, creating a data-driven culture that endorses data usage, data usage purpose, and data literacy has been achieved in most projects and schools that showed signs of successful data integrations in the scooped literature, which shows its importance.

Thirdly, providing training and support on how to use and analyze data, focusing on practical applications and case studies. Fourthly, connecting data to a maturity model so it can be assessed and supported. Fifthly, providing technological infrastructure and hardware, as the literature states, the readiness to use data and work with it is crucial to school leaders' success. Sixthly, providing local data and creating systems to timely access and share data. Seventhly, external resources and expertise can provide better solutions and a broader perspective. Providing schools with the needed support and expertise to improve their data-driven usage and skills, and eighthly, focusing on the deeper meaning of data and how to achieve equity, not only the data collection and analysis parts. These findings show that achieving a data-driven environment in schools is a challenging task and that leaders and ministries of education need to collaborate.

The scooped literature presented the previous eight factors as dominant with all projects that established successful and impactful data-driven leadership. Furthermore, other factors were also present but at a lesser frequency, such as the leader's attributes and personal character, which could have a positive or a negative effect on implementing data-driven models. The researcher believes that this could be related to the school leader's ability to adopt new changes and adapt to new changes. However, the researcher still thinks this could be solved by implementing a systematic change model to facilitate this change process and support the leader in his efforts. Other factors are presented in the literature, which presents the need for a deeper dive to gain a more diverse and profound understanding.

5. CONCLUSION

The researcher concludes that improving and promoting data-driven leadership among school leaders can be achieved by implementing certain aspects stated and discussed in the scoped literature. With the exception that some of these aspects are not internal to the school environment, thus, achieving these aspects needs the collaboration of government agencies, ministries of education, and the private sector. Moreover, education is a very complex

system. Therefore, data-driven leadership should not just focus on technology or data analysis but also on mindful insights that place the student at its center.

6. IMPLICATION

The scoped factors have helped successful leaders to achieve data-driven leadership and, therefore, can improve other school leaders' data-driven leadership, which will influence their ability to meet the specific needs of their schools. This research recommends using the previous eight factors to create a data-driven environment that fosters school leaders to be impactful data-driven leaders. These efforts should not be an internal effort only. External resources and partners must have an active role in these reformations. Moreover, more profound research should be conducted to gain a more comprehensive understanding of all the factors worldwide that affect this process.

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THE INFLUENCE OF AUTONOMOUS LEARNING ON ENGLISH MAJORS' CHINESE-ENGLISH TRANSLATION COMPETENCE IN CHINA

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ABSTRACT - This empirical study compares the influence of autonomous learning and traditional learning on English majors' Chinese-English (C-E) translation competence. "Learner autonomy" is also named as "autonomous learning", "independent learning". In C-E translation, autonomous learning offers a channel for learners to identify and analyze C-E translation problems and difficulties. Autonomous Learning activities includes learners' bilingual reading reflection, translation recording diary and group's accumulating C-E hot words, summarizing translation skills and correcting members' translation work. The research questions are as follows: 1) How do English majors in China evaluate their C-E translation competence? 2) How does autonomous learning work on English majors' C-E translation competence? 3) Is there any difference between experimental group (adopting autonomous learning) and control group (using traditional method) in their C-E translation competence? To address these questions, this research adopts the mixed research design integrating quantitative and qualitative data and applies the instruments including questionnaire, tests and interview. The results show that autonomous learning in C-E translation is favored by learners, and the participants' C-E translation competence in the experimental group has improved, exceeding that in the control group.

Keywords: autonomous learning; English majors; Chinese-English translation; traditional learning; translation competence

1. INTRODUCTION

As an interlingual and intercultural activity, translation serves as a bridge to connect China with the world. As Huang (2007) observed, it is a strategic task to improve China's translation level since translating Chinese into foreign languages is related to building China's international image. In order to cultivate qualified translators in telling Chinese stories well, it is essential to utilize efficient and feasible translation teaching and learning methods.

Translation teaching and learning falls into translator training as classified by Holmes (Toury, 2012) regarding translation studies. Traditional teaching and learning has played an important role in education due to its high efficiency in imparting knowledge, translation courses being no exception. According to Zhu and Xu (2010), in traditional teacher-centered translation teaching, translation teachers mainly evaluate students' translation competence from their translation products. Different from the traditional approach, autonomous learning emphasizes the active involvement of learners themselves. As Holec (1981) first introduced the concept of autonomous learning into the field of language teaching, he defined it as the ability to take responsibility for one's own learning. It is necessary to have autonomous learning in translation because translation requires a great deal of practice by learners themselves.

According to Ma (2013), translation teaching and learning are aimed at improving translation competence, which consists of bilingual communicative sub-competence, knowledge about translation sub-competence, strategic sub-competence, extra-linguistic sub-competence, and instrumental sub-competence. This research explores autonomous learning

in Chinese-English translation and compares the influence of traditional and autonomous translation learning models on English majors' C-E translation competence.

2. OBJECTIVES

- i. To master English majors' self evaluation of their C-E translation competence;
- ii. To investigate the influence of autonomous learning on English majors' C-E translation competence;
- iii. To explore whether there exist differences between the experimental group (adopting autonomous learning) and the control group (using traditional method) in English majors' C-E translation competence.

3. METHODOLOGY

a) Design

This research adopts a sequential embedded design (Creswell & Plano Clark, 2017) illustrated as follows in Figure 1:

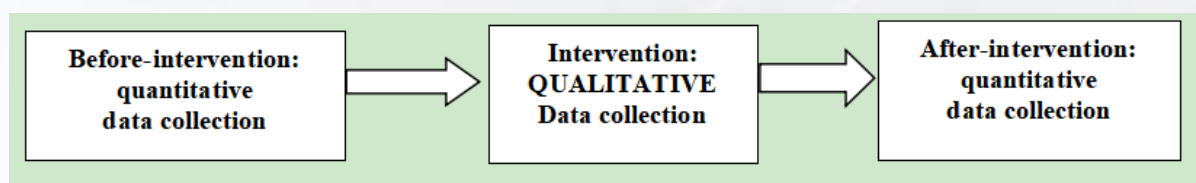


Figure 1 Sequential embedded research design

b) Instruments and Research Procedure

Before treatment, a scale-Likert questionnaire adapted from Yang (2016) was conducted to get participants' self-evaluation of their present C-E translation competence. In addition, a pre-test was implemented to get their C-E translation score for comparison with post-test. During the treatment, qualitative evidence gathered from students' reflective journals, translation diaries, group discussions and interviews were analyzed in a holistic and detailed way, all unveiling how autonomous learning works on English majors' C-E translation competence, the second research question. After experiment, quantitative evidence was collected by post-test which involved both experimental group and control group. The two sets of scores were processed by EXCEL and intends to answer the third research question. All this can be shown in detail in Table 1 :

Table 1. Instruments and data collection procedure

Stage	Before intervention		During intervention	After intervention
Instruments	Scale questionnaire	Pre-test	reflective journals, group discussion, interview	Post-test
Experimental Group	Result A	Outcome A1	Analysis A	Outcome A2
Control Group	Result B	Outcome B1	Analysis B	Outcome B2

c) Participants

The study was implemented among English juniors in Zaozhuang University, China. It had one Experiment Group of eight students and Control Group of six students. The participants' English proficiency were on the similar level with their CET (College English Test, a national English Proficiency Test in China) Band-4 score ranging from 500 to 550 points.

4. RESULTS AND DISCUSSION

Based on the research methods, the results of this study are divided into two broad parts as follows:

4.1 Results of quantitative data

a) Scale questionnaire

Twelve-item scale questionnaire was completed by participants of experiment group and control group. Total mean score of experiment group is 3.024, while that of control group is 3.22. Control group participants' self-evaluation of C-E translation competence is 0.196 higher than that of experiment group.

The mean score of English majors' self evaluation of current C-E translation competence is around 3 points (a 1-5 Likert Scale questionnaire) for both experiment group and control group, which demonstrates the participants' beginning level.

b) Results of pre- and post- test

In the pre-test, the mean scores of experiment group and control group were 61 points and 60.5 points respectively with a minor gap of 0.5 points. In the post-test, the mean scores of experiment group and control group are 69.6 points and 64 points respectively. The self-evaluation and pre-test outcomes of experiment group and control group manifested they were on the similar translation level; however, after eight weeks' study, the mean score of the post test showed a gap of 5.6 points, much wider than the pre-test gap of 0.5.

4.2 Results of qualitative data

c) Reflective journals

Participants in the experiment group took bilingual reading reflective journal and translation recording diary. By analysis, it was found that some could write detailed and inspiring journals covering translation strategies, resources referred to, gains from bilingual reading and independent thoughts, but others could not, just superficial recordings of words and sentences.

d) Group discussion

Participants in the experiment group formed two sub-groups with four in each. They had discussed problems and solving methods in translating texts via WeChat group. The details in discussion report included: the properness of word choice, the conciseness of sentence structure, how to determine the subject and predicate, and applying the resources on the Internet such as online dictionary. They compared each other's translated work and analyzed advantages and disadvantages, then achieving a consented group version.

e) Structured open-ended interview

Participants in the experiment group were interviewed individually by the researcher. On the one hand, they took a positive attitude of autonomous learning in improving Chinese-English translation competence; on the other hand, some problems and suggestions were discovered from the interview as follows: first, some had difficulty in writing translation recording diary since the problems they met were almost similar every time; second, some believe that discussing and recording the discussion process on WeChat was a little time-consuming and they preferred discussing face-to-face.

5. CONCLUSION

By engaging in these autonomous learning activities, students have increased their vocabulary, taken the initiative to gain theoretical knowledge about translation, and negotiated back and forth about the translated work in order to decide which version is better. Compared with traditional learning, autonomous learning stimulates learners' interest and equips them with practical translation learning methods. C-E translation competence of the participants in the experimental group has improved, exceeding that in the control group.

6. IMPLICATION

The study sheds light on further C-E translation teaching and learning for different stakeholders: for teachers, they should tailor teaching materials to learners' current C-E translation competence; furthermore, teachers should guide students in autonomous learning instead of passively instilling translation knowledge and strategies. For learners, they can improve their weak sub-competences and sharpen their translation strategies from vocabulary, syntax, and text accordingly. For learners, this study offers a channel to identify and analyze the translation problems and difficulties on their own and enables them to recognize that translation as a skill can only be mastered by abundant involvement by themselves.

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EXAMINING THE BRAIN FUNCTIONAL CONNECTIVITY PATTERN OF CHILDREN WITH DYSLLEXIA : AN EEG STUDY

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Abstract - Dyslexia is a hidden disorder that affects the ability to read in an individual. This disability brings a detrimental effect to a child's educational success as the world of knowledge is very much dependant on text-mastery. Children with dyslexia have disruption in their auditory and visual brain area that causes them to struggle to master the reading ability. There is various behavioural assessment done to evaluate their reading level but there is limited research done to examine their brain functional connectivity using electroencephalography (EEG). In this paper, we presented the initial work by making a comparison between age-matched typical readers and children with dyslexia when they were involved in rapid automatized naming (RAN) tasks. Results from the 2D topography images showed vey weak or no connectivity to important areas of the brain in charge of the reading process. The insights from this study are crucial to inform parents, teachers, and policy makers that the brain activates in a different way for children with dyslexia and there is an immediate need for evidence-based intervention to ameliorate their condition and help them to master reading ability.

Keywords: electroencephalography, dyslexia, brain functional connectivity, rapid automatized naming.

1. INTRODUCTION

Reading is fundamental in order for a person to excel in the school system. However, there are between 3 and 10% of children around the world who suffer from dyslexia, a hidden disorder that has no visible symptoms (Duff et al., 2014). Children with dyslexia have difficulty identifying the speech sounds within words or learning how each letter represents a different sound. This, in turn, impedes their ability to read like any other typically developing child. Since dyslexia is related to neurological differences, it is vital to examine the neural pathway of the reading process. Reading will activate the left hemisphere of the brain, which includes the visual cortex, occipital-temporal (OT), inferior frontal (IF), and inferior parietal (IP) regions as shown in Figure 1. Individuals with dyslexia do not generally experience this activation and struggle in the process of learning to read (Kearns et al., 2019).

Despite the fact that the exact cause of dyslexia is unknown, brain imaging studies have shown that the brain of a person with dyslexia develops and functions differently. Consequently, as technology advances, we have greater access to understand the functionality of the brain regions during the reading process. In this study, electroencephalogram (EEG) was adapted due to its cost-effectiveness and ability to focus on temporal resolution, which can detect changes within the brain in milliseconds (Fingelkurts et al., 2005).

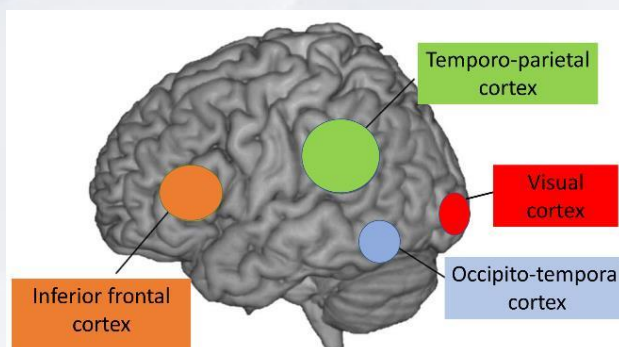


Figure. 1 Reading Circuit (Habib, 2021)

2. OBJECTIVES

This study intended to use EEG to examine the brain functional connectivity pattern of children with dyslexia when they were involved in the rapid automatized naming (RAN) tasks (Araújo & Faísca, 2019).

3. METHODOLOGY

There were 3 age-matched typical readers and 5 children with dyslexia at the age of 8-9 years old participated in this study. However, this paper will only highlight the findings from one typical reader and one child with dyslexia during one of the RAN tasks. EEG has been used to measure the pattern of the brain wave by placing electrodes on the scalp of the subjects. There were five RAN tasks given to the subjects namely; letter naming, digit naming, object naming, colour naming, and alphanumeric naming (a mix of digits and numbers) tasks. As one of the prerequisites of the study, the subject must be familiar with the stimuli being presented. When the subjects were engaged in the reading process, EEG signals were recorded from their brains to be analyzed after removing the artifacts using time- average differencing (TAD) method (Al-Naimi et al., 2022). EEG data were recorded using 19 channels electrodes cap during task completion. The sampling rate used for the recording is 500Hz using the 10-20 positioning system as shown in Fig.2. The signals were analyzed using partial directed coherence (PDC) method in order to examine the flow of information between the brain regions during the reading process.

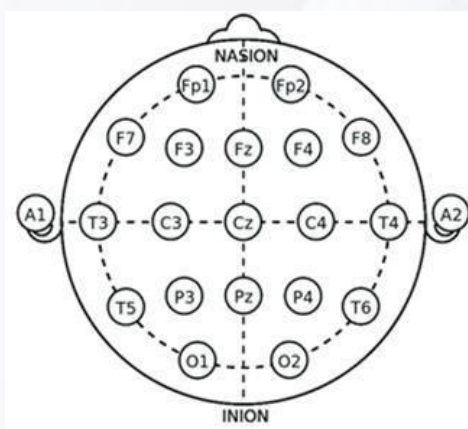


Figure 2 10-20 Electrodes Placement System (Rojas et al., 2018)

4. RESULTS

This section will discuss the results from the subjects when they involved in one of the RAN tasks, which is the letter naming task. The letter naming task consist of five rows and the timing selected for the analysis based on the timing the subjects took to name the first row of letters. The typical reader (TR) took 12 seconds to name the stimuli whereas the subject with dyslexia (SD) took 30 seconds to name the similar stimuli. The topography images in Fig.3 show the difference in the connectivity of the channels to the destination during the letter naming task. The red colour showed strong connectivity between the channels to the destination whereas the blue colour showed no connectivity. The TR showed strong connectivity in the left visual cortex (O1), parietal temporal (P3), occipito-temporal (T5), and inferior frontal (F7) which are the crucial regions for the reading process as shown in Fig.1. However, the SD showed lack of connectivity in all the important areas for reading at the left hemisphere but showed strong connectivity at the right temporal area (T6). This indicated that the SD used the right memory region to retrieve the stimuli but took a longer time to name them as there was no connectivity to the left hemisphere. By examining the 2D topography from PDC averaging, it is possible to determine the connectivity between the channels and the flow of information between the regions of the brain at a specific point of time.

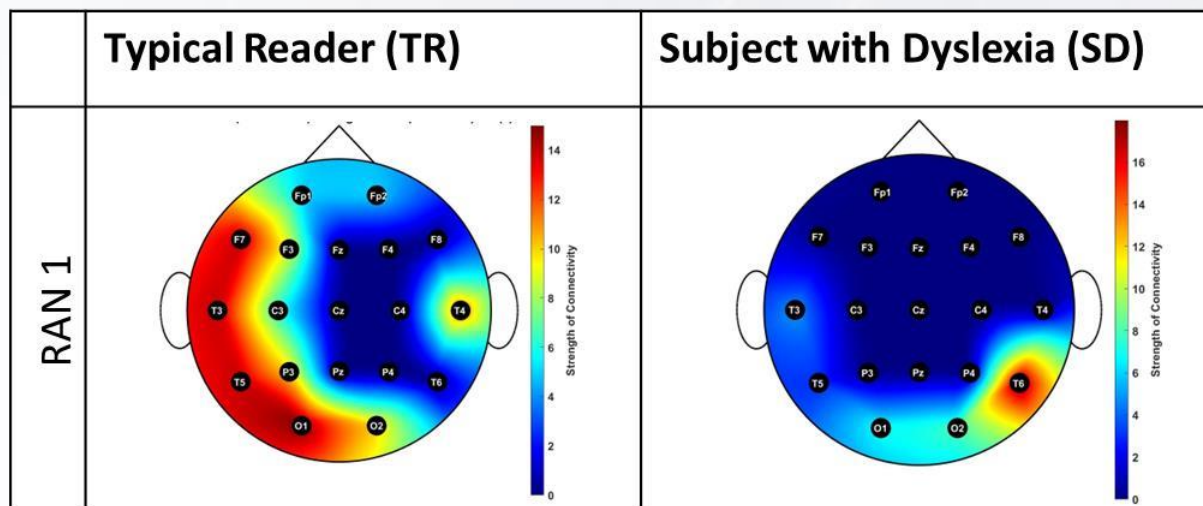


Figure 3 Comparison Between Typical Reader and Subject with Dyslexia

5. IMPLICATION FOR RESEARCH/POLICY

This research will be further extended by examining the brain functional connectivity of children with dyslexia before and after the implementation of a reading intervention. The information from this research will inform teachers, parents, and policy makers about the differences in the brain neural network of children with dyslexia as compared to typical readers. Early detection and effective intervention are the only remedies available for children with dyslexia in order to master the reading ability.

6. CONCLUSION

By using EEG, this study intended to investigate the brain functional connectivity between children with dyslexia and typical readers during RAN tasks. From the 2D topography being produced, there is a clear indication that the brain of children with dyslexia works differently from a typical reader and this, in turn, affects their reading ability. As a result of EEG signals, we can gain an understanding of how the brain processes information

and which regions of the brain are involved during certain reading activities like RAN tasks. Therefore, it is possible to detect neurological disorders like dyslexia early through the use of this information.

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ELEMEN MULTIMEDIA DALAM PEMBELAJARAN BERASASKAN WEB DI ABAD KE-21: SATU KAJIAN LITERATUR

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ABSTRAK - Penggunaan teknologi telah menjadi amalan biasa dalam pembelajaran abad ke-21 berbanding dengan Pengajaran dan Pembelajaran (PdP) secara konvensional. Perkembangan teknologi maklumat dalam pendidikan yang memfokuskan kepada pembelajaran secara digital terutamanya pembelajaran berasaskan web dilihat dapat meningkatkan produktiviti pelajar kerana mempunyai elemen fleksibiliti yang boleh dilaksanakan tanpa terhad. Namun begitu, dalam mengaplikasikan teknologi dalam PdP, ia memerlukan kompetensi literasi digital yang tinggi dan ini memberi cabaran kepada tenaga pengajar dalam menghasilkan bahan pengajaran yang interaktif terutamanya menggunakan platform pembelajaran berasaskan web. Oleh itu, kajian ini dijalankan bertujuan untuk membincangkan elemen-elemen multimedia yang diperlukan dan sesuai dalam menghasilkan pembelajaran berasaskan web yang interaktif. Penggunaan elemen yang tepat dan bersesuaian dalam pembelajaran berasaskan web dilihat mampu memberi impak positif dalam membantu meningkatkan keberkesanan proses PdP yang dijalankan.

Kata kunci: Teknologi pendidikan, pembelajaran berasaskan web, elemen multimedia, pembelajaran abad ke-21

1. PENGENALAN

Teknologi pendidikan semakin pesat berkembang di abad ke-21. Ia merupakan tempoh peralihan daripada pembelajaran berpusatkan guru (*teacher-centered*) kepada pembelajaran berpusatkan pelajar (*student-centered*). Ini akan menjadikan pembelajaran terhadap pelajar lebih berkesan dan tenaga pengajar hanya bertindak sebagai fasilitator (Fitri *et al.*, 2022).

Namun begitu, masih ramai tenaga pengajar menggunakan kaedah tradisional iaitu pengajaran secara bersemuka. Ini tidak memberi peluang yang lebih luas kepada pelajar untuk belajar secara berdikari dan menentukan pilihan masa secara bebas. Oleh itu, potensi teknologi pendidikan menggunakan pembelajaran berasaskan web dengan elemen multimedia dapat dimanfaatkan dan dimaksimumkan bagi meningkatkan pengalaman pembelajaran kepada pelajar (Osman *et al.*, 2022).

Elemen multimedia yang digunakan dalam pengajaran secara amnya adalah untuk membantu pelajar memahami dengan lebih mendalam tentang modul yang dipelajari selain menggunakan bahan bercetak yang disediakan oleh tenaga pengajar kerana setiap pelajar mempunyai stail belajar yang berbeza seperti visual, pendengaran dan kinestetik. Oleh itu, aplikasi pembelajaran berasaskan web yang disepadukan dengan elemen multimedia merupakan faktor utama dalam menjadikan bahan yang disampaikan lebih menarik dan menyeronokkan (Morley dan Parker, 2015) dan meningkatkan pengalaman pembelajaran (Osman *et al.*, 2022), terutamanya bagi mempelajari modul vokasional.

Antara modul vokasional yang menggunakan elemen multimedia dalam pembangunan pembelajaran berasaskan web adalah seperti AutoCAD 3D (Nurtanto *et al.*, 2020), elektronik (Miština *et al.*, 2018), automasi dan robotik (Klimasara *et al.*, 2011) dan banyak lagi modul-modul lain yang berkaitan. Penggunaan teknologi dalam proses pembelajaran khususnya pendidikan vokasional dapat menarik perhatian pelajar malah meningkatkan kepantasan pembelajaran (Nurtanto *et al.*, 2020).

2. OBJEKTIF

Kajian ini dijalankan bertujuan untuk membincangkan elemen-elemen multimedia yang diperlukan dan sesuai dalam menghasilkan pembelajaran berasaskan web yang interaktif. Elemen ini dikumpulkan berdasarkan kajian literatur berkaitan dengan elemen yang digunakan dalam pembangunan web.

3. METODOLOGI

Pangkalan data Scopus dan Google Scholar digunakan dalam kajian literatur ini melalui penerbitan seperti artikel, e-buku dan nota pengajaran dari tahun 2003-2022 (20 tahun). Kata kunci yang digunakan adalah "*Multimedia Element in Web*" dan "*Web Design*" bagi mendapatkan maklumat berkaitan dengan elemen multimedia yang digunakan dalam pembangunan web. Maklumat tersebut diterangkan melalui kajian literatur ini.

4. DAPATAN DAN PERBINCANGAN

Kajian literatur telah dijalankan bagi membincangkan elemen asas multimedia yang diperlukan dalam pembangunan pembelajaran berasaskan web. Multimedia merupakan gabungan beberapa jenis media iaitu teks, imej, gambar, audio, video dan animasi yang membantu dalam meningkatkan pemahaman dan hafalan pelajar (Guan et al., 2018).

4.1. Elemen Teks

Teks adalah elemen penting dari keseluruhan laman web yang dipaparkan dalam pelbagai *typeface*, warna dan saiz (Morley & Parker, 2015; Robbins, 2018). *Typeface Serif* selalunya digunakan untuk kuantiti teks yang banyak kerana lebih mudah dibaca. *Typeface Sans serif* pula sering digunakan untuk tajuk, baner laman web dan elemen teks lain yang biasanya dipaparkan lebih besar daripada teks badan atau yang memerlukan penampilan yang lebih tersendiri (Morley & Parker, 2015).

ABC DEFGHIJKLM NOPQRSTU WXYZ 0123456789	ABC DEFGHIJKLM NOPQRSTU WXYZ 0123456789	ABC DEFGHIJKLM NOPQRSTU WXYZ 0123456789	ABC DEFGHIJKLM NOPQRSTU WXYZ 0123456789
<i>Times New Roman</i>	<i>Cooper Black</i>	<i>Arial</i>	<i>Dom Casual</i>
<i>Serif TypeFaces</i>		<i>Sans Serif Typeface</i>	

Rajah 1. Koleksi teks dan reka bentuk *serif* dan *sans serif* (Morley & Parker, 2015)

Selain daripada pemilihan *typeface*, penggunaan saiz dan warna teks yang sesuai juga adalah penting. Kebiasaannya, saiz teks adalah sekitar 11 atau 12 (Morley & Parker, 2015). Penggunaan saiz teks yang lebih kecil adalah tidak sesuai kerana ia mungkin sukar dibaca. Sekiranya teks terlalu besar, ia akan mengambil terlalu banyak ruang pada skrin. Selain itu, kombinasi warna teks dan latar belakang laman web perlu diteliti bagi memastikan teks boleh dibaca (Morley & Parker, 2015; Robbins, 2018).

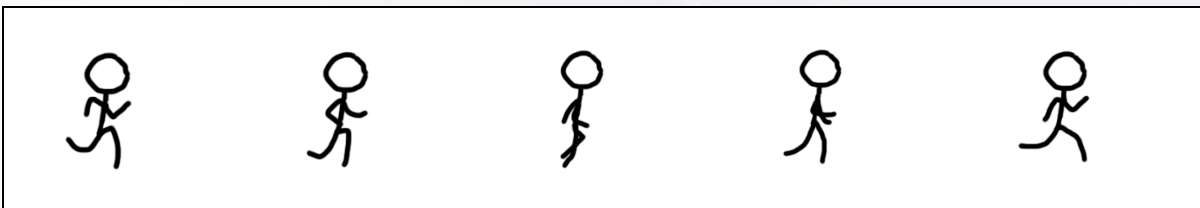
4.2. Elemen Imej

Imej atau grafik adalah merujuk kepada gambar digital, lukisan, carta dan objek visual yang lain. Ia berbeza dengan animasi atau video kerana imej adalah statik. Imej yang

digunakan pada laman web biasanya disimpan dalam format GIF, JPEG atau PNG. Format ini boleh dipaparkan menggunakan semua *browser* tanpa perlu menggunakan *plug-in* lain. Format fail dan saiz fail imej boleh diubah menggunakan program penyuntingan imej bagi membolehkan imej dioptimumkan untuk digunakan pada laman web. Imej JPEG beresolusi tinggi boleh disimpan dengan tahap pemampatan yang lebih tinggi untuk mengecilkan saiz fail imej supaya paparan lebih cepat apabila ia dimasukkan pada laman web. Ia juga boleh disimpan sebagai imej GIF beresolusi rendah untuk digunakan pada butang navigasi atau baner laman web (Huddleston, 2011; Morley & Parker, 2015).

4.3. Elemen Animasi

Animasi boleh dijadikan daya penarik kepada pengguna (pelajar) (Ambarwati et al., 2020; Putra et al., 2020). Elemen animasi adalah sangat penting dalam pembangunan pembelajaran berasaskan web kerana memudahkan penyampaian pembelajaran secara dalam talian (Putra et al., 2020) dan mempunyai terhadap motivasi pelajar dan pemindahan pengetahuan (Omar et al., 2019). GIF animasi perlu disimpan dalam fail GIF animasi khas untuk digunakan dalam laman web. Imej individu yang terkandung dalam fail GIF animasi seperti di Rajah 2 dipaparkan satu per satu untuk menjadikan simulasi pergerakan. GIF animasi sering digunakan untuk menukar imej yang dipaparkan dalam baner pengiklanan pada skrin (Morley & Parker, 2015).



Rajah 2. Siri imej yang dipaparkan satu per satu bagi menjadikan GIF animasi

4.4. Elemen Video

Kebiasaannya, video akan dimampatkan supaya saiz fail menjadi lebih kecil (Morley dan Parker, 2015). Video yang dipaparkan dalam laman web dirakam dengan menggunakan kamera video digital (kamera digital, telefon pintar atau tablet) dan kemudian diedit mengikut keperluan sehingga menghasilkan video yang diperlukan. Video yang dihasilkan juga boleh dikongsi di YouTube, Facebook dan laman media sosial yang lain. Selain itu, video juga boleh di strim secara langsung dari komputer atau peranti mudah alih (Morley dan Parker, 2015).

4.5. Elemen Audio

Audio adalah bunyi termasuk muzik, suara pertuturan dan suara latar. Kebiasaannya dalam laman web, bunyi digunakan sebagai muzik latar belakang dalam permainan, tutorial, video dan elemen multimedia lain. Audio boleh dirakam menggunakan mikrofon atau dimuat turun dari internet (terdapat fail muzik dan muzik latar belakang tersedia secara percuma). Saiz fail audio yang besar boleh dimampatkan kepada format MP3 untuk mengurangkan bilangan bait dalam muzik dengan mengekalkan kualitinya. Penggunaan pautan atau butang ke fail audio boleh digunakan pada laman web supaya audio boleh dilaraskan sendiri oleh pengguna. Bagi memastikan penghantaran audio pada laman web adalah cepat, fail selalunya digunakan dalam bentuk audio penstriman (Morley dan Parker, 2015).

5. KESIMPULAN

Pembangunan aplikasi pembelajaran seperti pembelajaran berasaskan web dengan penggunaan elemen multimedia interaktif amat berpotensi untuk meningkatkan kualiti pembelajaran. Penggunaan teknologi ICT mempunyai potensi besar dalam meluaskan perkhidmatan pendidikan kerana ia boleh diakses tanpa had melalui rangkaian internet. Penggunaan elemen multimedia dalam modul pembelajaran mampu menghasilkan media pembelajaran yang interaktif, bermotivasi dan mewujudkan suasana pembelajaran yang menyeronokkan (Prasetya et al., 2018). Penggunaan elemen yang tepat dan bersesuaian dalam pembelajaran berasaskan web dilihat mampu memberi impak positif dalam membantu meningkatkan keberkesanan proses PdP yang dijalankan.

6. PENGHARGAAN

Pengkaji ingin mengucapkan terima kasih kepada Universiti Teknologi Malaysia dan Jabatan Perkhidmatan Awam Malaysia atas sokongan mereka. Kerajaan Malaysia telah menyediakan pembiayaan dan biasiswa bagi kajian ini.

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UNIVERSITY ENGLISH TEACHERS' TEACHING COMPETENCIES IN CHINA: A LITERATURE REVIEW

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ABSTRACT - University English teachers in China comprise English as a Foreign Language (EFL) teachers for English-major students and College English (CE) teachers for non-English-major students in China. Teaching competencies of university English teachers have powerful effects on student learning and generally have several dimensions. However, there exist different taxonomies for the dimensions of teaching competencies. This article reviewed the dimensions of teaching competencies for university teachers, EFL teachers, and CE teachers between 2000 and 2022 in three databases: CNKI in China, ERIC and WoS. The purposes of this literature review are to (a) explore how the researchers have defined teaching competency; (b) explore the core dimensions of teaching competencies for university teachers; (c) explore the core dimensions of teaching competencies for EFL teachers who teach English-major students and those of CE teachers who teach non-English-major; (d) investigate the difference in core dimensions of teaching competencies between EFL teachers and CE teachers. The main conclusion is that the core dimensions of teaching competencies in the two teacher categories stay almost the same. There are around four dimensions with slightly different wording and phrasing: language proficiency, professional knowledge, teaching skills, and teaching ethics. The article helps university administrators to assess teacher performance and so improve higher education quality. Recommendations for future research are also offered.

Keywords: teaching competencies; core dimensions; university English teachers; EFL teachers; CE teachers

1. INTRODUCTION

English as a Foreign Language (EFL) is learnt by English majors in their entire four years. College English (CE), a basic and mandatory course for all non-English-major students in China's universities and universities, is learnt 1-2 years and also plays an important role in developing students' language abilities as well as cultivating international talents for China (Shu, 2020). It is worth noting that in this review EFL teachers in higher education refer to the non-native English teachers lecturing English to English majors while CE teachers refer to the non-native English teachers lecturing College English curriculum to non-English-major students. The two teacher categories are called English teachers when added up as a whole.

Although English education has made a great contribution to cultivating international talents in China, English teachers in colleges and universities didn't equip themselves with adequate teaching competencies (TCs). Quite a lot of research studied TCs of EFL teachers or CE teachers by giving different definitions and dimensions in different models, however, the comparisons between TCs of EFL teachers and CE teachers are understudied.

The comparisons of the two teacher categories should be studied because the similarities in the two TC models may simplify the dimensions in the final TC model of all English teachers, making it convenient for the English teachers themselves to refer to and improve their teaching quality. Also, it becomes easier for educational administrators to assess English teachers' performance in a much clearer way.

2. OBJECTIVES

- a) To identify definitions of TC.
- b) To identify core dimensions of university teachers' TCs.

- c) To identify core dimensions of TCs for EFL teachers for English majors and CE teachers for non-English majors.
- d) To investigate the differences in core dimensions of TCs between EFL teachers and CE teachers.

3. METHODOLOGY

To identify relevant studies of university EFL teachers' and CE teachers' TCs respectively, three of the main online databases were used with the time restriction between 2000 and 2022: CNKI (China National Knowledge Infrastructure) in China, ERIC and WoS. The emphasis is, of course, more placed on CNKI in China because the study was to focus on EFL teachers and CE teachers in China's universities. The search terms included but are not limited to EFL teacher competency, English teacher competency, College English teacher competency, teaching ability, and teaching competency. A second retrieval was performed. Two search procedures presented a total of 319 potentially relevant studies.

4. RESULTS AND DISCUSSION

This part answers the research questions based on research objectives.

4.1 Definitions of Competency and Teaching Competency

The definitions of competency in China have fallen into three categories, some focusing on underlying personality traits, some on explicit behavior, and some on functions. The commonalities lie in that competencies acknowledgedly include personal characteristics such as knowledge and skills.

The reviewer agrees on the most recognized definition came from McClelland (1998) who suggested that competency distinguished outstanding employees from ordinary ones and it involved some effectively measurable motivation, traits, self-concept, attitude, value, knowledge as well as some identifiable behavioural demonstration of expertise. Teaching competency, therefore, is a collection of the potential characteristics and abilities needed in teaching involving some effectively measurable motivation, traits, self-concept, attitude, value, knowledge as well as some identifiable behavioural demonstration of expertise.

4.2 University Teachers' Core Teaching Competencies

Table 1 shows a matrix of the research on university teachers' TC models.

Table 1. Representatives of university teachers' TC models (He, 2014)

Researchers	Research Instruments	Research Conclusions
Y. Wang et al (2006)	Behavior event interviews, questionnaire surveys	University TCs includes 7 domains: creativity, ability to absorb information, interpersonal understanding, responsibility, ability to establish a relationship, thinking ability and achievement orientation.
Yao Rong (2008)	Questionnaire surveys	University TCs includes 7 dimensions and 33 indicators: personal characteristics (responsibility, confidence, integrity, stable emotion, self-evaluation, acuity, perseverance, optimism); developmental characteristics (entrepreneur, self-development, creativity, learning ability, ability to collect information); working attitude (professional values, sacrifice, patience, loving teaching, course proficiency); teaching skills (expression, power, classroom controlling, practice ability); professional skills (knowledge base, research ability); concerns about students (understand and respect students, care for students, responsibility for students); personal communication (teamwork, good listeners, coordination, effective communicators, easy-going, forgivingness).
Niu & Zhang (2012)	Behavioural Event Interview, O* NET job analysis	University TCs include 8 indicators: creativity, critical thinking, teaching strategies, attention, social service consciousness, logic and analytic ability, achievement desire, and respect for others.
Huang Yan (2013)	Analytic hierarchy process, interviews, Delphi method	University TCs include 5 dimensions 19 indicators: education and teaching competencies (teacher-student relationship, classroom teaching, practice and internship supervision, micro-teaching and thesis supervision, teaching improvement and research, students' achievements); scientific research competency (research programs and finance management, research outcomes and rewards, research cooperation and sharing); social service competency (engagement in university public welfare, engagement in public welfare of other social institutions, engagement in social academic service related to one's professional knowledge); teacher morality competency (political morality, professional morality, academic morality); quality development competency (knowledge, skills, physical and mental quality, of self-development consciousness and ability).

From what has been reviewed, it can be seen that the methods to construct the dimensions of university teachers' TC model are various. Generally, there exist five methods for the research to adopt: Behavioural Event Interview, Delphi method, Analytic hierarchy process, questionnaire surveys and O* NET job analysis. It is suggested that at least two methods be adopted to decide on the dimensions of university teachers' TC models, the core dimensions of which involve professional knowledge, skills, and value.

4.3 University EFL Teachers' Core Teaching Competencies

EFL teachers' TCs either as a whole or from particular curricula were reviewed. EFL teachers' TCs generally are divided by some researchers into three general dimensions including language proficiency, professional knowledge, and teaching skills, as Richards (2010) put forward, although some researchers (J. Wang, 2018; Wu, 2005) complemented teaching views or ethics to the three dimensions.

4.4 College English Teachers' Core Teaching Competencies

There are around four dimensions with slightly different wording and phrasing from those in EFL teachers' TCs: language proficiency, professional knowledge, teaching skills, and teaching ethics.

5. CONCLUSION

Language proficiency is what both EFL and CE teachers should possess. There are around four dimensions in TCs of the two teacher categories with slightly different wording: language proficiency, professional knowledge, teaching skills, and teaching ethics.

Future work would be recommended to investigate university English teachers' TCs not only in China's developed areas (Huang, 2015) but also in other less developed areas, especially the southwestern part of China where higher education needs much improvement. Also, their TCs related to the currently heated educational issues can be explored like TCs for deep learning, TCs for Ideological and Political Education, etc.

6. IMPLICATIONS

By referring to the core dimensions of university English teachers' TCs, The university English teachers change their teaching concepts, improve their teaching skills, and enhance their research ability more quickly, which makes a significant influence on teachers' professional development (Xie, 2015). Students are thus cultivated to become 21st-century talents to transcend the language itself and become critical thinkers, real-life problem solvers, all-life learners, etc. Besides, the core dimensions of TC models help university administrators to rank the English teachers' professional titles, optimize the faculty structure, and improve the competitiveness of university English teachers and even the university itself.

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THE NEED ANALYSIS OF e-MODULE DEVELOPMENT INTEGRATED WITH PROBLEM-BASED LEARNING ON CHEMICAL EQUILIBRIA TO IMPROVE STUDENTS' HIGHER-ORDER THINKING SKILLS

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ABSTRACT - This research seeks to identify the requirements for developing a Problem-Based Learning e-Module for Chemical Equilibria in order to improve students' Higher Order Thinking Skills (HOTS). Eight teachers from form six colleges and centres in Penang participated in this qualitative study employing a semi-structured interview technique. The results of the interviews were analyzed using NVivo 12 by dividing the transcripts into multiple codes based on a thematic analysis approach. The need analysis interviews revealed four major themes: (1) The significance of Chemical Equilibria, (2) Difficulties in teaching and learning Chemical Equilibria, (3) Teaching Strategy, and (4) Desired improvement. The findings of this study indicated that Chemical Equilibria is an essential topic for students to master in the Form 6 curriculum. Still, it was the hardest concept for students to understand and for teachers to explain. The findings of the interviews also revealed that teachers required an e-Module integrated with Problem-Based learning due to a lack of teaching resources, the content of the curriculum, and the absence of students' critical thinking abilities. In addition, instructors recommended diversifying the modules' content, strategies, and technologies. These results indicate that teachers are still dissatisfied with the existing instructional materials and strategies and require an e-Module to meet their needs. Using schematic diagrams, all themes and codes are summarised from the findings. The findings of this study are crucial to ensuring that the design and development of an e-Module integrated with Problem-Based Learning for the topic of Chemical Equilibria is implemented and has a positive impact on the increase of the HOTS level among Form 6 students.

Keywords: Higher Order Thinking Skills; Problem Based Learning; Chemical Equilibria; e-Module; Qualitative Approach.

1. INTRODUCTION

To be effective in the twenty-first century, the traditional teacher-centered learning model must give way to student-centered learning. One suitable strategy for achieving this goal is the use of teaching and learning modules. According to previous research, using modules in teaching and learning can benefit students of all abilities (Richeal et al., 2021). Modules can also help students solve Chemistry problems more effectively and connect newly learned theory to prior knowledge, which can help them learn (Siregar et al., 2019).

The emphasis on knowledge in the Chemistry curriculum is supplemented by instructions for students to develop better attitudes and skills. This demonstrates the significance of emphasizing HOTS aptitude in Chemistry. Teachers' teaching methods are critical in providing opportunities for students to develop the ability to deal with problems and tasks cognitively, which contributes to the development of students' HOTS (Tsaparlis, 2020). Many teachers, however, continue to use teacher-centered learning, which causes students to be passive, only listening to teachers and memorizing information, making it difficult for students to master HOTS (Fajari et al., 2020).

This situation makes teaching and learning activities less effective. There is no denying that most teachers have begun to incorporate ICT into the preparation of teaching materials. However, according to a Malaysian Ministry of Education report, there are still

teachers who do not use ICT to implement the teaching and learning process. As a result, the e-Module developed in this study is expected to be used as an alternative teaching and learning material to aid in the improvement of students' conceptual understanding and HOTS.

2. OBJECTIVES

This study was conducted as a result of the researcher's desire to learn more about the need for developing an e-Module Integrated with Problem-Based Learning on Chemical Equilibria to improve the HOTS of Form Six Students.

3. METHODOLOGY

This qualitative study employs the semi-structured interview method, in which the researcher acts as moderator and creates semi-structured questions to gather information from all participants. The Nor Tutiani (2019) instrument served as the foundation for the semi-structured interview protocol. This protocol seeks to collect verbal data from Chemistry teachers regarding the importance of Chemical Equilibria, the difficulties associated with teaching and learning Chemical Equilibria, the instructional strategies employed, and suggestions for improving the essential components and content that should be included in the e-Module to improve students' HOTS.

Eight teachers from six colleges and centres in Penang participated in this study. Informants are chosen using sampling techniques with a specific intent. The interviewees (teachers) were selected based on the following criteria; have at least five years of experience teaching Form Six Chemistry and a Bachelor's degree in Chemistry or Science. These standards are established to ensure that the selected teachers or subject matter expert can provide the necessary information (Akbari & Yazdanmehr, 2015).

For data analysis, several procedures were carried out, including data preparation (transcripts of expert interview data), data organisation, and data coding with specific codes. During the implementation of the semi-structured interviews, audio recordings were utilised to collect the data. The complete interview transcript was then provided to the informant for content review and verification. Using the NVivo 12 software, each interview transcript was analysed, divided into smaller codes, and coded according to the theme of the pertinent research question.

4. RESULTS AND DISCUSSION

This study's objective analysis revealed four themes:

4.1 Theme (i): The Importance of Chemical Equilibria

Two codes – the basic concept and application – have been developed to explain Chemical Equilibria. Figure 1 summarises interview data themes and codes.

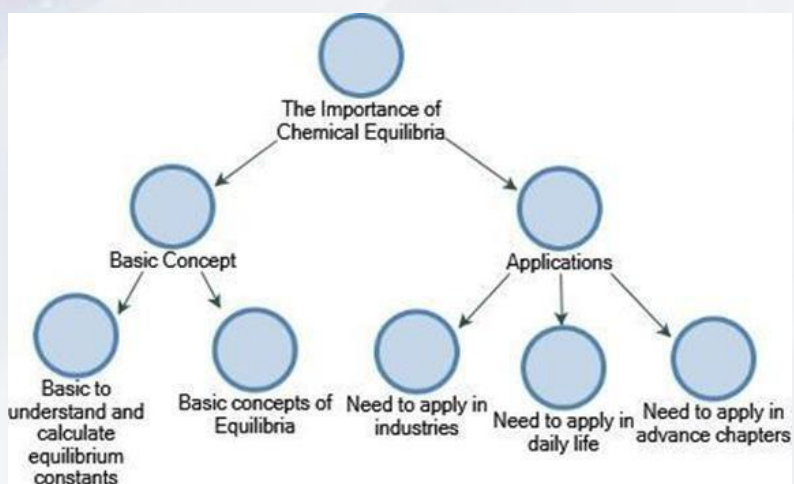
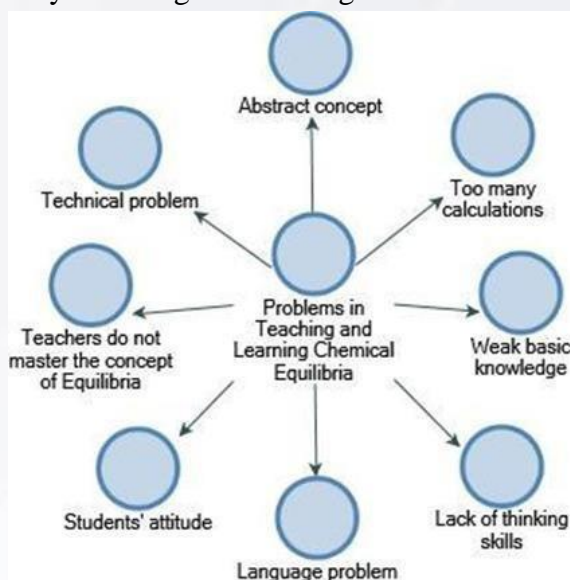


Figure 1. Importance of Chemical Equilibria

Chemical Equilibria is a key concept for all eight participants. According to some sources, understanding Chemical Equilibria can increase output and reduce losses. Sources say students can solve pollution by identifying its causes using Chemical Equilibria.

4.2 Theme (ii): Problems in Teaching and Learning Chemical Equilibria This theme yielded eight codes. Figure 2 shows themes



and codes.

Figure 2. Problems in Teaching and Learning Chemical Equilibria

Chemical Equilibria are abstract, according to the analysis. Some sources said students found many calculations difficult. Students struggle because they do not get enough practice and must move on before fully understanding Chemical Equilibria. Students struggle to understand basic concepts, according to the study. Students' inability to think critically hinders their mastery of Chemical Equilibrium. Diverse and underprivileged student backgrounds hampered language comprehension, according to several sources. Students had trouble learning concepts because of unclear notes and questions.

Analysis shows that student attitudes are a problem. Students' unwillingness to ask questions, lack of focus, lack of cooperation, and inability to complete tasks are attitude issues. Many teachers don't understand Equilibria. The informant admitted that Chemical Equilibria was difficult to understand and required more time to review, making it difficult to explain.

Technical issues are also a challenge in teaching and learning chemistry, according to the results. The syllabus is late. Informant: Animation and video can help students visualize abstract ideas. Due to technical issues like a lack of internet in the classroom, teachers can't download YouTube videos. Under this technical problem code, some informants cited a lack of teaching aids. Lack of teaching resources is one of their biggest challenges when explaining Chemical Equilibrium.

4.3 Theme (iii): Chemical Equilibria Teaching Strategies

Several learning methods have been presented. Figure 3 summarises the Chemical Equilibria teaching strategies code.

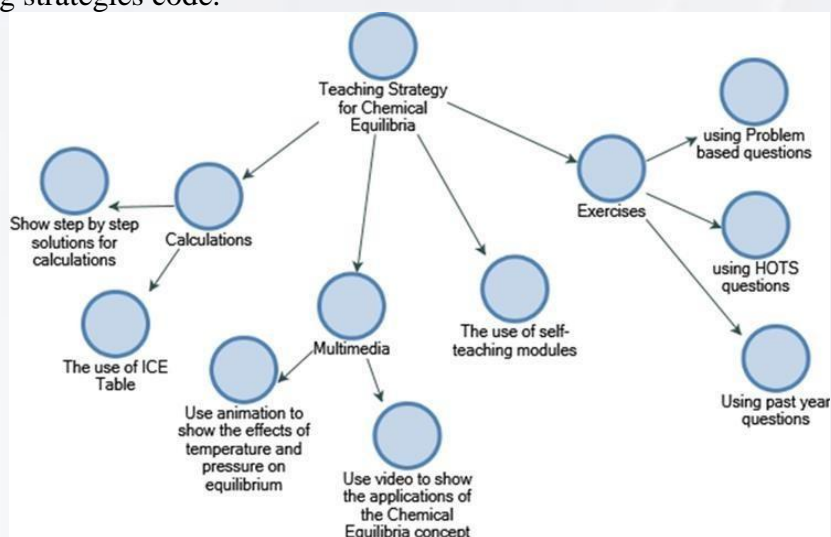


Figure 3. Chemical Equilibria Teaching Strategies

Most informants agreed that they use many exercises to teach Chemical Equilibria because most of its sections involve calculations. Some informants suggested using the ICE Table to teach this topic, especially for Equilibrium Constant questions. All respondents agree that multimedia is important for teaching Chemical Equilibria. Videos and animations can help students visualize Le Chatelier's Principle, they said. The self-learning module usage code was mentioned. All informants created a teaching module for Chemical Equilibria.

4.4 Theme (iv): Desired Improvement for Teaching and Learning of Chemical Equilibria

Two principal codes, problem-based learning and technology, encompass the desired improvement suggestions for teaching and learning Chemical Equilibria to improve students' HOTS achievement. Figure 4 summarises the developed themes and codes.

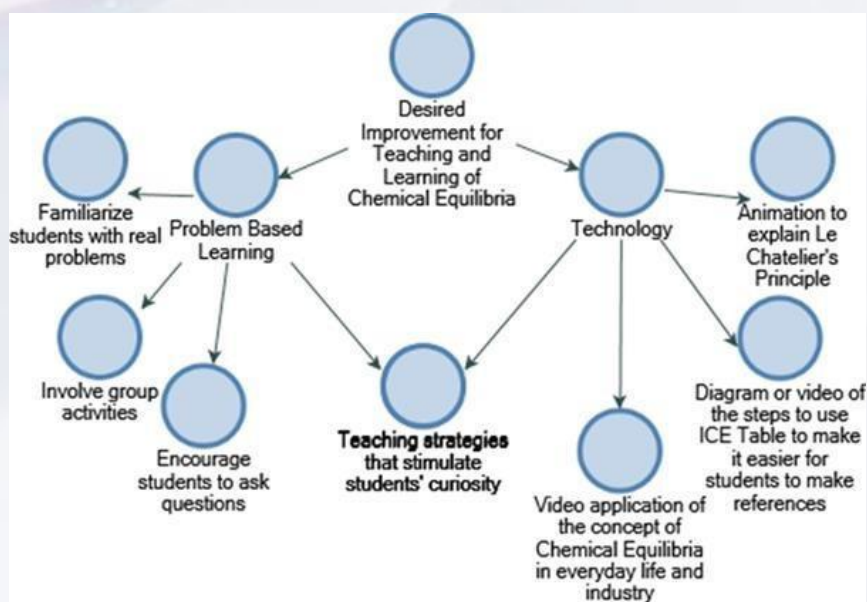


Figure 4. Desired Improvements for Teaching and Learning Chemical Equilibria

Nearly all the informants agreed that students need real-world problems to become familiar with HOTS questions and as a problem-based learning alternative. Informants agreed that problem-based learning is ideal for this topic because it encourages student participation through group projects. Participating in group activities and encouraging others to ask questions improves students' communication skills. The informant suggests a way to spark students' interest. Problem-based learning is recommended to teach and learn Chemical Equilibria.

The technology code includes a learning approach code to engage students. Using a video to introduce Chemical Equilibria can spark student interest in the lesson. This keeps students engaged. Some sources said animation can help students understand Le Chatelier's Principle. Diagrams show how to use the ICE Table and solve real-world problems. This helps students remember references and solve problems.

5. CONCLUSION

According to eight teachers, Chemical Equilibria helps students integrate knowledge across Chemistry topics. This subject has many industrial and daily life applications. Chemical Equilibria students cannot understand abstract and complex concepts. According to Jusniar *et al.* (2020), Chemical Equilibria's abstract concepts and use of representations make it difficult to understand. All teachers should know and use the learning strategies for using HOTS to teach Chemical Equilibrium. Teachers should use different methods and be open to new ideas.

6. IMPLICATION

This study helps teachers and researchers narrow their focus so they do not do too much teaching that gets in the way of learning. This method creates effective interventions. Based on the four themes identified, an alternative teaching module must be developed to aid in the teaching and learning of Chemistry and the application of HOTS for Chemical Equilibria for both teachers and students. Everyone interviewed believes using technology to study Chemical Equilibria is relevant and essential in the digital era. Additional research should focus on the effects of digital literacy on form six students and Chemical Equilibria.

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CONCEPTUAL MODEL FOR INITIATIVES AND ENTERPRISES SKILLS INTEGRATION IN THE CURRICULUM OF ELECTRICAL TECHNOLOGY EDUCATION

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ABSTRACT - The existing Electrical Technology Education (ETE) curriculum of Nigerian universities has been complained for not creating employable alumnae that contend at international markets. The content of the curriculum indicates a reduced amount of 21st Century skills due to lack of conceptual model that can guide its application. 21st Century skills refers to non-technical courses including Initiatives and Enterprises skills that may likely help ETE graduates to obtain positive social relationships and contributes to the work setting. Exploratory sequential design was used in this study. The interview data were collected from 10 industry and analyzed using coding process. Analyzed interview results: structured questionnaire which was validated by 4 expert and the reliability alpha value found was 0.854. The survey data was collected from 528 ETE graduates, 22 ETE lecturers and 96 industry and analyzed using Stepwise Linear Regression to produce best elements of Initiatives and Enterprises skills. The research gap and best results of elements of best elements of Initiatives and Enterprises skills were used to developed new conceptual model for the integration of Initiatives and Enterprises skills in ETE curriculum. Fifteen indicators of initiatives and enterprises skills found from interview results were work improvement, ideas creation, ideas construction, ideas development, change acceptance, change adjustment, ideas sharing, knowledge sharing, opportunities identification, strategic vision development, long vision creation, new situation adaptation, friendship with colleagues, patient skills at workplace and sense of humour. The best elements of initiatives and enterprises skills for ETE Curriculum Integration by Graduates, ETE lecturers and Industry Technical Managers were ideas creation skills, change acceptance skills, long-time vision creation skills, work improvement skills and patient skills at workplace. It is recommended that the best elements of initiatives and enterprise skills be integrated in ETE Curriculum.

Keywords: Initiatives and Enterprises Skills, Curriculum, Technology Education, Electrical Technology

1. INTRODUCTION

The existing Electrical Technology Education (ETE) curriculum of Nigerian universities has been complained for not creating employable alumnae that contend at international markets (UNESCO Institute of Statistics, 2007). The content of the curriculum indicates a reduced amount of 21st Century skills due to lack of conceptual model that can guide its application (NUC, 2018; Mohammed and Ismail, 2019). 21st Century skills refers to non-technical courses including Initiatives and Enterprises skills that may likely help ETE graduates to obtain positive social relationships and contributes to the work setting (Caleb and Udofia, 2013; Down, 2012).

Many countries have integrated their educational systems with initiatives for their small, medium and big enterprise developments. For example, United States had integrated its educational system with ethics and integrity to produce honest and responsible employees for industrial and economic developments (Shipuri and Kim, 2004). Also, Malaysia had integrated western and eastern education to produce not only competent but also good employees (Hashim, 2008). The initiatives of European Union in their education and training package include greening and sustainability, innovation, digitalization and entrepreneurship (D'Avolio, 2021). One of the initiatives of United Kingdom Universities for graduates'

employability is involving employer and work experience in the design and delivery of education and training curricular (William and Cranmer, 2009). Some initiatives of Polish and Lithuanian Universities for the improvement of social and industrial enterprises are provision of entrepreneurial knowledge and skills in the education curriculum (Greblikaite, et al., 2016).

2. OBJECTIVES OF THE STUDY

- i) To Explore the perceptions of industry on Initiatives and Enterprises skills for ETE curriculum.
- ii) To Determine the best elements of Initiatives and Enterprises skills for ETE curriculum
- iii) To Develop a conceptual model for the integration of Initiatives and Enterprises skills in ETE curriculum

3. RESEARCH QUESTIONS

- i) What are the perceptions of Industry on Initiatives and Enterprises skills for ETE curriculum?
- ii) What are the best elements of Initiatives and Enterprises skills for ETE Curriculum?
- iii) What is the conceptual model for the integration of Initiatives and Enterprises skills in ETE curriculum?

4. METHODOLOGY

Exploratory sequential design was used in this study. The interview data were collected from 10 industry and analyzed using coding process. Analyzed interview results: structured questionnaire which was validated by 4 expert and the reliability alpha value found was 0.854. The survey data was collected from 528 ete graduates, 22 ETE lecturers and 96 industry and analyzed using Stepwise Linear Regression to produce best elements of Initiatives and Enterprises skills. The research gap and best results of elements of best elements of Initiatives and Enterprises skills were used to developed new conceptual model for the integration of Initiatives and Enterprises skills in ETE curriculum

5. MAIN RESULTS

The results of this study are presented according to research questions:

i) Interview Results: Fifteen indicators of initiatives and enterprises skills found from interview results were work improvement, ideas creation, ideas construction, ideas development, change acceptance, change adjustment, ideas sharing, knowledge sharing, opportunities identification, strategic vision development, long vision creation, new situation adaptation, friendship with colleagues, patient skills at workplace and sense of humour.

ii) Survey Results: The best elements of initiatives and enterprises skills for ETE Curriculum Integration by Graduates, ETE lecturers and Industry Technical Managers were ideas creation skills, change acceptance skills, long-time vision creation skills, work improvement skills and patient skills at workplace.

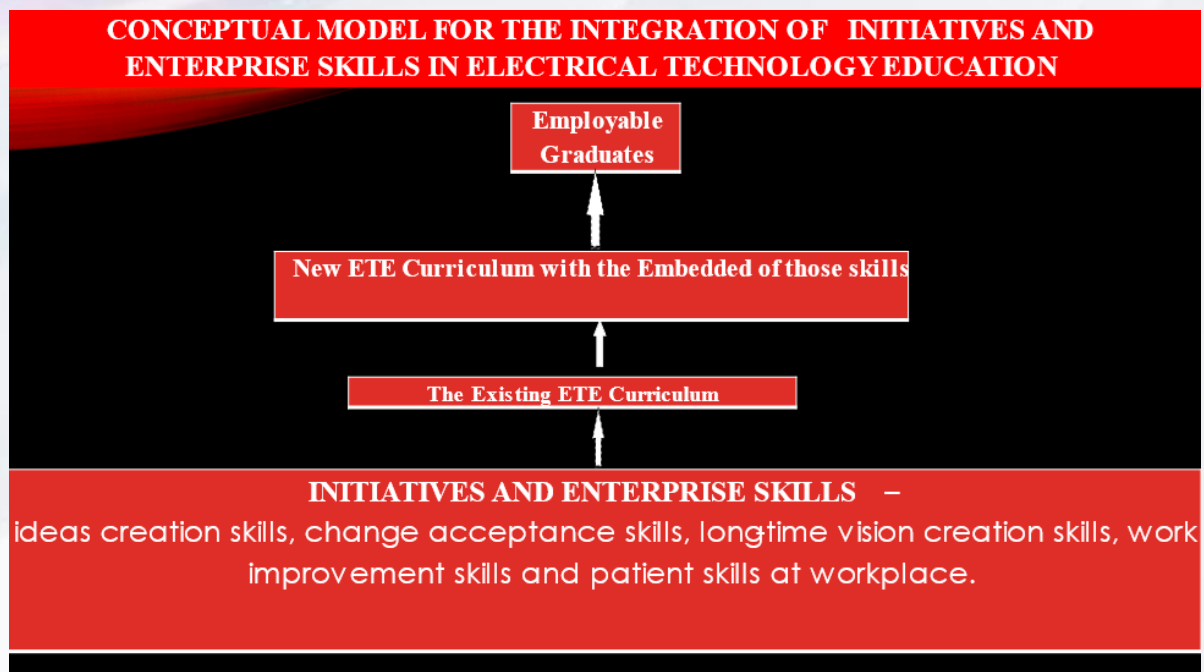


Figure 2: Conceptual model for the Integration of Initiatives and enterprise Skills in ETE Curriculum

6. IMPLICATIONS OF THE STUDY

The findings of this study suggest that building Initiatives and Enterprises skills may likely have impacts on performance of undergraduate students in the university ETE academic courses as well as performance of ETE graduates during working life in industry. The employee equipped with the elements of Initiatives and Enterprises skills will likely create new business ideas, improve general work setting and create short and long term vision of the industry.

7. CONCLUSION

In conclusion the concept of employability skills which include Initiatives and Enterprises skills is new in Nigeria and has not been integrated into tertiary education system of the country as such there is need for Initiatives and Enterprises skills to be integrated at graduate levels in Nigeria. Also, TVET institutions in Nigeria should focus and equip the students with the Initiatives and Enterprises skills. Finally, this study has developed a Conceptual Model for the Integration of Initiatives and Enterprises skills in ETE Curriculum to be use in Nigerian universities.

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ADDITIVE MANUFACTURING AS A MEANS OF SELF- RELIANCE JOB CREATION FOR TVET UNDERGRADUATES IN KANO- NIGERIA

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ABSTRACT - Technical, Vocational Education and Training (TVET) undergraduate programmes at Nigerian tertiary institutions have been criticized for not meeting the anticipated programme goals, due to the challenges of insufficient resources for training, inadequate infrastructure, and inadequate collaboration between TVET tertiary institutions and private sectors. These lead to the underachievement of the programme goals and TVET undergraduates' difficulty to get employed after graduation. This study was conducted to explore the potential job area for self-employed applying additive manufacturing technology based that TVET final-year students are interested to work under those challenges. 169 final-year technical education students at two universities offering TVET programmes in Kano, Nigeria were involved in this survey study. A set of a questionnaire developed was validated by three experts in the field of technical education and Cronbach's Alpha reliability value was 0.86. The descriptive statistics of mean and standard deviation were used for data analysis. The finding of the study showed that the jobs that are additive manufacturing technology based in which the students are more interested were making toys, creating and customizing household items, and making items for interior decorations. This study recommended that the additive manufacturing technology base should be introduced and implemented in the TVET curriculum to provide a new area of job creation to be ventured for TVET undergraduates at the tertiary institutions of Nigeria. This initiative is seen can reduce the unemployment rate among TVET undergraduates in Nigeria.

Keywords: additive manufacturing technology base; technical education; Self-reliance; TVET; job creation.

1. INTRODUCTION

Technical, Vocational Education and Training (TVET) is the study of technological skills and sciences acquisition, attitudes, and practical skills related to various occupations such as metalwork technology, woodwork technology, building technology, and electrical technology, among others. besides the acquisition of general education, Federal Republic of Nigeria, (2014). The main purpose of technical education is the training of skilled-oriented people who are to be the inventors, implementors, and facilitators of the nation's progress technologically. When these people are technically knowledgeable, it may likely lead to self-reliance, which has a direct effect on a country's development, Okoye and Arimonu, (2016). TVET undergraduate programmes of Nigeria's tertiary institutions have been criticized for not meeting the anticipated goals, this might be due to the challenges of insufficient resources for training, inadequate infrastructure and collaboration between tertiary institutions and the private sector among others. These and other reasons may likely lead to the underachievement of the goals of the programme, where most of the students find it difficult to start a job after graduation Serumu, (2014), Akinyele and Bolarinwa, (2018). Hence there is a need for the integration of new technology that may likely augment the inadequate infrastructure for effective training and job creation, which additive manufacturing (AM) may serve. AM is a process by which 3D solid objects of any shape can be formed from a digital file using Computer-Aided Design and Drafting (CADD) Mpofu, Mawere, and Mukosera, (2014).

2. OBJECTIVES

The objectives of the study are to explore the possible jobs that TVET undergraduates may be interested in creating using additive manufacturing technology (AMT), its benefits to them, awareness of its contribution to sustainable development, and the challenges of its implementation into TVET programmes of Nigerian tertiary institutions.

3. METHODOLOGY

The study adopted a descriptive survey design, which is a procedure in quantitative research where the researchers administered a survey questionnaire to a sample or to the whole population to describe their opinions, attitudes, behaviours, or characteristics (Creswell, 2012). Bayero University, Kano and Kano University of Science and Technology, were the study area. 325 final-year students from the department of technical education in the study area constituted the population. A total number of 169 (N) students were selected as the sample for the study, the selection was based on the Research advisor (2006). A simple Random Sampling technique was used in the selection.

The instrument used for data collection was a structured researcher-made questionnaire from the reviewed literature and the researchers' experiences, titled 3D printing jobs. The instrument is a four-point rating scale of Strongly Agreed (SA), Agreed (AG), Disagreed (DA), and Strongly Disagreed (SD) with numerical values of 4, 3, 2, and 1 respectively. The instrument was faced and content validated by three experts in the field of Technical Education. The reliability of the instruments was obtained using Cronbach's Alpha, and the correlation coefficient reliability index score of 0.86 was obtained. Data collected from the respondents were analyzed using Mean (\bar{X}) and Standard deviation (Σ). For decision, an item with a Mean (\bar{X}) of 2.50 and above was considered high Mean (\bar{X}), which indicates that the respondents agreed with the item. Any item with a Mean (\bar{X}) rating of less than 2.50 was considered not agreed upon.

4. RESULTS AND DISCUSSIONS

4.1 Result on jobs interest

The respondents showed great interest in the AMT jobs, the standard deviation (Σ) of 0.45 showed the respondents are close to their responses based on the grand mean of 3.52. The finding brought up nine jobs in which the TVET students showed interest to establish using AMT, those jobs like making interior decorations, and models, are related to building technology and woodwork technology, making machine parts, utensils, and agricultural equipment are related to Metalwork and Automobile technology. Kianian, Tavassoli and Larsson (2015) said that AM contributes to job creation in the development and production stages, manufacturing and service sectors. Hence, proper integration of AM in the TVET curriculum might serve as a tool for job creation among TVET students.

4.2 Result on additive manufacturing advantages

The result of the study disclosed that the respondents agreed with all the advantages that can be gained using AMT, with a grand mean of 3.46 and 0.40 Standard deviation (Σ), Job creation is one of the major benefits of additive manufacturing to TVET undergraduates besides it helps in enhancing the design and creative ability of the students by widening the horizon of their thinking and innovation capability. Franco, Devós Ganga, Santa-Eulalia, and Filho (2020) mentioned some benefits of AM such as enhancing mass customization

capability, increasing customer/client interaction, increasing product design freedom, increasing product diversity and reducing production complexity. These benefits supported the finding of this research work.

4.3 Result of awareness on additive manufacturing

The result showed that the respondents are aware of the contribution of AMT towards sustainable development, having a grand mean of 3.72 and standard deviation (Σ) of 0.37 which indicated the closeness of their decision. It can be seen that with the use of additive manufacturing real object can be imitated and produced which can serve as a better instructional aid for students learning, and it promotes innovation and ensure sustainable patterns of production and does not harm the environment, there is no doubt in the contribution of AM toward a greener environment. The study of Ford and Despeisse (2016), buttressed this, which clearly said that AM plays a part in the transition towards a more sustainable industrial system and job opportunities.

4.4 Result on challenges of implementation of additive manufacturing

The result showed that there are challenges regarding the implementation of AMT in Nigerian higher institutions, with a grand mean value of 3.67 and a Standard deviation (Σ) of 0.36. It is discovered that AM is just an emerging technology, and most of the TVET programmes stakeholders have less knowledge about its impacts which may lead to giving it less priority or concern as it requires expensive 3D printers, computers, and staff training. Hence, there is a need for an awareness campaign for higher institutions' stakeholders on the importance of AMT. This study has a similarity to that of Maihöfer and Gernreich (2019), who said. there is a low level of knowledge about AMT among some stakeholders.

5. CONCLUSION

It is concluded from the results of this study that TVET undergraduates of tertiary institutions in Nigeria are highly interested in the jobs they can establish using AMT, this shows the level of readiness the students had in learning the technology, and they are aware of the advantages, contributions, and challenges of the implementation of additive manufacturing into the TVET curriculum of the Nigerian institutions. The study recommended the integration of the technology into the TVET programmes in Nigerian tertiary institutions.

6. IMPLICATION

This implies that the research work might serve as an eye-opener to tertiary institutions' stakeholders offering TVET programmes and avenues that highlighted the prospect of AMT as a new area of job creation to be ventured for TVET undergraduates at tertiary institutions in Nigeria. This initiative may reduce the unemployment rate among TVET undergraduates in Nigeria, due to its various applications in the area of building technology, woodwork technology, metalwork technology, automobile technology and electrical technology. Thus, identifying the self-reliance Jobs that TVET students can establish using AMT in Kano-Nigeria is highly crucial.

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CONCEPTUAL MODEL OF COMPUTER AIDED DESIGN AND DRAFTING SOFTWARE INTEGRATION IN TE CURRICULAR OF UNIVERSITIES IN KANO, NIGERIA

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ABSTRACT - The curricula of Technical Education in Nigerian universities give less emphasis to modern design technology due to the unavailable model that can guide its implementation. Hence, this study was conducted to develop a conceptual model of Computer Aided Design and Drafting (CADD) Software for Integration into undergraduate Technology Education (TE) curricula and to identify if statistically significant differences between the control and experimental groups exist during testing the effectiveness of the model. The study employed a quasi-experimental research design. 90 final-year TE students from Mechanical, Construction and Electrical programmes in the two universities in Kano Nigeria were purposely chosen as a sample of the study. They were taught using the software of Solidworks 2020, Chief Architect X2, and AutoCAD Electrical for the integration into the TE curricula. The reliability coefficient value for the research instrument used was 0.89. Data collected was analyzed using a T-test with the aid of SPSS computer software. The findings of the study showed that there is a significant difference between the experimental groups and the control groups. Finally, it is recommended that the conceptual model should be integrated into the tertiary institution TE curricula of the universities in Kano as it may serve as a means of training the graduates with skills required for today's industries.

Keywords: Conceptual Model; Technical Education; Computer-Aided Design; Drafting; Integration.

1. INTRODUCTION

Current Technology Education (TE) curricula of Nigerian Universities have been challenged for not meeting the desired goals. The curricula give less emphasis to modern design technology due to the unavailable model that can guide its implementation. The constant changes and evolution of new technologies mandate the paradigm shift from traditional design technology to modern Computer-based Technology. Thus, Computer- Aided Design and Drafting (CADD) software was introduced in the design process used to increase the productivity of the designer, improve the quality of drawings, improve communications through documentation, and create a database for manufacturing (Robinson and Amadi 2015).

Relying on traditional technical drawing courses in Nigerian Universities may likely cause the graduates of the programmes to lack the required skills to compete in the global market, as they cannot design and operate Automated Machines such as Computer Numerical Control (CNC) Machines. The applications of CADD software have NOT been integrated into TE Programmes in the 2018 National Universities Commission (NUC) Benchmark Minimum Academic Standard for Undergraduate Programmes in Nigerian Universities (NUC, 2018). Therefore, there are needs for research in education and training that will prepare current and future citizens for the new knowledge and CADD skills to address the contemporary issues facing the country, such as graduate employability and skills development. Hence, the study developed a conceptual model for the integration of Computer Aided Design and Drafting (CADD) Software in Kano Universities' undergraduate TE curricula.

2. OBJECTIVES

The main objective of the research is to develop and test a conceptual model for integrating CADD software into TE curricula by determining if a significant difference exists between TE final-year students taught with the manual drafting method and those taught with the newly developed model of CADD software.

3. METHODOLOGY

A quasi-experimental research design was used in this research work in form of a post-test. According to Dinardo (2008), a Quasi-experimental design is a research design used to estimate the causal impact of an intervention on its target population. The research design involved experimental and control groups, achievement tests in industrial design and drafting technology on Mechanical TE-related programmes, Construction TE-related programmes, and Electrical TE-related programmes were developed and validated before it was administered for the pilot study. A good reliability coefficient of 0.89 was attained before proceeding with the data collection for the study. 392 and 249 final year TE Students of Bayero University Kano (BUK) and Kano University of Science and Technology (KUST) were the study population. 90 students from both universities were purposively selected as experimental and control groups for each programme namely Mechanical, Construction, and Electrical TE Programmes. 45 participants for each group.

The experimental group were taught the contents of CADD based on their area of specialization, Solidworks for Mechanical related programmes, Chief Architect Premier X12 for Construction related programmes, and AutoCAD Electrical for Electrical related programmes for 6 weeks. The same contents were taught to the control group using traditional design and drafting methods. The instrument used for data collection was developed by the researchers titled the performance evaluation test (PETEST). The data collected was analyzed using a T-test with the aid of SPSS software to determine the statistically significant differences that exist between the two groups.

4. RESULTS AND DISCUSSION

4.1 Conceptual Model for CADD Integration

The conceptual framework for this research was built based on the Constructivism theory. Aldoobie (2015) stated that constructivism theory has a great impact on both the learner and the instructor when integrated with technology. Also, the technologies get benefit from using the theory as learners will become very active and more responsible about what they learn. Lewandowski et al. (2019) presented evidence of substantial differences in the same occupation conducted using different methods, as the technology-based method influences the task content of the workers. The integration of the CADD design process began at the initial stage, then teaching the experimental group to test the effectiveness of the model before agreeing on its fitness.

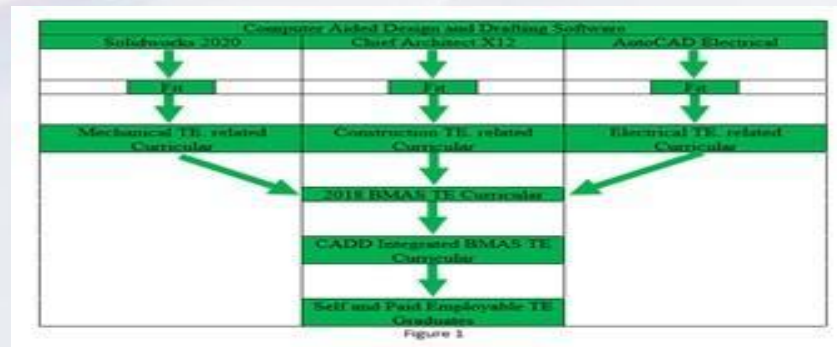


Figure 1. Final Conceptual model for the Integration of CADD software applications into the TE Curricular in Kano Universities, Nigeria

4.2 Post-test Results

Table 1. Post-test result of Independent samples t-test analysis of experimental and control groups for Mechanical related TE programmes

Groups	N	Mean	SD	Df	A	t. cal	t-crit	p-value	Decision
Experimental	30	69.13	11.441						
				28	0.05	19.833	2.048	0.000	Rejected
Control	30	51.34	4.689						

Table 1 above, indicates that the calculated t-value (19.833) > the table value ((t-crit) 2.048) with 28 degrees of freedom at 0.05 level of significance. This implies a statistically significant difference exists in the academic performance between the two groups, therefore, the null hypothesis is rejected. This is in line with that of Shixin, Fenping and Fuxun (2014) who pointed out that the traditional design method could not fully satisfy the learning needs of mechanical courses..

Table 2. Post-test result of Independent samples t-test analysis of experimental and control groups for Construction TE related programmes

Groups	N	Mean	SD	Df	A	t. cal	t-crit	p. value	Decision
Experimental	30	70.55	11.494						
				28	0.05	21.397	2.048	0.000	Rejected
Control	30	51.45	4.383						

Table 2 above, it shows that the calculated t-value (21.397) > the table value ((t-crit) 2.048) with 28 degrees of freedom at 0.05 level of significance. This means that there is a statistically significant difference in terms of academic performance between the experimental group and the control group, therefore the null hypothesis is rejected. This is in line with Huang (2017) research work where he said using construction CADD software reduced the rework rate, construction cost, and construction period.

Table 3. Post-test result of Independent samples t-test analysis of experimental and control groups for Electrical related TE programmes

Groups	N	Mean	SD	Df	A	t. cal	t-crit	p. value	Decision
Experimental	30	70.21	11.542						
				28	0.05	20.335	2.048	0.000	Rejected
Control	30	51.81	4.727						

Table 3 above, shows that the computed t-value (20.335) > the table value ((t-crit) 2.048) with 28 degrees of freedom at 0.05 level of significance. This indicated that there is a significant difference in the academic performance between the two groups, hence, the null hypothesis is rejected. This conforms with that of Chandra (2021) who stated that AutoCAD Electrical make the production of prototypes easy and enables easy modification.

5. CONCLUSION

This study was carried out to establish if teaching TE-related courses in Mechanical, construction and electrical using CADD software would improve learning. The experimental group were trained using CADD software of Solidworks 2020, Chief Architect X12, and AutoCAD 2020 Electrical for the mechanical TE-related programmes, construction TE-related programmes, and electrical TE-related programmes respectively, while the control group of the three programmes were trained using traditional design and drafting methods. Finally, the experimental group trained using CADD software was found to have the skills needed to fit in the global market as industries changed from traditional design to modern design processes.

6. IMPLICATION

The result of the study revealed that a significant difference exists between the experimental group and control group of the mechanical TE related programmes, Construction TE related programmes, and Electrical TE related programmes, when taught with Solidworks 2020, Chief Architect X12, and AutoCAD 2020 Electrical respectively, which means the designed conceptual model will serve as a guide for the integration of CADD into TE programmes of Nigerian universities. This will invariably help in improving the qualities of the graduates and increase their chances of employability and self-reliant income generation.

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EFFECT OF ROE’S CAREER DEVELOPMENT TECHNIQUE TOWARDS STUDENTS’ CAREER PREFERENCE AMONG SECONDARY SCHOOL STUDENTS OF KANO STATE, NIGERIA

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ABSTRACT - The study assessed the effect of Roe’s career development technique towards students’ career preference among secondary school students of Kano State, Nigeria. The main objective of the study was to find out effect of Roe’s career development on career preference preference among secondary school students of Kano State. The study adopted quasi experimental design in form of pretest, posttest control group design. The population of this study comprised both male and female 14,508 SSS II with 60 students as a sample size from of Gwale Educational Zone, Kano Stat. The data collection instrument used in the study for identification, pretesting and post-testing on students is an adopted instrument namely: ‘Career Orientations Inventory’. The validity and reliability of the instrument was obtained and the reliability index of 0.73 was established. Descriptive statistics in form of frequency and percentage was used to answer the research question while t-test for independent sample was used to test the null hypotheses of the study at 0.05 level of significance. The study found out that: the level of career preference among the students is low with 42.16%, there is significant effect of Roe’s career development technique on career preference (p-value= 0.000) as well as there is significant difference in the effect of Roe’s career development technique on career preference between boys and girls SSS II students of Kano State (p-value= 0.004). Based on these finding the study recommends among others: School counsellor should structure Roe’s career development technique and assumptions into a school comprehensive Career and Vocational Guidance and Counselling programs.

Keywords: Career guidance; Career Preferences; Vocational Guidance; Roe’s career development technique

1. INTRODUCTION

The study designed to assessed the effect of Roe’s career development technique towards career preference among secondary school students of Kano State. Career preference is a free opportunity to select a desired career and decision-making in a confusing situation which occurs during the senior schools’ level (Angela, 2014). As claimed by Ullah and Yahya (2021) “external factor such as parents’ choice of what course their child to study, this affects the child’s interest to study, they may go to school but it’s for compliance because they are not interested in the course they are studying”. Roe’s Theory of career Development is among the various theorists of career choice developed by Anne Roe, a clinical psychologist (1904–1991) was born and raised in Denver, Colorado (Niles & Harris- Bowsbey, 2017). The publication of the book Psychology of Occupations introduced Roe’s most enduring scientific contribution. Ann Roe suggested a personality approach to career choice based on the premise that a job satisfies an unconscious need but some refer to her work as the Person-environment theory which is primarily psychoanalytic, though it also draws on Maslow’s Hierarchy of needs.

Choosing the perfect career that will fit is one of the most important and crucial decision that every person has to make. At this stage, self-realization, role try-outs, occupational explorations in schools, and finding the first job is the tentative step. Then, it is the responsibility of guidance counsellors to supply these students with enough and pertinent information and proper interpretations concerning their abilities, aptitudes, interest, needs, temperament and personal characteristics to help them make crucial decisions.

2. OBJECTIVES OF THE STUDY

The objectives of the study were to:

- i) find out the level of career preference.
- ii) find out effect of Roe's career development on career preference
- iii) find out difference in the effect of Roe's career development technique on career preference based on students' gender.

3. METHODOLOGY

The study adopted quasi experimental design in form of pretest, posttest control group design. The population of the study comprised both male and female 14,508 SS II students with 370 as a sample size in senior secondary schools of Gwale Zonal Education Directorate, Kano State using stratified random sampling technique. And 60 SS II students were selected to participate in the experiment. The data collection instrument used for was an adopted instrument namely: 'Career Orientations Inventory'. The validity and reliability of the instrument was obtained and the reliability index of 0.73 was established. The study was carried out in the following three phases as: Pretest Phase, Treatment Phase and Posttest Phase. Descriptive statistics in form of frequency and percentage was used to answer the research question while t-test for independent sample was used to test the null hypotheses of the study at 0.05 level of significance ($p < .05$).

4. RESULTS

Table 1. Level of Career Preference among SSS Students, Kano State

Variables	Frequency	Percentage
1. Students with low career preference awareness	165	44.59%
2. Students with effective career preference awareness	205	55.41%
Total:	370	100%

Source: *Field Work, 2022*

Table 1 above presents the level of career preference awareness among secondary school students of Kano State. It presents that, students with low career preference awareness are 165 with (44.59%) while the students with Good Study Habits are 205 with (55.41%). Therefore, the above analysis present that, **44.59%** of secondary school students in Kano State have low level of career preference.

Table 2. Career Preference Posttest Mean Score between Treatment and Control Groups

	N	Mean	SD	t-value	df	p-value (2-tailed)
Treatment Group	30	44.32	6.82	28.04	29	0.000
Control Group	30	17.51	2.90	26.04		

p-value 0.000 < 0.05 = significant

The above table shows t-test analysis for related sample career preference mean score between treatment and control groups of senior secondary school students in Kano State exposed to Roe's career development technique. It shows that, the p-value is (0.000) tested at 0.05 level of

significance, hence the p-value 0.000 is less than 0.05 level of significance and as such the null hypothesis is rejected and maintained that, there is significant effect of Roe's career development technique towards career preference among secondary school students of Kano State.

Table 3. Career Preference Mean Score Difference between Boys and Girls

	N	Mean	SD	t-value	df	P-value (2-tailed)
Post-Test Boys	15	46.20	8.12	2.718	28	0.003
Post-Test Girls	15	38.54	5.96			

p-value 0.001 < 0.005 = significant

Table 3 above shows t-test analysis for posttest career preference mean scores between boys and girls senior secondary school students exposed to of Roe's theory of career development technique in Kano State. It shows that, the p-value is 0.003 tested at 0.05 level of significance hence the p-value is less than 0.05 level of significance as such the null hypothesis is rejected and reveals that, there is significant difference in the effect of Roe's career development technique towards career preference between boys and girls secondary school students in Kano State in favor of boys.

5. DISCUSSIONS

The study found out that, 44.59% of secondary school students in Kano State have low level of career preference. The 44 percent obtained is higher it is almost 50%, this mean there is need for more effort to orient students on career issues especially at secondary school level because critical decisions on career choice are made during this level. To understand career preference, Pascual (2014) conduct a study to determine factors affecting students' career preference of University of Rizal System Laboratory School in Morong Rizal and the findings revealed the availability of work after college is the first consideration of students in choosing a course in college.

Another finding of the study presents that, there is significant effect of Roe's career development technique towards career preference among secondary school students of Kano State (p-value= 0.000). This shows that, Roe's career development technique improves students' career orientations, career motive and career decision-making skills. This finding is in line with the experiment of Cakir (2013) on the effect of group psychological counselling response program on career decisiveness skills, created a group Guidance program on the career indecision level of higher school students and the result of the study showed decision-making skills of the students have improved. The last finding of the study revealed that, there is significant difference in the effect of Roe's career development technique towards career preference between boys and girls secondary school students in Kano State in favor of boys (p-value= 0.003).

6. IMPLICATIONS FOR RESEARCH

The implication of the study identified low level of career preference among secondary school students and there is need to intensified training and orientation on career preferences and vocational choice among secondary school students. The curriculum of secondary school should be design as a career and vocational oriented curriculum especially

incorporating vocational and career theories postulations. This study structured Roes' theory of career development into career development counselling sessions to improve level of career preference among students, therefore there is a need for school counsellors at all educational level to adopt it in their school career guidance programs.

7. CONCLUSION

The study concluded that, the level of career preference awareness among the students is low with 42.16%, there is significant effect of Roe's theory of career development technique on career preference and there is significant difference in the effect of Roe's theory of career development technique on career preference between boys and girls senior secondary school students of Nasarawa Local Government, Kano State.

8. RECOMMENDATIONS

The following recommendations were made:

- i. School counsellor should structure Roe's career development technique and assumptions into a school comprehensive Career and Vocational Guidance and Counselling programs.
- ii. A standard and well-designed Roe's theory of career development technique on career preference should utilize in secondary school students of Kano State as part of comprehensive vocational and career guidance and counselling program.
- iii. The comprehensive vocational and career guidance and counselling services program should consider gender differences and peculiarities among senior secondary school students of Kano State.

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DIFFICULTIES FACED BY THE REAL ESTATE VALUATION INDUSTRY TO PRODUCE FUTURE READY REAL ESTATE VALUATION GRADUATES

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ABSTRACT - Nowadays, people are discussing modern technologies like Industrial 4.0, big data, automation, Artificial Intelligence (AI), blockchain, Internet of Things (IoT), proptech, and fintech. Our standard of living and way of life have both improved thanks to all these innovative technologies. Big data, blockchain, AI, and automated valuation models (AVMs) are some of the technological advancements that have had an impact on the real estate industry as a whole and the role of the valuer particularly. In terms of the valuation process, the role of the valuer, and the added value to clients, the valuation profession is likely to experience significant changes in the upcoming years. Additionally, there is a dearth of academic studies in Malaysia that concentrate on valuation-related topics; instead, real estate programmes generally discuss them. In light of these circumstances, it is crucial to determine whether our undergraduate real estate valuation education curriculum and academic syllabus align with the most recent business trends. Since it is decisive to preserve or improve the standard of undergraduate valuation education, graduates should be better prepared to enter the valuation industry. The goal of this study is to identify the difficulties faced by the real estate valuation industry and the strategies being used by the industrial players to produce real estate valuation graduates who are prepared for the future. Therefore, it is critical to improve the standard of undergraduate valuation instruction and get the next generation of graduates ready for the valuation industry.

Keywords: Real estate; Education; Valuation; Industry; Future Ready Graduate

1. INTRODUCTION

The world is changing. Digital era is emerging. With technological advancements, our lifestyle has improved. The real estate valuation profession is undergoing evolutions and transformations as a result of being immersed in the digital world. Technological developments in big data, blockchain, artificial intelligence (AI) and automated valuation models (AVMs) have impacted the real estate valuation industry. Real estate and construction are significant sectors in the economy. In both cases, a substantial amount of capital is employed as well as a significant proportion of the workforce (Nikolai Siniak et al., 2020). In the era of smart sustainable development and growth (European Commission, 2010a), companies are interested in solutions that can enable their processes, machines, employees, and even their products and services themselves to be integrated into a single integrated network of processes, machines, employees, and even the products and services themselves to be collected, analyzed, analyzed, and evaluated for the purposes of evaluating the development of the company and improving performance. Therefore, many steps in a valuation process, including data collection and data analysis, are performed using computerised models, which in turn facilitates many aspects of the valuation process. It seems that the valuation profession is going to experience a paradigm shift. However, the question is if our valuation practitioners have prepared for this industrial revolution in order to sail through this strong technology wave. Keeping up with the demands is critically compulsory of today's global business environment requires continual improvement in productivity, quality, agility, and service levels (European Commission, 2010b).

2. OBJECTIVES

The study identifies the difficulties faced by the real estate valuation sector and practical strategies being employed by practitioners to prepare recent real estate valuation graduates for the future. In recent years, several instances have indicated graduates aren't prepared for their profession after graduation.

3. METHODOLOGY

This research is based on a critical content analysis of the selected literature in order to conduct the research. There has been a considerable amount of literature on valuation including peer reviewed journal articles, website articles, and insight papers from professional associations that relate to the current practice of valuation with its challenges, and the future of the valuation professions. Throughout this research, every issue involving the necessity for the company to have expertise in the field as described in the writings of the previous researcher will be investigated and used as a source of relevant information. As an additional source of information, the results of the interrogation and analysis of the content are compiled in order to aid in the researcher's research.

4. DIFFICULTIES WITHIN VALUATION INDUSTRY AND ITS STRATEGIES

Every profession has its own limitations and difficulties, and the real estate industry is no exception. This is especially true in terms of ensuring that the graduates are better equipped to meet the demands of this real estate professional field.

4.1 Technological Progress (Automated Valuation Models)

A review of an insight paper of a UK-based professional body for surveyors, Royal Institution of Chartered Surveyors (RICS), indicates that 'Automation and the use of digital data impact the whole valuation process, for almost all asset types and across the majority of world markets' (RICS, 2022, p. 2). Besides, Zrobek, Kucharska-Stasiak and Renigier-Bilozor (2020) found that property valuers are not capable of performing increasingly sophisticated market data analysis as they are lacking the necessary skills and knowledge. In fact, most of them are concerned about their employment and eventually being eliminated from the professional community. Further, local practitioners find that Automated Valuation Models (AVMs) may pose a threat to their business income. This is because the AVMs' developers are trying to persuade banks to adopt this software and bypass valuers' services. Consequently, this will affect the valuation of businesses by banks. Sad to say, banks tend to accept this suggestion. At this time, it is just a matter of professional indemnity insurance. As of yet, local insurance companies are not acknowledging the situation. However, the software developers are trying to approach insurers in other countries to obtain approval. To overcome all these challenges, it is paramount to maintain the sustainability of the valuation profession. In order to stay competent and resilient, RICS conducted a survey and proposed six recommendations. These include (1) embrace technology, (2) enhance the client experience, (3) ensure independence and objectivity, (4) beware of liability, (5) reduce timescales, and lastly (6) update the required skill set (RICS, 2017). Additionally, along with upskilling to work with the new landscape of data science, big data, and data analytics, RICS (2017) also pointed out that it should begin at university level.

The FIABCI World Council of Experts had also organized international webinars to discuss the future of the valuation profession. This is because it has the potential to be disrupted a great deal under the current conditions starting this year. The webinars with different sub-themes were conducted in June, August, and September 2022. As the researchers's observation output, these international webinars are held periodically. It shows

that worldwide valuation practitioners are treating this issue aggressively and positively. They have prepared themselves for the evolution of the valuation profession. In the long run, the researcher agrees with (Zrobek et al., 2020, p. 100) that "reformulated curricula should be designed and implemented in consultation with government agencies, professional organizations, and market participants."

4.2 Plant and Machinery (P&M) Valuation

Within the valuation industry, we found that graduates are not competent to conduct Plant and Machinery valuations. Few education institutions in the world provide Plant and Machinery valuation (Rahman Mohd Nasir A., Eves C. and Yusof Y., 2012). Currently, the problem still exists because when browsing through the university syllabus provided by Malaysian universities, it appears to be more on a "touch and go" basis. To solve this problem, the industry focuses on on-the-job training. However, a valuer's experience and on-the-job training are not sufficient for performing the Plant and Machinery valuations, according to Rahman Mohd Nasir A. et al. (2012).

4.3 Business Valuation

From observation, the researchers found that graduates and some seasoned practitioners do not have sufficient knowledge, skill, and expertise about business valuation to complete the valuation competently. Besides, majority of academicians in Malaysia are still not well-versed with the business valuation concept and required skill (Razali, M. N., Jalil, R. A., Achu, K. and Ali, H. M., 2022). To solve this issue, there is a 3-day intensive Professional Business Valuation Course with an examination organized by Business Valuers Association Malaysia (BVAM). The goal is to prepare future practitioners and seasoned practitioners who wish to upgrade their skills, obtain an international qualification in Business Valuation, and become involved in business valuations in Malaysia.

5. CONCLUSION

Ultimately, we believe that this research will aid all academies in their initial preparation. These academies will prepare their graduates to meet industry needs and their fields of expertise. The real estate market has evolved in accordance with the needs of the global market and the pace of technological advancements. This study identifies difficulties that can be incorporated into the conceptual framework for addressing graduate preparation challenges. It implies that the scientific capacity of the application must be balanced and aligned with the current needs of the global market in order to be successful.

6. IMPLICATIONS FOR RESEARCH/POLICY

It examines how real estate valuation professions are overcoming challenges they are facing today. Nonetheless, it is hoped by the researchers in this study that it will inspire the higher education providers when they come to improve the teaching materials and syllabus they provide to their students. A new aspect of knowledge has been gained through this study which will help improve our higher education level at the university level in the field of real estate valuations, so that the next generation of graduates can prepare them for a career in valuations.

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EXTERNAL ASSESSORS' PERCEPTIONS OF INNOVATION AND COMMERCIALIZATION TOWARD FINAL YEAR DIPLOMA PROJECT

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ABSTRACT - At Politeknik Ibrahim Sultan, there are four major departments which can be classified into engineering departments and non-engineering departments. Students from all departments are compulsory to pass the final year diploma project in order to pass their undergraduate program. Typically, the best projects from departmental evaluations are chosen to compete in the Diploma Project Exhibition (D'ProjEx) at the polytechnic level. However, the competition is evaluated by external assessors, including academics from other institutions and industry professionals with a background in engineering and non-engineering. Hence, this study analyzes the external assessors' perspective on the level of innovation and commercialization of final year diploma projects. Afterwards, the difference in innovation and commercialization scores given by the assessors to projects in the same field and different fields were also identified. The assessment is based on a rubric scale where 4 is a full mark and the analysis involves the best projects from two cohorts which is Session 1 and Session 2 in 2021/2022. A total of 24 projects were included from all departments, with a distribution of 12 projects from Session 1 and 12 projects from Session 2. The results show the engineering and non-engineering assessors rated the project's innovation at moderate level and satisfactory levels, respectively. Meanwhile, both external assessors from engineering and non-engineering fields agree the project's commercialization for the final year diploma students achieved a moderate level. An independent sample t-test was performed and the results show that there is no significant difference between the scores given by assessors in the same field and different fields. This study demonstrates that external assessors concur on the achievement of innovation and commercialization in projects created by final-year students in both engineering and non-engineering fields.

Keywords: innovation; commercialization; external assessors; engineering field; non-engineering field.

1. INTRODUCTION

There are four major departments at Politeknik Ibrahim Sultan that fall under the categories of engineering departments (mechanical engineering and electrical engineering) and non-engineering departments (Tourism and Hospitality and Visual Communication & Design). In order to graduate from their undergraduate programme, all students must complete their final year diploma project (Kamal, et al., 2017). During this course, students will have the opportunity to put the skills and knowledge they have learned in the classroom to use (Gusau, et al., 2019). At the end of the semester, all projects will be evaluated according to the assessment in their respective departments. The best projects in each department will be selected to compete in the Diploma Project Exhibition (D'ProjEx) at the polytechnic level. In this light, three projects from each department will represent the final stage.

Nevertheless, the evaluation in this competition was judged by external assessors, including academics from other institutions and industrialists from both the engineering and non-engineering fields. Therefore, this study is important to carry out in order to ascertain the scores given by assessors from the same and different fields. This is because the panel's field of expertise may have an impact on the score given (Benjamin, et al., 2022). It is intended that the study's findings can validate the competition's rubric used for innovation and commercialization categories.

2. OBJECTIVES

The objectives of the study are:

- i. to determine the perception of the engineering panels and non-engineering panels on the innovation and commercialization of the final year projects
- ii. to identify the difference score evaluated by the Engineering panels
- iii. to identify the difference score evaluated by the Non-Engineering panels

3. METHODOLOGY

D'ProjEx comprised video and poster presentations. Each project will be evaluated by external assessors from both the engineering and non-engineering fields. The evaluation has been divided into innovation and commercialization categories and broken down into five criteria, as indicated in Table 1.

Table 1. Evaluation criteria

Category	Criteria	Scale Mark
Innovation	Being unique/ having ideas "outside the box"	*4/3/2/1
	The latest technological approaches are used in the production of innovations	
	The production of innovation is able to solve problems	
	Have Creation Value (Value of Creation) / Originality of ideas	
	Presentation/Presentation (Informative and Creative)	
Commercialization	Benefits/Relevance	*4/3/2/1
	User friendly	
	Patent Potential	
	Commercial Potential	
	Project Cost Effectiveness	

*4=Very Satisfactory, 3=Satisfactory Level, 2=Moderate Level, 1=Unsatisfactory Level

Evaluation of the external assessors' perceptions of innovation and commercialization was observed through the score given by the panels. The score counts of 24 projects from Session 1 and Session 2 were analyzed by using Statistical Package for the Social Sciences (SPSS) software version 27. Table 2 summarizes the number of projects and assessors involved in this study.

Table 2. Number of projects and assessors

Session	Number of projects	Number of external assessors	
		Engineering field	Non-engineering field
Session 1 2021/2022	12	5	4
Session 2 2021/2022	12	4	4
Total	24	9	8

The data is analyzed to understand the perspective of assessors toward the final year Diploma Project. Firstly, the score, in general, is compared to determine the perception of the engineering panels and non-engineering panels on the innovation and commercialization projects. The difference score between engineering projects and non-engineering projects evaluated by the engineering panel as well as by the non-engineering panels is then determined using a t-test.

4. RESULTS AND DISCUSSION

This section presented the findings based on the three research questions as stated below.

Research Question 1: What is the perception of the engineering panels and non-engineering panels on the innovation and commercialization of the final year projects?

The results in Table 3 show that engineering and non-engineering panels rated the project's innovation at moderate (mean = 2.82) and satisfactory levels (mean = 3.015), respectively. Meanwhile, both external assessors from engineering and non-engineering fields agree the project's commercialization for the final year diploma students achieved a moderate level.

Table 3. Mean score and standard deviation

Category	Assessor	N	Mean	Standard deviation	Findings
Innovation	Engineering Panels	9	2.82	0.36	Moderate Level
	Non-Engineering panels	8	3.01	0.31	Satisfactory Level
Commercialization	Engineering Panels	9	2.85	0.34	Moderate Level
	Non-Engineering panels	8	2.86	0.45	Moderate Level

Research Question 2: Do engineering projects and non-engineering projects scored

differently by the engineering panel in terms of innovation and commercialization?

Null Hypothesis, *H₀*: Engineering projects and non-engineering projects scored did not significantly differ by the engineering panel in terms of innovation and commercialization.

Based on Table 4, it is shown that there is no significant difference between engineering projects and non-engineering projects in the evaluation scores by the engineering panel for the categories of innovation ($t=0.472$; $p>0.05$) and commercial ($t=0.090$; $p>0.05$).

Table 4. Independent sample t-test (Evaluation by engineering panels)

Assessor	Category	Project	Mean	Standard deviation	df	t	Sig.
Engineering panels (N= 9)	Innovation	Engineering	2.86	0.47	16	0.472	0.643
		Non-Engineering	2.77	0.36			
	Commercialization	Engineering	2.86	0.44	16	0.090	0.929
		Non-Engineering	2.84	0.43			

Research Question 3: Do engineering projects and non-engineering projects scored differently by the non-engineering panel in terms of innovation and commercialization?

Null Hypothesis, *H₀*: Engineering projects and non-engineering projects scored did not significantly differ by the non-engineering panel in terms of innovation and commercialization.

Table 5 shows that there is no significant difference between engineering projects and non-engineering projects in the evaluation scores by the non-engineering panel for the categories of innovation ($t=1.156$; $p>0.05$) and commercialization ($t=0.539$; $p>0.05$).

Table 5. Independent sample t-test (Evaluation by non-engineering panels)

Assessor	Category	Project	Mean	Standard deviation	df	t	Sig.
Non-Engineering panels (N=8)	Innovation	Engineering	2.89	0.37	14	-1.156	0.267
		Non-Engineering	3.14	0.52			
	Commercialization	Engineering	2.78	0.54	14	-0.539	0.598
		Non-Engineering	2.93	0.58			

5. CONCLUSION

This study demonstrates that external assessors concur on the achievement of innovation and commercialization in projects created by final-year students in both engineering and non-engineering fields. Although the evaluation involves assessors from different fields, the scores given are not influenced by their respective fields. This shows that the evaluation rubric used is suitable and valid for measuring the criteria stated in the innovation and commercialization categories.

6. IMPLICATION

The study's findings indicate that the D'ProjEx competition's scoring criteria can be kept as is. This is because the rubric criteria specified in innovation and commercialization do not affect the assessor's background. This demonstrates that winning projects are indeed eligible candidates for proceeding to a higher level of competition. However, the findings show the results of innovation and commercialization for student projects whether from the engineering field or non-engineering fields need to be improved. Therefore, courses or training involving the development of innovation and commercialization projects need to be organized for students.

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EXPLORING THE POTENTIAL OF AN ENGLISH LANGUAGE LEARNING WEBSITE

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ABSTRACT - Websites are viewed as learning opportunities created beyond the classroom walls and as proposed by Nunan and Richards (2015) vital for students to enhance their second/foreign language competence. The overarching problem is the difficulties to find quality websites (Fuentes & Martinez, 2018). This notion accentuates the critical need for website evaluation. The use of methodological frameworks as evaluation tool can comprehensively explore the potential of a website within a specified context since frameworks are descriptive. Besides, they significantly connect with the context where the language teaching and learning takes place (Hubbard, 2006). Despite the plethora of research conducted within the continuum of website evaluation, a substantial number of issues remains elusive. Thus, to fill this crucial gap, there is an urgent need to evaluate the potential of LearnEnglish Kids website and highlighting the strengths and limitations which will provide useful information for the website hosts and teachers. This qualitative study aims at evaluating the potential of an ELL website by exploring its technical and pedagogical aspects. The LearnEnglish Kids website was selected as it fulfils all the screening criteria. The evaluation process was guided by Hubbard (2006) methodological framework. The exploration of the website accentuates a list of strengths and limitations with regards to each aspect as outlined in Hubbard's (2006) evaluation framework. Despite the highlighted limitations, LearnEnglish Kids is an appropriate ELL website to be used in Malaysian context. The result of this exploration sheds light to the use of methodological framework in evaluating language learning websites. The in-depth analysis based on the six evaluation aspects form a complete guide which will be useful for the Ministry of Education to develop open educational resources (OER) for Malaysian primary students.

Keywords: CALL; Language Learning website; online learning

1. INTRODUCTION

Web usage has gained high priority in recent Computer Assisted Language Learning (CALL) research (Fuentes & Martinez, 2018). The abundance of websites available for English language learning has made it easier for educators to find resources and learners to master the language. Websites are viewed as learning opportunities created beyond the classroom walls and as proposed by Nunan and Richards (2015) vital for students to enhance their second/foreign language competence. The overarching problem is the difficulties to find quality websites (Fuentes & Martinez, 2018). This notion accentuates the critical need for website evaluation. Evaluation can be driven by checklists, guided by methodological frameworks for language teaching or linked to second language acquisition (SLA) theories (Levy and Stockwell, 2007). The use of methodological frameworks as evaluation tool can comprehensively explore the potential of a website within a specified context since frameworks are descriptive. Besides, they significantly connect with the context where the language teaching and learning takes place (Hubbard, 2006).

Despite the plethora of research conducted within the continuum of website evaluation, a substantial number of issues remains elusive. First, majority of studies used checklists and questionnaires. A few made an attempt to comprehensively explore a specific website and judging its potential. Second, less studies explored the issue within the specific Malaysian context. Thus, to fill this crucial gap, there is an urgent need to evaluate the potential of LearnEnglish Kids website and highlighting the strengths and limitations which will provide useful information for the website hosts and teachers.

2. OBJECTIVE

This study aims to explore the potential of a selected free ELL website with respect to a methodological framework. The 6 aspects evaluated are based on Hubbard's (2006) methodological framework. The strengths and limitations accentuated determine the potential of the selected website to be used in Malaysian context.

3. METHODOLOGY

This qualitative study aims at evaluating the potential of an ELL website by exploring its technical and pedagogical aspects. The study was carried out in July 2022. It was initiated with a screening process to choose an appropriate website to be explored. This study combined both screening methods suggested by Fotos and Browne (2013). First, a few websites with a list of ESL/EFL websites were visited. Second, six criteria were listed (based on the aim of the study) and applied to available learning websites via search engines.

The LearnEnglish Kids website was selected as it fulfils all the screening criteria which are; i) ELL website, ii) free, iii) contains resources for all skills, iv) appropriate for primary level, v) provides complete lessons (with assessment) and vi) supports independent learning. LearnEnglish Kids is developed by the British Council.

The evaluation process was guided by Hubbard's (2006) methodological framework (Figure 1). This framework was selected as it is a complete evaluation package with courseware development and implementation elements (Hubbard, 2006). The first part of the evaluation focused on strengths and limitations of LearnEnglish Kids website which were analysed based on the 4 major aspects; technical preview, operational preview, teacher fit and learner fit. The second part focused on the remaining 2 aspects which are implementation scheme and appropriateness. A list of recommendations based on the limitations were highlighted. The data gathered were analysed to determine the potential of the website to be used in Malaysian context.

4. RESULTS AND DISCUSSION

The exploration of the website accentuates a list of strengths and limitations with regards to each aspect as outlined in Hubbard's (2006) evaluation framework (Figure 1). These strengths and limitations are summarised in table 1 below. The first aspect which is the technical preview highlights the very first strength; the main page loads quickly. This aspect evaluates the accessibility of the website. The second aspect, the 'operational description' highlights how the website operates. This website operates in an excellent mode as the lessons, activities and resources are systematically arranged. The navigation buttons are simple and effortless which cater to the target audience; young learners.

'Teacher fit' which is the third aspect discusses the credibility of the selected site with regards to the language teaching approach reflected by the site as well as the degree of compatibility with the approach implemented by the teachers who intended to use the site (Hubbard, 2006). This learning platform fulfils the 5 tenets of the natural approach theory proposed by Krashen (1982). LearnEnglish Kids exposes learners to a variety of comprehensible input in the target language. Nevertheless, there are limited number of step-by-step writing lessons as well as unavailability of appropriate and effective speaking lessons. Adding to this, there are limited resources to support the process of teaching reading for the beginners. The assessment formats are limited to matching and filling in the blanks.

Fourth, ‘learner fit’ explores how well the content, skills, and language level correspond to the target learners’ needs. Based on the evaluation, LearnEnglish Kids is appropriate for visual, auditory and kinesthetic learners. Although it develops intercultural awareness (21st century skill) by bringing in different cultures around the globe, the limited personalised and contextualised resources impedes the process of learning the language skills.

The fifth aspect; the ‘implementation schemes’ describes the possible ways to address the limitations accentuated upon exploration of the website. There are six recommendations based on the limitations discussed in the previous aspects (Table 2). First, adding step-by-step guides for writing lessons will definitely assist primary learners to comprehend better. Second, in order to provide effective speaking lessons, teachers can supplement their lessons with either own recorded videos or other appropriate videos. Third, the use of advanced automated speech recognition technology and AI chatbots are recommended to assist learners in pronunciation and speaking as a whole. Fourth, phonics videos and supplementary modules should be provided as reading lessons for the beginners. Next, teachers are advised to adapt, add and differentiate the assessment activities or tasks available formats to cater the need of their students. Finally, personalising and contextualising the resources are highly recommended to optimise the development of the language skills.

The sixth aspect; the ‘appropriateness judgments’ summarises the appropriateness of the website within Malaysian context with close reference to the previous aspects discussed. Despite the highlighted limitations, the superb technical and operational quality as well as the abundance of valuable resources have made the LearnEnglish Kids an appropriate ELL website to be used in Malaysian context.

4.1 List

There were six main areas explored within the LearnEnglish Kids which are as follows:

- i. Listen and watch
- ii. Read and write
- iii. Speak and spell
- iv. Grammar and vocabulary
- v. Fun and games
- vi. Print and make

4.2 Tables and figures

Table 1 shows the strengths and limitations of LearnEnglish Kids.

Table 1. The strengths and limitations of LearnEnglish Kids

ASPECTS	STRENGTHS	LIMITATIONS
TECHNICAL PREVIEW	1. The main page loads quickly.	

OPERATIONAL DESCRIPTION	1. Operates in an excellent mode (lessons, activities and resources are systematically arranged). 2. Navigation buttons are simple and effortless.	
TEACHER FIT	1. Fulfils the 5 tenets of the natural approach theory proposed by Krashen (1982). 2. Exposes learners to a variety of comprehensible input in the target language.	1. Limited number of step-by-step writing lessons 2. Unavailability of appropriate and effective speaking lessons. 3. Limited resources to support the process of teaching reading for the beginners. 4. Assessment formats-limited to matching and filling in the blanks.
LEARNER FIT	1. Appropriate for visual, auditory and kinesthetic learners. 2. Develops intercultural awareness	1. Limited personalised and contextualised resources-impedes the process of learning the language skills.

Table 2 shows the analysis of the last two aspects.

Table 2. Recommendations (Implementation Schemes) and Appropriateness Judgements

ASPECTS	REMARKS
IMPLEMENTATION SCHEMES	1. Add step-by-step guide (writing lessons) 2. Record or find appropriate videos (speaking lessons). 3. Use advanced automated speech recognition technology and AI chatbots (pronunciation and speaking skill). 4. Search for phonics videos and modules (reading for the beginners). 5. Adapt, add and differentiate (assessment formats). 6. Personalise and contextualise the resources (language skills).
APPROPRIATENESS JUDGEMENTS	Despite the highlighted limitations, LearnEnglish Kids is an appropriate ELL website to be used in Malaysian context.

5. CONCLUSION

This paper accentuates the potential of the LearnEnglish Kids website to be used in Malaysian context. The results of this exploration sheds light to the use of methodological framework in evaluating language learning websites. The analysis gives rise to a few recommendations which are useful for the website hosts to improve their site and for educators to adapt the resources to cater the needs of their students. The in-depth analysis based on the six aspects specified above form a complete guide which will be useful for the Ministry of Education to develop open educational resources (OER) for Malaysian primary

students.

6. IMPLICATION

The implementation schemes described above assist the teachers to effectively and intelligently utilise LearnEnglish Kids in teaching and learning due to the abundance of superb quality resources and materials as well as its interactive and fascinating features. As the website consists of a limited number of culturally-relevant resources, teachers can carefully adopt and adapt the resources to suit Malaysian context considering on that fact that it is impossible to find a one-fit-for-all learning website. Above all, this research highlights the current trend in education which is the online learning with concern on the importance of providing good quality learning resources.

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A FRAMEWORK FOR THE INTEGRATION OF GREEN TECHNOLOGY SKILLS IN STEM EDUCATION CURRICULUM

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ABSTRACT - The existing Science, Technology, Engineering and Mathematics Education (STEM Education) curriculum of Nigerian universities of technology has been criticized for not producing employable graduates that compete at global markets. The curriculum gives less importance to green technology skills due to lack of concepts that can guide its implementation. Hence, the purpose of this empirical paper was to develop a framework for the integration of green technology skills in STEM Education curriculum. The research was designed to explore and determine the types of green technology skills and their respective elements for the integration in in STEM Education curriculum. Mixed methods exploratory research design was employed for this study. 10 industry technical managers were interviewed. The interview data were analyzed by using coding process starting with open coding followed by axial coding to selective coding. The interview results were used to develop structured questionnaire. The questionnaire was validated by 4 experts in the area of STEM education and then it was pilot tested and alpha value was 0.89. The population of this study was 2152 and the sample of the survey was 646 including 528 STEM Education Graduates, 22 STEM Education Lecturers and 96 Industry Technical Managers. Stepwise linear regression was used to analyze the survey. The study explored and determined the best green technology skills for the integration in STEM Education Curriculum including green appliance installation, green campus, green research and green appliances repairing. The researcher recommended that governments should implement the developed framework for the integration of green technology skills into STEM Education Curriculum.

Keywords: Framework; Green Technology Skills; Stem Education; Curriculum

1. INTRODUCTION

STEM Education refers to Science, Technology, Engineering, and Mathematics Education. It equips employee to carry out their roles to the best of their abilities (STEMNET, 2022) One of the STEM Education is Technology Education (TE). TE is an integral part of general Education which is intended for the preparation of individuals into the fields of occupations for effective participation in the world of work (UNESCO, 2002). Electrical Technology Education (ETE) is one of the TE programmes being taught at Bachelor, Masters and PhD Degrees in Nigerian Universities. FGN (2014) stated Trainee completing TE programmes including ETE shall obtain paid or self-employment. However, ETE and other TE programmes are being taught at university and other educational levels in Nigeria since early 1980's, to date unemployment is increasing annually among the Nigerian citizens (National Bureau of Statistics (NBS), 2012 & CBN, 2020). One of the main reasons for graduates' unemployment in Nigeria might be the lack of incorporating green technology skills and other employability skills in the curriculum of Nigerian tertiary institutions (Oresanya, et al., 2014; Ismail and Mohammed, 2015; Mohammed and Ismail, 2019). Green Technology refers to the application of various researches, methods, processes and techniques to achieve certain objectives such as continuous development of products, systems and equipment which are Less taxing to the natural environment. It reduces emission of Green House Gases like CO₂ and encourages usage of renewable energy.(Richardson, 2018). The market for green Technology is new but the money invested exceeded \$200 billion in 2017 (Kenton, 2020).

2. OBJECTIVES OF THE STUDY

The main objectives of the study are as follows:

- i) To Explore the perceptions of industry on GTS for STEM Education Curriculum
- ii) To Determine the best elements of GTS for STEM Education Curriculum
- iii) To Develop the framework for the integration of GTS in STEM Education curriculum

3. METHODOLOGY

The research was designed to explore and determine the types of green technology skills and their respective elements. Mixed methods exploratory research design was employed for this study. 10 industry technical managers were interviewed. The interview data were analyzed by using coding process starting with open coding followed by axial coding to selective coding. The interview results were used to develop structured questionnaire. The questionnaire was validated by 4 experts in the field of Electrical Technology Education (ETE) and its reliability was 0.834 which was established through pilot study. The population of this study was 2152 and the sample of the survey was 646 including 528 STEM Education Graduates, 22 STEM Education Lecturers and 96 Industry Technical Managers. Stepwise linear regression was used to analyze the survey.

4. MAIN RESULT

The findings of this study are presented according research questions:

- i) Interview result: The interview findings from the perceptions of industry technical managers revealed that the green technology skills have eight major groups as presented in Figure 1:

Green Technology Skills							
Green Technology Installations Skills:	Green Technology Campaign Skills:	Green Technology Campus Skills:	Green Technology Curriculum Skills:	Green Technology Retraining Skills:	Green Technology Repairing Skills:	Green Technology Research Skills:	Green Technology Management Skills:
1. Ability to understand theoretical knowledge in handling sustainable development technologies in electrical technology systems 2. Ability to understand practical skills in handling sustainable development technologies in electrical technology systems 3. Ability to understand basic environmental friendly electrical systems 4. Ability to understand advance environmental friendly electrical systems for instance, solar generators, traffic and street lights	1. Ability to arouse people interest on the needs of environmental friendly appliances in electrical technology systems 2. Ability to warn people against the needs of sustainable developments in electrical technology systems 3. Ability to promote environmental friendly systems through radio and televisions. 4. Ability to promote environmental friendly systems through other media like magazine.	1. Ability to provide green campus for larger society 2. Ability to provide green university grounds for bigger community	1. Ability to provide embedding green skills in the curriculum on sustainability 2. Ability to provide set of courses in sustainable development	1. Ability to provide knowledge of sustainable electrical technology equipment 2. Ability to retrain lecturers on sustainability	1. Ability to man sustainable energy technology equipment and machineries 2. Ability to repair environmental friendly appliances such as inverters	1. Ability to plan sustainable technology development research Ability to plan sustainable technology development research 2. Ability to conduct sustainable technology development research Ability to evaluate sustainable technology development research	1. Ability to manage basic sustainable technology equipment and machineries 2. Ability to advance basic sustainable technology equipment and machineries 3. Ability to man basic sustainable technology equipment and machineries 4. Ability to handle advance sustainable technology equipment and machineries

Figure 1: Green Technology Skills

- ii) Survey Results: The best elements of green technology skills for the integration in STEM Education curriculum are green appliance installation, green campus, green research and green appliances repairing..
- iii) The framework for integration of Green Technology Skills is as follows
Based on the four best elements of green technology skills for STEM Education Curriculum integration from SLR analysis of data obtained from Graduates, STEM Education Lecturers and Industry Technical Managers, the framework was designed as shown in Figure 2.

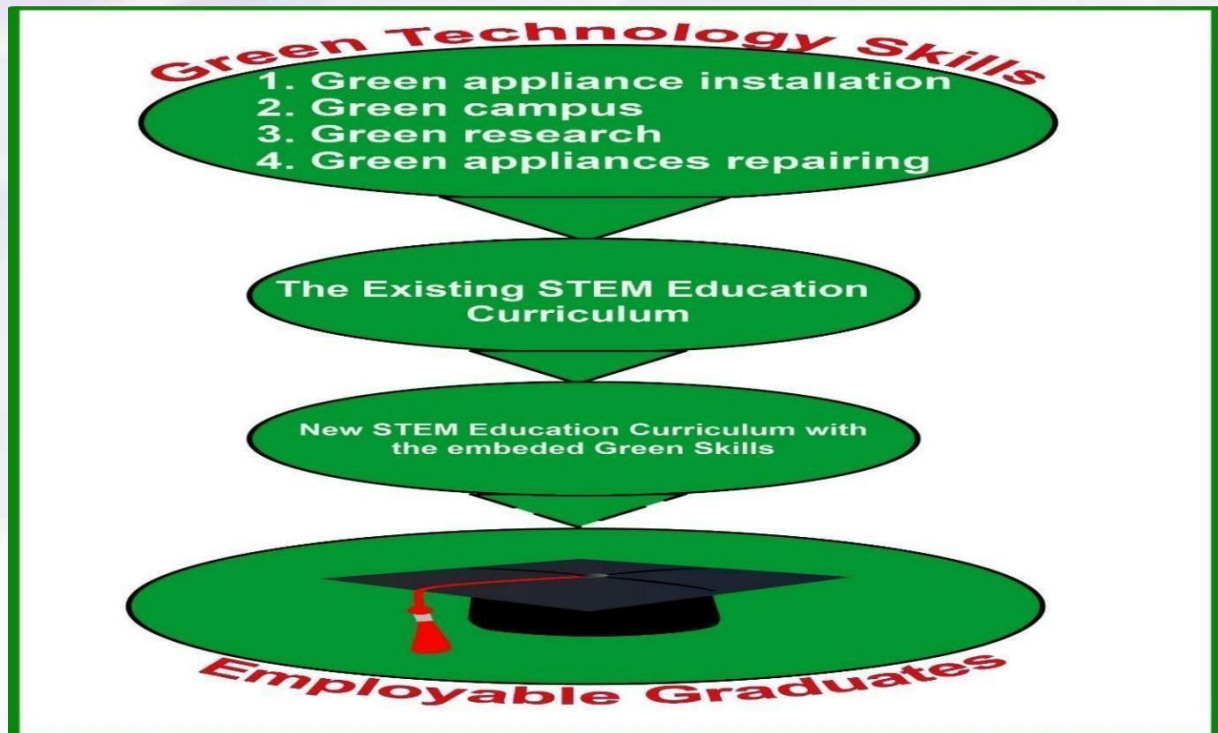


Figure 2: A Framework for the Integration of Green Technology Skills in STEM Education Curriculum

5. CONCLUSION

Background of this study indicated that the concept of GTS is new in Nigeria and has not been integrated into tertiary education system of the country (Oresanya, et al., 2014). TVET institutions in Nigeria were challenged to focus and equip their students with the GTS (Idris and Rajuddin, 2012). Therefore, this study has developed the framework for the Integration of GTS in STEM Education Curriculum of Nigerian universities.

6. IMPLICATION

The findings of this study suggest that building GT skills may likely have impacts on performance of undergraduate students in academic courses and performance of TVET graduates during working life in industry. It is recommended that feasibility studies and implementation of the Conceptual Model for the integration of GT skills in ETE curriculum be conducted in the university settings in Nigeria.

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A CASE STUDY ON SPEECH ANXIETY AMONG TERTIARY-LEVEL STUDENTS: EFFECTS AND STRATEGIES

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ABSTRACT - Some people consider students' speech anxiety issues to be a minor problem, hence failing to realize that speech anxiety could have a negative impact on students' speaking performance in the long run if it is not addressed immediately. Therefore, this study aims to examine the level of speech anxiety among students at tertiary level. This study further investigates the effects of speech anxiety on students' speaking performance in their classrooms and identifies students' strategies in overcoming speech anxiety. Speech anxiety in the context of this study refers to the fear of speaking in front of the public or audience. In this study, it is expected that students who are more anxious will not be able to perform well during their speaking performance whereas students who are more affected by speech anxiety will not be able to perform well during their speaking performance. On top of that, students who practice strategies to overcome speech anxiety will perform better during a speaking performance in their classrooms. On that account, in order to obtain reliable data, this study adopted a case study with a mixed-method approach. Through a convenience sampling method, a total of 30 undergraduate students enrolled in a general English course at one of the higher education institutions were selected. The result of this study revealed that a large majority of the students experienced high-level anxiety regardless of their level of English proficiency. As a result, most of them only managed to obtain poor to satisfactory speaking performance during speaking activities in classrooms and only a small minority were able to obtain good to excellent speaking performance. On top of that, all students agreed that practicing improving English by embracing errors helps them to overcome speech anxiety. These findings imply that speech anxiety among tertiary-level students can be a serious concern since it can negatively impact students of different proficiency levels during speaking performance if it is left unresolved.

Keywords: speech anxiety, oral communication, tertiary education

1. INTRODUCTION

Research findings over the past decade revealed that speech anxiety has been the topic of unending concerns among students. Alahem (2013) defined anxiety as a series of physiological and behavioral responses such as feeling worried and overwhelmed by unpleasant feelings, sweaty palms, racing heartbeats, nausea, self-doubts, and persistent worry about things. According to Syafrudin, Nurkamto, Linggar & Mujiyanto (2017), one of the aspects that affect students' ability in delivering speeches is speech anxiety. This statement was supported by another scholar from the same field of study who claimed that some students may suffer nervousness while performing spoken English in front of an audience, making it difficult for them to provide a great oral presentation (Anandari, 2015). Numerous researchers from across the globe have examined the relationship between students' speech anxiety level and their speaking performance which indicated the two variables had a moderately significant relationship (Vicky, Ting & Yeo, 2016; Lian & Budin, 2014; Heng, Abdullah & Yusof, 2012; Adeng & Shah, 2015). Although various studies have been done exploring different areas of speech anxiety issues among students, significant results have yet to be noticed in the last decade. Most concerning, there has not been a lot of research examining the effect of speech anxiety on students' speaking performance and strategies in overcoming speech anxiety issues among tertiary-level students in Malaysian classrooms.

2. OBJECTIVES

- i. To examine the level of speech anxiety among students in the classrooms.
- ii. To investigate the effects of speech anxiety on students' speaking performance in the classrooms.
- iii. To identify students' strategies in overcoming speech anxiety in the classrooms.

3. METHODOLOGY

This study aimed to find out the effects of speech anxiety on students' speaking performance in the classrooms focusing on the tertiary level students in one of the public higher education institutions in Malaysia alongside examining students' speech anxiety level and identifying the students' strategies in overcoming speech anxiety. A case study mixed- method was utilised by distributing an online survey and executing a semi-structured interview.

30 undergraduate students taking general English courses were selected using convenience sampling of the non-probability sampling method. The survey and interview items were formulated based on the Personal Report of Public Speaking Anxiety (PRPSA) instrument and Babaii, Taghaddomi & Pashmforoosh's (2016) speaking self-assessment sheet. All participants responded to the survey, while 10 were involved in the group interview session. Data analysis included descriptive statistics for the quantitative data and thematic analysis for the qualitative data. Next, the result of the data analysis of both quantitative and qualitative approaches was compared. The last step of the data analysis was data interpretation where the outcomes of the study were elaborated and examined through comparison and contrast with other research that explored the same research area to verify the reliability of the study.

4. RESULTS AND DISCUSSION

60% of the respondents obtained an average range of 2.76 to 4.00, implying high- level speech anxiety. Meanwhile, 23.33% obtained an average range of 2.26 to 2.75 which implies they have moderate-level speech anxiety. Only a small minority of the respondents (16%), obtained an average range of 1.00 to 2.25, implying they have low-level speech anxiety.

In terms of the effects of speech anxiety on students' speaking performance in the classrooms, the findings also revealed that only a small percentage were in the range of excellent and good speaking performance, with 13.3% and 10% of respondents respectively. A larger percentage, i.e. 36.67% obtained satisfactory speaking performance, and 40% obtained poor speaking performance in the classroom.

Interestingly, the results revealed the most ranked strategies in overcoming speech anxiety in the classrooms as follows: (1) familiarise speaking only English in the classroom, (2) continue practicing speaking while embracing errors, (3) engage in collaborative speaking tasks. These are followed by (4) read lecture notes before class, (5) employ breathing techniques, and (6) practice speaking with those with higher proficiency. Two of the lowest ranked strategies were (7) practice accurate pronunciation in front of a mirror, and (8) participate in many speaking activities.

5. CONCLUSION

In summary, majority of the students demonstrated high-level anxiety notwithstanding their levels of English language proficiency which therefore yielded apparent results where most of them were unable to give an excellent speaking performance during speaking

activities. On that account, all concurred with practicing by embracing errors in dealing with this issue.

Therefore, to conclude, it is indubitable that speech anxiety issues among tertiary-level students in the classrooms can be a major concern given that it could greatly impact students of different levels of English proficiency. More than that, it also could become a stumbling block if it is left unresolved, specifically for students who possessed moderate to high-level proficiency in delivering their speaking ability and giving their optimal speaking performance during speaking activities in the classrooms.

6. IMPLICATIONS

The findings of this study showed that a significant number of tertiary-level students experienced moderate to high-level anxiety irrespective of their English proficiency level. Therefore, it is pertinent to have more studies in this field especially in terms of what the indicators of speech anxiety are, how the speech anxiety possibly affects their speaking performance and immediate measures that can be taken based on the strategies for overcoming their speech anxiety in the classrooms.

To obtain more authentic and credible data regarding the students' behavioural and cognitive responses caused by speech anxiety, future qualitative research should also include an observation method in lieu of interviews. Hither, the researchers could directly see the evidence that is not possibly visible from on-screen. The observable evidence like little gestures and body language could give the researcher an-insights that can contribute to the focus of their research.

Future quantitative research could consider integrating ANOVA analysis method to assess the relationship between two variables and to obtain the significance of findings. Future research also could focus more on students' speaking proficiency results to determine the level of their English-speaking proficiency rather than looking at the students' overall English proficiency for a more reliable data.

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VIDEO PENGAJARAN DALAM MENINGKATKAN PENGETAHUAN KONSEPTUAL MATEMATIK PELAJAR

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ABSTRAK - Pengetahuan konseptual merupakan salah satu daripada pengetahuan Matematik yang perlu dikuasai pelajar selain daripada pengetahuan prosedural, pengetahuan faktual dan metakognitif. Namun begitu, pengkaji mendapati tidak banyak kajian lepas mengenai penekanan pengetahuan konseptual Matematik dibincangkan oleh para pengkaji lepas. Sementara itu, tidak dinafikan bahawa perkembangan teknologi terkini turut memberi impak dalam membantu pelajar mendalami pengetahuan konseptual pelajar dalam subjek Matematik. Oleh yang demikian, kertas konsep ini akan membincangkan peranan teknologi terutama yang melibatkan penggunaan video pengajaran dalam meningkatkan pengetahuan konseptual Matematik pelajar. Selain itu, kertas konsep ini juga akan membincangkan impak pengetahuan konseptual Matematik pelajar terhadap pemahaman dan pencapaian pelajar dalam subjek Matematik. Justeru itu, adalah diharapkan agar hasil kajian ini dapat menjadi rujukan kepada para guru bagi mengenalpasti mekanisme pengintegrasian video pengajaran yang dapat dipraktikkan dalam kelas bagi meningkatkan kemahiran pengetahuan konseptual pelajar khususnya bagi subjek Matematik.

Keywords: *Pengetahuan konseptual, Matematik, Teknologi Pendidikan, Video pengajaran, Youtube*

1. PENGENALAN

Kepesatan teknologi pada masa kini yang berkembang dengan sangat pantas menjadikan Malaysia juga tidak terkecuali untuk menyaingi negara luar seiring dengan perkembangan pesat Revolusi Digital atau lebih dikenali sebagai Revolusi Perindustrian 4.0 (IR 4.0). Menurut Muhammad & Maat (2020), pelaksanaan IR 4.0 ini turut memberi kesan kepada sektor pendidikan yang akan mempersiapkan pelajar dalam mendepani cabaran IR 4.0. Disamping itu, (Mantihal & Maat, 2020) dalam kajian mereka yang bertajuk ‘Pengaruh pembelajaran abad-ke21 (PAK21) terhadap minat pelajar dalam pengajaran dan pembelajaran Matematik : Satu tinjauan sistematik’ turut bersetuju bahawa pendidikan merupakan salah satu cara bagi mengintegrasikan teknologi ini. Sementara itu, bagi meningkatkan pencapaian pelajar dalam matematik, para pendidik khususnya para guru disarankan oleh pihak Kementerian Pendidikan Malaysia (KPM) untuk mempelbagaikan strategi dan kaedah pengajaran di dalam bilik darjah seperti mengaplikasikan pembelajaran abad ke-21. (Mantihal & Maat, 2020). Namun demikian, Ravendran & Daud (2019), dalam kajian mereka, menyatakan, ‘tugas mengintegrasikan teknologi ke dalam pengajaran bilik darjah terutamanya subjek Matematik dengan cara yang bermakna dan canggih masih mencabar’.

2. OBJEKTIF

Objektif kajian ini adalah untuk:

- i. Menenalpasti peranan video pengajaran dalam meningkatkan pengetahuan konseptual Matematik pelajar.
- ii. Membincangkan impak pengetahuan konseptual Matematik pelajar terhadap pemahaman dan pencapaian pelajar dalam subjek Matematik.

3. METODOLOGI

Kaedah meta-analisis digunakan melalui pencarian di pengkalan data iaitu Google Scholar serta beberapa pengkalan data yang telah dilanggan oleh UTM seperti Scopus dan Science Direct. Kajian berkaitan peranan teknologi terutamanya video pengajaran dalam meningkatkan pengetahuan konseptual matematik pelajar telah dianalisis secara sistematik. Artikel berkaitan video pengajaran dalam Pendidikan matematik yang diterbitkan sekitar tahun 2018-2022 telah dimuat turun untuk dianalisis. Kata kunci yang telah digunakan adalah 'Pengetahuan konseptual', 'Matematik', 'Teknologi Pendidikan', 'Video pengajaran' dan 'Youtube'.

4. DAPATAN

4.1 Peranan video pengajaran dalam meningkatkan pengetahuan konseptual matematik Berdasarkan kajian Nugroho et al., (2019) yang bertajuk, 'Pemahaman Konsep Matematika melalui Media Youtube dengan Pendekatan Etnomatematika' menyatakan bagi mengatasi kesukaran dan kesilapan pelajar dalam memahami konsep dan penyelesaian masalah matematik, media elektronik seperti 'youtube' boleh menjadi salah satu pilihan guru. Selain daripada dapat dicapai pada bila-bila masa, media ini juga dapat ditonton berulang kali bagi meningkatkan pemahaman konseptual pelajar.

Terdapat 3 kunci utama peranan guru dalam melaksanakan pengintegrasian teknologi dalam PdP Matematik iaitu, persediaan sebelum kelas, pengurusan semasa kelas dan penilaian (Wijaya, 2020). Selain dapat memberi tumpuan kepada teknologi yang bersesuaian dengan bahan yang dapat meningkatkan kemahiran berfikir murid, pemilihan teknologi yang bersesuaian juga dapat mencungkil dan menggilap kreativiti pelajar disamping dapat menguasai pengetahuan konseptual dengan baik. Ini disokong oleh Putrawangsa & Hasanah (2018), dalam kajian mereka yang menjelaskan bahawa tujuan integrasi teknologi dalam pengajaran dan pembelajaran adalah untuk membantu meningkatkan kemahiran dan kefahaman konseptual dalam matapelajaran matematik.

Berdasarkan beberapa kajian lepas, teknologi dilihat berperanan untuk meningkatkan pengetahuan konseptual Matematik pelajar disamping memberikan impak yang positif terhadap pemahaman dan pencapaian pelajar dalam subjek matematik. Nugroho et al., dalam kajian mereka, menyatakan bagi mengatasi kesukaran dan kesilapan pelajar dalam memahami konsep dan penyelesaian masalah matematik, media elektronik seperti 'youtube' boleh menjadi salah satu pilihan guru. Manakala (Putrawangsa & Hasanah, 2018), dalam kajian mereka menjelaskan bahawa tujuan integrasi teknologi dalam pengajaran dan pembelajaran adalah untuk membantu meningkatkan kemahiran dan kefahaman konseptual dalam matapelajaran matematik.

Berdasarkan pencarian analisis artikel yang dijalankan sepanjang 2018-2022, hanya 3 daripada 7 artikel yang mengkaji pengetahuan konseptual matematik dikalangan pelajar (Nugroho et al., 2019, Marsudi et al., 2021 & Nurdin et al., 2019). Manakala 4 daripadanya lebih merujuk kepada tahap pencapaian matematik pelajar seperti hasil dapatan oleh A Wahid & Abu Samah (2020), Rozali & Abd Halim (2020), Kamlin & Keong (2020) & Nabayra (2022).

Dapatan analisis tersebut turut menunjukkan terdapat impak yang positif hasil penggunaan video pengajaran seperti youtube (Nugroho et al., (2019), Rozali & Abd. Halim (2020), A. Wahid & Abu Samah (2020), Kamlin & Keong (2020), Nabayra (2020) & Marsudi et al., (2021)). Manakala Nurdin et al., (2019) mendapati penggunaan video

geogebra dapat meningkatkan kefahaman konseptual pelajar berbanding pembelajaran secara konvensional.

Kajian analisis data terhadap artikel-artikel tersebut mendapati terdapat pelbagai kaedah pengajaran yang digunakan iaitu pendekatan etnomatika, pembelajaran berasaskan inkuiri, pembelajaran teradun, pembelajaran menggunakan Teori Mayer dan pembelajaran sendiri. Walaubagaimanapun kajian yang dilakukan oleh (Marsudi, Lestari, & Hidayati, 2021) tidak menggunakan mana-mana kaedah pembelajaran. Sementara kajian (Kamlin & Keong, 2020) pula menjalankan kajian berbentuk literatur.

4.2 Impak video pengajaran dalam perkembangan pengetahuan konseptual matematik

Pengetahuan konseptual matematik dilihat sangat penting bagi meningkatkan pencapaian pelajar dalam matapelajaran matematik. Pengintegrasian video pengajaran bagi meningkatkan kefahaman pengetahuan konseptual matematik pelajar dapat memberi impak positif kepada pencapaian dan kefahaman pelajar. Tontonan berulang kali pada bila-bila masa serta kepelbagaian penggunaan aplikasi serta perisian yang menarik seperti 'Powtoon' dan Canva dalam penghasilan video pengajaran disamping penggunaan media interaktif seperti bahan-bahan pengajaran berbentuk gamifikasi, dan voice chatting dapat menarik minat pelajar untuk lebih menguasai dan memahami konsep matematik yang dipelajari. Kemahiran guru dalam mengendalikan teknologi ini khususnya penghasilan video yang berkualiti dapat dipertingkatkan dengan menghadiri bengkel-bengkel atau kursus-kursus peningkatan profesional yang boleh dianjurkan oleh pihak sekolah, PPD dan JPN. Justeru, pemilihan bahan dalam membina modul yang melibatkan pengetahuan konseptual perlu diteliti dan diberi perhatian bagi memastikan kandungannya selari dengan silibus terkini KSSM.

Seiring dengan perkembangan pesat teknologi pada masa kini, kajian ini diharap bukan hanya dapat menyumbang dalam meningkatkan pengetahuan konseptual pelajar, malah dapat dijadikan panduan oleh guru-guru matematik untuk mengintegrasikan teknologi dalam pengajaran dan pembelajaran mereka bagi meningkatkan pencapaian dan tahap pengetahuan konseptual pelajar. Kajian ini juga akan menjadi panduan kepada pentadbir sekolah, PPD, JPN dan khususnya pihak KPM dalam menyediakan kursus-kursus serta modul bagi meningkatkan profesionalisme guru dalam penerapan teknologi bagi meningkatkan pengetahuan konseptual matematik pelajar.

5. KESIMPULAN

Berdasarkan dapatan-dapatan dari pengkaji terdahulu, tidak dapat dinafikan pengintegrasian teknologi sangat memberi impak terhadap pencapaian pelajar khususnya bagi matapelajaran matematik. Pengaplikasian video pengajaran bukan sahaja dapat menarik minat pelajar bagi subjek matematik malah turut dapat meningkatkan kefahaman konseptual matematik pelajar disamping menyumbang kepada peningkatan pencapaian dalam subjek tersebut.

Penggunaan video pengajaran ini juga dapat memberi impak yang positif kepada guru, pelajar malah kepada pihak sekolah khususnya. Namun begitu, penekanan kepada pengetahuan konseptual dalam penghasilan video pengajaran perlulah diberi penekanan bagi memastikan bahan yang dihasilkan dapat memberikan hasil yang diharapkan disamping dapat memenuhi keperluan silibus terkini.

Video pengajaran telah menjadi salah satu alat bantu mengajar yang berkesan untuk menyampaikan sesuatu ilmu serta memberikan peluang kepada para guru untuk menjadi lebih kreatif dalam PdPc berbanding kaedah tradisional. Guru yang dapat memanfaatkan teknologi untuk menggalakkan pelajar menguasai kemahiran matematik serta memahami konsep secara

mendalam dapat mempersiapkan pelajar bagi menghadapi cabaran dunia digital akan datang.

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FACTORS INFLUENCING ADOPTION INTENTION TOWARDS CHATBOTS AS A LEARNING TOOL

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ABSTRACT - Online learning tools usage has been unprecedented growth in higher education institution to provide lesson plan creation, facilitate communication and social interaction with students. Chatbots are programs that integrate artificial intelligence, which allows them to simulate and maintain a certain level of conversation with real people. The tools are currently becoming popular because its' based on natural language and user conversation interfaces that are very common in messaging apps on smartphones. Past studies identified that chatbots able to increase the quality and outcome of learning experience for students. However, many higher education institutions are still trying to understand how chatbots can help in students' learning particularly in Malaysian higher education. The main question is what are the factors that influence the students' acceptance of chatbots as an e-learning tool? Many research have been done in reference to the phenomenon and its implications for developed countries. This paper reviews the literature on chatbots adoption and used a theoretical framework in order to identify the critical factors to capture a complete picture of chatbots adoption intention. This study applied Technology Acceptance Model (TAM) theory as the foundation to examine the relationship between relative advantages, perceived credibility, perceived risks, perceived trust, perceived usefulness, technology self-efficacy, perceived enjoyment, attitude, and intention towards chatbots. With the proposed critical factors, the author was able to investigate their relative contribution to chatbots adoption intention decisions. Using a survey method, data were collected from 624 sampled respondents with chatbots usage experience from Malaysia. Results showed that there were factors were found to play important role in the chatbots adoption. The result contributes to a deeper understanding of the individual factors that promote the use of chatbots in the Malaysian higher education.

Keywords: Chatbot; Learning Tools; Technology Acceptance Model

1. INTRODUCTION

Chatterbot (Chatbot) tools have been unprecedented growth in Internet website to provide superb online services. Chatbot is an application designed to simulate with human users through the Internet. Business website makes use of this conversational AI to communicate and get closer to customers without a human operator. Chatbot can answer questions formulated to platform in natural language and respond through message or voice command. There are three types of chatbots, scripted chatbot, application chatbot and intelligent chatbot. The most found website chatbots are scripted chatbot and intelligent chatbot. In a conversation, script chatbot allows users choose from the limited options provided to reach the next stage of conversation. Intelligent chatbot able to accept different type of input commands in the form of phases or sentences via text or voice.

Chatbot provide numerous advantages to business, such as 24/7 availability, customer empowerment, build customer relationship, saves customer service costs and many more. The size of chatbot market is projected to be USD994.5 million in 2024 across different sectors including education (XXXX) . In education, chatbots have significant advantages on student learning success and satisfaction. For example, University of Georgia created chatbot to handle forum posts by students (Jones, A. 2022). Moreover, chatbots help institutional providing individual learning support with limited investment of financial and organizational resources. For example, in high population course, chatbots can compensate the insufficient individual support of lecturers.

2. OBJECTIVES

Many past studies indicated chatbot have the potential benefits toward the large-scale learning scenarios with more than 100 students per lecturer. It able to solve the problem of individual student support and increase the quality and outcome of learning experience for students. However, many higher education institutions are still trying to understand how chatbots can help in students' learning particularly in Malaysian higher education. In this study, the research will identify the determinant that influence the students' acceptance of chatbot as a learning tool.

In most of the Malaysian higher education institution official website contain chatbot to support web audiences, the extent to which students will adopt and utilise the chatbot as a learning tool remains unknown. This study intends to investigate the student's perception using chatbot. Although the Malaysian higher education institution has aware the benefits of chatbot, the extent to which higher education students will adopt and utilise chatbot remains unknown. There are no known studies on chatbot in Malaysian higher education. This research intends to bridge the knowledge gap by studying the students' acceptance of the chatbot as a learning tool. So far, focus has been placed in developed countries such as the western countries. It is important to know whether similar results can be generalised to other developing countries. In this study the researcher provides empirical validation on the acceptance and possibility of using chatbot as a learning tool in Malaysia. The study modifies the Technology Adoption Model (TAM) as the research framework to investigate the chatbot acceptance as a learning tool (Davis, 1993).

3. METHODOLOGY

This study uses the quantitative research methodology. The data was obtained by distributing a set of structured questionnaires to the respondents concerned. The respondents were asked to indicate the importance factors that are important to their opinion along a five-point scale. In this study, 823 respondents were selected. The questionnaires were distributed to every student from Malaysia IPTA and IPTS via email with a hyperlink to Google form. In the final analysis, only 624 were used for analysis. The questionnaire has been piloted to a group of 30 students to assess its validity before it was distributed. From this test, the respondents were able to attempt all the questions without much difficulty. The research was conducted in IPTA and IPTS at Klang Valley due to the large scale of population. In order to analyse the data, Statistical Package for Social Science (SPSS) software was used. Results were analysed under the following categories which include frequency, ANOVA and factor analysis. Besides that, the validity and reliability of the questions were analysed using Cronbach Alpha (Sekaran, 2003).

4. RESULTS AND DISCUSSION

A modified TAM framework with 13 hypotheses (H₁₋₁₃) were developed to determine the students' acceptance as an eLearning tool in Malaysia. The findings of the hypotheses results have been summarised as follows:

- i. Relative advantage of chatbot has a positive influence on the perceived usefulness of chatbot (H₁ was supported);
- ii. Perceived credibility of the chatbot providers has a positive influence on the perceived trust of the chatbot (H₂ was supported);
- iii. Perceived risk of chatbot has a negative influence on the perceived trust of chatbot (H₃ was not supported);

- iv. Technology self-efficacy on chatbot have a positive influence on the perceived enjoyment of chatbot (H4 was supported);
- v. Perceived trust of the chatbot has a positive influence on the perceived usefulness of chatbot (H5 was supported);
- vi. Perceived trust of the chatbot has a positive influence on the perceived enjoyment of chatbot (H6 was supported);
- vii. Perceived enjoyment of the chatbot has a positive influence on the perceived usefulness of chatbot (H7 was supported);
- viii. Perceived trust of the chatbot has a positive influence on the users' attitude towards accepting chatbot as a learning tool (H8 was supported);
- ix. Perceived usefulness of the chatbot has a positive influence on the users' attitude towards accepting chatbot as a learning tool (H9 was supported);
- x. Perceived enjoyment of the chatbot has a positive influence on the users' attitude towards accepting chatbot as a learning tool (H10 was supported);
- xi. Perceived usefulness of the chatbot has a positive influence on the users' intention to use chatbot as a learning tool (H11 was supported);
- xii. The users' attitude has a positive influence on the users' intention to use chatbot as a learning tool (H12 was supported); and
- xiii. Perceived enjoyment of the chatbot has a positive influence on the users' intention to use chatbot as a learning tool (H13 was supported).

5. CONCLUSION

This study has provided empirical evidence of the students' intention to use chatbot as a learning tool. The determinants that influence the students' intention to use chatbot as a learning tool have been identified and included in the modified TAM. This study may provide institutions to consider the features of chatbot and attitudes of students and encouragement to students before the implementation of chatbot.

6. IMPLICATION

Relative advantages influence usefulness of chatbots. Students may not use the chatbot without the features that benefits to them. Chatbot must include the contents details that able to assist them in learning. Perceived usefulness of chatbot also influence users' attitude and intention to use chatbot. The more benefits of chatbot, the more positive of their attitude would be toward accepting chatbot as learning tool. This also shows that the students are concerned with the credibility of chatbot provided by their institutions. They expect a reliable system in order to help in their learning. Perceived risks have a negative influence to perceived trust. The students are confident with tools provided by the institution. Institutions may not implement a system that will endanger their students. Students are more willing use chatbot if they trust it, find it easy to handle, pleasant, fun and enjoyable. Similar with past studies using TAM, attitude is assumed to be influenced by perceived trust, perceived usefulness and perceived enjoyment.

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SUSTAINING TECHNICAL AND VOCATIONAL EDUCATION TRAINING BASED ON THE COMPETENCE AND CREATIVITY OF INSTRUCTORS

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ABSTRACT - This quantitative study examines the issue of the implementation of the sustainability of Technical and Vocational Education Training (TVET) among the instructors staff of the Training Institute of the Human Resources Department (ILJTM) based on competence and creativity. This study determines whether there is a relationship and influence of competence and creativity of teaching staff on the implementation of TVET sustainability. A total of 444 ILJTM teaching staff were involved as survey respondents. Pearson's Correlation Analysis and Structural Equation Modeling (SEM) are data analysis techniques in this study. The results of the study show that all the mean values of the variables are at a high level, namely competence mean=4.27, creativity mean= 4.10 and TVET sustainability mean=4.35. The results of Pearson Correlation analysis found that there is a significant and positive relationship at a medium level for competence ($r=0.64$, $p<0.05$) and a high level for creativity ($r=0.22$, $p<0.05$) with the implementation of TVET sustainability. Meanwhile, the regression analysis of the SEM path shows that competence and creativity significantly affect the implementation of TVET sustainability with β values of $\beta=0.23$ and $\beta=0.37$ respectively. Therefore, in order to increase the level of effectiveness of TVET's sustainability implementation, improvements are needed from the aspects of training infrastructure, curriculum, industry relations, instructor expertise and training quality assurance.

Keywords: Sustainability of TVET; Competence; Creativity; Instructors.

1. INTRODUCTION

The concept of sustainability in all areas of learning was declared in December 2002 in South Africa during the 57th United Nations General Assembly during the launch of the Decade for Education Sustainable Development (ESD) (UNESCO, 2005). All levels of education around the world will mobilize efforts to make changes in education programs to apply elements of sustainability in vocational subjects (Elias, 2006).

Right now, the TVET system in Malaysia is undergoing regular changes towards the implementation of sustainability programs in accordance with UNESCO's recommendations. This is a mainstream process which has become the approach of the Ministry of Education Malaysia (KPM). The aim is to provide a highly skilled and adaptable workforce to produce innovative, creative and competitive workers (KPM, 2012). TVET transformation is an effort to re-engineer the framework of the current Technical and Vocational Education Training (TVET) institutional system until a new TVET system is built and contributes to Malaysia's transformation agenda as a high-income country (EPU, 2015).

In order to form an Education framework to achieve the transformation process of the education system to a more effective and efficient higher level, the Education Development Plan (PPPM) 2013-2025 has been enacted (KPM, 2014). The increase in human capital through the transformation of teaching, the restructuring of the TVET system, as well as the application of several initiatives and the culture of the TVET organization will be able to have an impact on the development of a country that is able to face challenges and critical thinking in the world of globalization (KPM, 2014). The Ministry of Education is determined to transform the education system towards sustainability to ensure that the PPPM 2013-2025

can be achieved by equipping human resources with 21st century knowledge and skills by focusing on mainstreaming TVET institutions in order to become sustainable global competitors and achieve the goals of educational development sustainable (EPU, 2015).

2. HYPOTHESES

Based on the objectives of the study and the research questions that have been set, the researchers have developed several null hypotheses that are used in this study as follows;

- i. H_o^1 : There is no significant relationship between competence and creativity with the implementation of TVET sustainability among instructors at ILJTM.
- ii. H_o^2 : There is no significant influence of competence and creativity on the implementation of TVET sustainability among instructors at ILJTM.
- iii. H_o^3 : There is no significant direct and indirect relationship and influence between competence and creativity on the implementation of TVET sustainability among instructors at ILJTM.

3. METHODOLOGY

The study that has been conducted uses a non-experimental research design. A set of questionnaires is used as a research instrument in a survey method on a study sample that aims to obtain information from part of the population related to the variables in this study. This quantitative approach is used to facilitate the effort to obtain data and to ensure the reliability, validity and describability of the data to be obtained. Questionnaires were distributed to the study population, namely TVET instructors at Human Resources Department Training Institutions (ILJTM) across the country. Probability sampling techniques have been used involving stratified random sampling, cluster random and finally simple random sampling. Based on the combination of several sampling methods, the total number of targeted samples is 444 respondents in this study. According to Sekaran (2016), simple random samples have the lowest level of bias and offer the highest level of generalization.

After the questionnaire was obtained from TVET instructors throughout ILJTM who were selected through probability sampling, the data was analyzed using statistical analysis software using IBM SPSS and SEM AMOS version 26.0. Among the analyses involved in this study are descriptive statistical analysis and inferential statistical analysis.

4. RESEARCH INSTRUMENT

The form of the questionnaire is in the form of a Likert scale where the respondent can choose the answer criteria related to the respondent. The questions are rated on a scale of five (5) points, from a scale of one (1) representing strongly disagree to a scale of five (5) meaning strongly agree. In this study, two independent variables were selected, namely i) instructor competence; and ii) teacher creativity. While the dependent variable is the sustainability of TVET. The creativity variable is also a mediator in this study and can also act as a second dependent variable. To measure the independent variable of teacher competence, the researcher used a questionnaire based on The Education for Sustainable Development Toolkit (McKeown, 2002), Competencies for ESD Instructors (Sleurs, 2008) and the Sustainable Education Development Framework for Technical and Vocational

Education in Malaysia by (Minghat & Yasin, 2010). The instrument used in this study was also used by (Zainal, 2015) in his study. The Creativity Fostering Teacher Behavior Index (CFTIndex) developed by Soh (2015) based on the study of Cropley (1997) is used as an instrument to measure the variables of teacher creativity. Some previous researchers such as Chan & Yuen (2014a), Dikici & Soh (2015), and most recently Hui, Cheung, & Ho (2018), (Jaggil Apak, 2018) have used this measuring tool. While to measure the dependent variable of TVET sustainability, the researcher used a questionnaire based on the Sustainable Education Development Framework for Technical and Vocational Education in Malaysia by Minghat & Yasin (2010) and developed by Zainal (2015). The sustainable education development framework by Minghat & Yasin (2010) was developed based on the model and core outlined by UNESCO (2005).

5. FINDINGS AND DISCUSSION

5.1 Level of TVET competence, creativity and sustainability practice (Objective 1)

The analysis of the findings of the study that has been conducted shows that the competency variables for vocational knowledge, functional skills, values and professionalism are at a high level with a mean score (M=4.27, SP=0.36). The value dimension has the highest score (M=4.34, SP=0.42), followed by the professionalism dimension (M=4.29, SP=0.44), the functional skills dimension (M=4.25, SP=0.35) and finally the vocational knowledge dimension (M=4.23, SP=0.36). It clearly shows that the instructors have a high level of competence for the four dimensions studied. The result of the mean score for the competency variable is shown in table 1.

Table 1. Mean Score and Standard Deviation of Competence (N=444)

	Mean	Standard Deviation
• Competence	4.27	0.36
• Vocational Knowledge	4.23	0.38
• Functional Skills	4.25	0.35
• Value	4.34	0.42
• Professionalism	4.29	0.44

The analysis of the findings of the study that has been conducted shows that the Creativity variables for vocational freedom, motivation and opportunities are at a high level with a mean score (M=4.10, SP=0.39). The value opportunity has the highest score (M=4.17, SP=0.48), followed by the motivation dimension (M=4.08, SP=0.43) and finally the freedom dimension (M=4.05, SP=0.50). It clearly shows that the instructors have a high level of creativity for the three dimensions studied. The result of the mean score for the creativity variable is shown in table 2.

Table 2. Mean Score and Standard Deviation of Creativity (N=444)

	Mean	Standard Deviation
• Creativity	4.10	0.39
• Freedom	4.05	0.50
• Motivation	4.08	0.43
• Opportunities	4.17	0.48

While the analysis of the findings of the study that has been carried out shows that the level of implementation of sustainability for the implementation of curriculum design, training infrastructure, industrial relations, staff development and quality assurance is also at a high level with a mean score (M=4.35, SP=0.38). The implementation of quality assurance has the highest score (M=4.51, SP=0.44), followed by the implementation of industrial relations (M=4.38, SP=0.44), staff development (M=4.37, SP=0.49), curriculum design (M=4.34, SP=0.43) and then the implementation of training infrastructure (M=4.12, SP=0.59). This means that the five dimensions of TVET sustainability implementation among instructors are at a high level and are important elements in ensuring the effectiveness of TVET sustainability implementation. The result of the mean score for the TVET sustainability variable is shown in table 3.

Table 3. Mean Score and Standard Deviation of TVET Sustainability (N=444)

	Mean	Standard Deviation
• Sustainability of TVET	4.35	0.38
• Curriculum Design	4.34	0.43
• Training Infrastructure	4.12	0.59
• Industrial Relations	4.38	0.44
• Staff Development	4.37	0.49
• Quality Assurance	4.51	0.44

5.2 Null Hypothesis (Ho¹): There is no significant relationship between competence and creativity with sustainability of TVET among instructors at ILJTM (Objective 2).

The results of the Pearson Correlation test coefficient for the total study sample (N=444) as explained in table 4 show the existence of a significant positive relationship between the independent variables of distributive leadership ($r=0.61$, $p<0.01$), organizational commitment ($r=0.65$, $p<0.01$), competence ($r=0.64$, $p<0.01$) and creativity ($r=0.72$, $p<0.01$) with the dependent variable of TVET sustainability. However, the strength of the relationship was found to be moderate for all variables except for the creativity variable which is based on the index proposed by Davies (1971) and Cohen et al. (2007). It was found that a high correlation strength was obtained for the relationship of the creativity variable which is 0.72.

In conclusion, since the findings show that there is a significant relationship between the variables of the study, the Null Hypothesis 1 (Ho¹) is rejected. Therefore, the findings of the study explain that there is a relationship between the variables of competence and creativity with the sustainability of TVET among instructors at ILJTM.

Table 4. Pearson Correlation Analysis Between Competence And Creativity With TVET Sustainability

Variable		Competence	Creativity
Sustainability TVET	<i>Pearson Correlation</i>	.64**	.72**
	<i>p (Sig)</i>	.00	.00
	<i>N</i>	444	444
** Significant at the level $p<0.01$ (2-tail)			

5.3 Null Hypothesis (Ho2): There is no significant influence of competence and creativity on the implementation of TVET sustainability among instructors at ILJTM (Objective 3).

Findings showing the value of the beta coefficient and the level of significance for the two predictor variables show that if competence increases by 1 unit, then it also changes the sustainability of TVET by 0.23 ($\beta=0.23$, C.R= 6.12, $p<0.05$). Next, when creativity increases by 1 unit, it will increase the sustainability of TVET by 0.37 ($\beta=0.23$, C.R=9.12, $p<0.05$). Based on table 5, the study findings also show that the combination of the influence of the two predictor variables contributes as much as 59 percent ($R^2=0.59$) to the sustainability of TVET among instructors. The results of this analysis show that the competency predictor variable contributes as much as 24.0 percent ($R^2=0.24$), while creativity contributes as much as 35 percent ($R^2=0.35$).

Table 5. Estimated Values of Multiple Regression Coefficients and the Significance of Competence and Creativity Variables on TVET Sustainability

			R ²	β	S.E.	C.R.	P
Sustainability TVET	<---	Competence	.24	.23	.038	6.120	.000
Sustainability TVET	<---	Creativity	.35	.37	.038	9.119	.000

Therefore, there is another 41.0 percent change in the dependent variable of TVET sustainability that cannot be predicted because there are other factors that were not investigated in this study. Since the significant value is found to be less than $P<0.05$, then Null Hypothesis 2 (Ho2) is rejected. In conclusion, the findings of this study show that the variables of competence and creativity have a significant influence on the sustainability of TVET among instructors at ILJTM. Therefore, this finding also shows that increasing competence and creativity influence the implementation of TVET sustainability among instructors and vice versa. Therefore, this situation means that better competence and creativity will have a positive effect on the implementation of TVET sustainability among ILJTM instructors. The regression equation for this analysis can be formed as follows: $Y = 0.59 + 0.23X_1 + 0.37X_2 + 0.16$

5.4 Null Hypothesis (Ho3): There is no significant direct and indirect relationship and influence between competence and creativity towards the implementation of TVET sustainability among instructors at ILJTM (Objective 4).

Based on the SEM path analysis results, competence ($\beta=0.40$, C.R=7.24, $p<0.05$) is a predictor variable that has a significant impact on teacher creativity. Competence ($\beta=0.21$, C.R=4.49, $p<0.05$) and creativity ($\beta=0.34$, C.R=6.20, $p<0.05$) also play a role as predictor variables that have a significant impact on the implementation of TVET sustainability. Since

the significant value is found to be less than $P < 0.05$, then Null Hypothesis 3 (Ho3) is rejected. In conclusion, the findings of this study show that the variables of competence and creativity have a direct and indirect relationship and influence between the independent variables and the dependent variables that are significant at each level as shown in table 6.

Table 6. Results Analysis of Regression Coefficients of Each Path (path) for Study Variables

			β	S.E.	C.R.	P
Creativity	<---	Competence	.40	.055	7.236	.001
Sustainability TVET	<---	Competence	.21	.047	4.491	.001
Sustainability TVET	<---	Creativity	.34	.055	6.200	.001

Next, the role of the mediator for the creativity variable whether or not it has a significant effect on the relationship between the dependent variables of competence and the sustainability of TVET is also studied in the SEM Model of this study as shown in figure 4. From the tests conducted the indirect effect path (a =0.40) and (b=0.34) the relationship between competence variables and TVET sustainability implementation after creativity was included as a mediator was found to be significant in the regression test of the variables involved. It was also found that the direct effect of the path (c=0.21) or the direct effect of the competence variable on the TVET sustainability implementation variable is statistically significant.

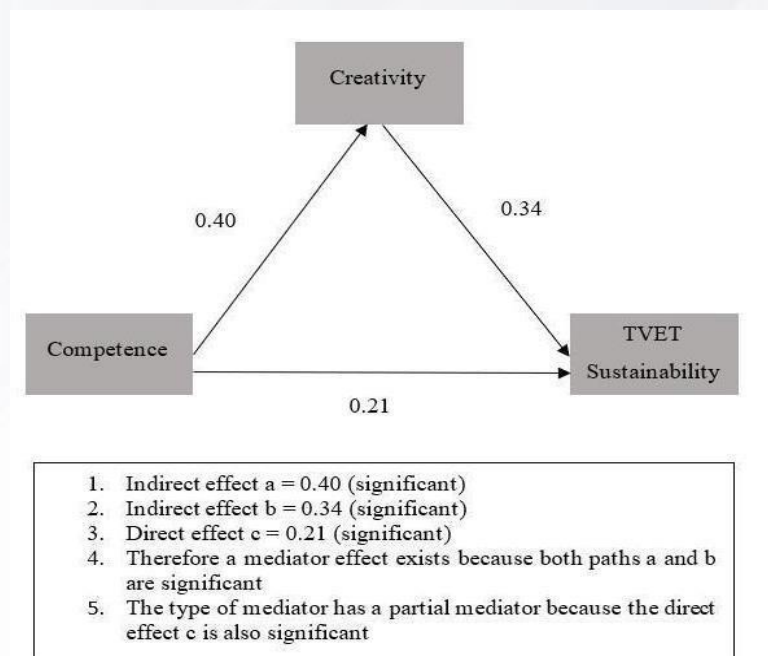


Figure 4. Mediator Testing of Organizational Commitment - Creativity - TVET Sustainability

Therefore, the creativity variable is a mediator and has a partial mediator effect for the relationship between the competence variable and the implementation of TVET sustainability. This result was again confirmed using parametric bootstrap analysis to confirm

the conventional mediation test as presented in figure 4. The researcher again performed the Maximum Likelihood (ML) algorithm bootstrap procedure by applying a sample of 1000 bootstraps at the 95% percentile confidence level and 95% bias corrected. Bootstrapping test results have also confirmed that creativity is a mediator and has a partial mediator effect on the relationship between competency variables and TVET sustainability implementation as shown in table 7. The findings of this study refer to the approach of Baron & Kenny (1986) and Zainuddin et al. (2018).

Table 7. Bootstrapping Analysis Results For Competence – Creativity – TVET Sustainability Mediator Testing

	Indirect Effects (ab)	Direct Effects (c)
<i>Bootstrapping Value</i>	.163	.253
P-Value	.001	.003
Result	Significant	Significant
Types of Mediators	Mediation exists because indirect effects are significant. Partial Mediation due to direct effects is also significant.	

6. CONCLUSION

This study can provide an understanding of the concept and goals of sustainable education development to help in improving the effectiveness of the implementation of TVET sustainability in this country in general and ILJTM in particular. This is because based on the views and ideas of the UNESCO organization, the concept of sustainable education development (ESD) is necessary to ensure a better quality of life and impact TVET graduates to become sustainable workers. It can be concluded that, in order to develop knowledge and skills that support economic development and enable the community to improve the quality of their daily lives, then integrating ESD into the TVET program based on the competence and creativity of instructors is very important. Thus, in order to increase the level of effectiveness of the sustainability of TVET, several suggestions for improvement from the aspects of training infrastructure, curriculum, industry relations, instructor expertise and training quality assurance need to be taken into action by all those involved in its implementation.

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AL- GHAZALI APPROACH IN RELATIONSHIP BETWEEN E-LEARNING AND COMMITMENT AMONG STUDENTS

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ABSTRACT - The spread of the COVID-19 epidemic has a significant impact on all sectors, including education. COVID-19's unexpected arrival has left the education sector unprepared to implement e-learning in teaching and learning sessions. Ministry of Higher Education (MOHE), lecturers, universities students have all been impacted by the spread of COVID-19, which has amended the educational landscape and learning methods. This paper focuses on the e-learning proficiency that impacted students' commitment towards e-learning session during this epidemic. Many recent research found that students are less committed to e-learning that caused by several factors. However, in contrast stated that the flexibility of e-learning is a solution for people's family or work commitments. In addition, al-Ghazali's approach will also examine as mediator role towards e-learning and commitment of students under current learning session in Malaysian public universities. This paper is conceptual in nature, all the discussion about e-learning proficiency, students' commitment and al- Ghazali's approach prior to data collection phase. It is hoped that this study will be able to give enlightenment to the MOHE, government, policy makers, lecturers and universities students. Necessary action should be imposed by education sector to provide an action in adapting e-learning to students. Thus this action plan will add more readiness to students to improve the e-learning session process and promote effective new learning system with high level of acceptance by the knowledge seekers. Theoretically, it paved the way towards the virtue of knowledge, education and prolonged the extend of happiness of all in the world and hereafter according to the life of the time of the Prophet and his companions.

Keywords: e-learning; COVID-19; education; students commitment; al-Ghazali's approach

1. INTRODUCTION

The world was shocked by the outbreak of the epidemic COVID -19 at the end of 2019 in Wuhan. The novel virus was introduced as COVID-19 novel coronavirus by the Chinese scientists (Shereen et al. 2020)[1]. Coronavirus 2019, also known as COVID-19, is a viral infection that causes lung inflammation. The spread of the COVID-19 epidemic has hit the whole world, resulting in millions of deaths, hospitals full of critical patients and patients infected with the virus. The rate was approximately 612,876 souls. In addition to affecting human health, this virus also affects the economic and social sectors and the education sector.

The existence of Corona Virus (COVID-19) has changing the educational landscape dramatically .This type of virus is easy to infect others and spread widely in a short time. In this light, the COVID-19 pandemic has forced the universities to close face-to-face education and send students home. Based on literature from UNESCO (2020), more than 100 countries were forced to close schools, affecting half of the student population. This support with research by Abdul Hamid & Khalidi, (2020) stated that Malaysia is no exception, with the learning of 4.9 million students impacted by school closures beginning in the middle of March 2020. Therefore, face-to-face education is impractical in the current situation, and the e-learning platform has become the primary alternative to be considered as the mode of teaching and learning. One study conducted by Sun & Chen (2016) stated that online learning is unlikely to replace traditional learning, but it can be used as an alternative to traditional learning, and it is increasing popularity because to its flexibility, cost, and accessibility[2].

Based on media statement by the Ministry of Higher Education (MOHE) on 20 March 2020, MOHE allows all Public Universities and Private Institutes of Higher Education to implement online Teaching and Learning (PdP) or e-learning. An unexpected shift from face-

to-face learning to online, there are few difficulties faced by students and lecturers. Arguably, the adoption of technology has disrupted the traditional teaching practices as teachers often find it difficult to adjust and connect their existing pedagogy with technology (Sulisworo 2013) [3]. On the other hand, others have been less positive about e-learning due to difficulty of use, work load, lack of technological skills, and lack of face-to-face interactions (Picciano, 2002)[4]. This COVID-19 pandemic bring such a huge challenge to education systems that these expanded national education systems have ever faced.

Finally, these issues and constraints have the effect of preventing students from committing to the e-learning session, thereby interfering with the smoothness of the teaching and learning process. Thus, this paper expected to enhance further the existing body of knowledge regarding the al-Ghazali approach as mediate role to e-learning and student's commitment, especially among students.

2. OBJECTIVES

The general objectives in this research is to determine the relationship between al-Ghazali approach, e-learning and commitment among students .This research tries to fulfil the need for empirical findings of the comprehensive correlation between the variables. Therefore, the study is proposed to be conducted within the specific objectives as follows:

- (i) To investigate the state of commitment showed by the students upon experiencing the current e-learning session in Malaysian public universities.
- (ii) To identify the level of e-learning proficiency among students under current learning session in Malaysian public universities.
- (iii) To determine the al-Ghazali approach toward practising e-learning under current learning session in Malaysian public universities.
- (iv) To examine the mediate role of al_Ghazali approach towards e-learning and commitment of students under current learning session in Malaysian public universities.

3. METHODOLOGY

Based on the objectives of this study, quantitative research is planned to be employed in order to answer the research questions. Generally, the evaluation of choosing the proper method depends on the research objectives and research questions outlined within the study. This study will employ a quantitative research method where data collection using a structured questionnaire survey will be administered to identify the state of commitment showed by the students upon experiencing the current e-learning session in Malaysian public universities and their level of e-learning proficiency. Besides, this study also determine the al-Ghazali approach toward practising e-learning in Malaysian public universities. In this study, the explanatory research design is employ as it fits the objectives of this study which is to identify the relationship between al-Ghazali approach towards e-learning and commitment of students in Malaysian public universities. In this study will use inferential analysis test which is correlation analysis, it is used to understand the extent to which two variables are dependent on one another. This analysis essentially tests the strength of the relationship between two variables, and if their correlation is strong or weak. An inference test is run on the subject and the decisions are generalized to all other in the population.

4. RESULT AND DISCUSSION

4.1 Al-Ghazali's Philosophy Of Education

Al-Ghazali had writing a lot of literary works which have had a lasting effect in moulding the moral dan spiritual life of the Islamic World. Al-Ghazali had mentioned in his book, *Ihya' Ulum al-din* that in his time, people forget about eternal salvation and hankering to material gains lead to worldly temptations. In the context of knowledge, people will seek knowledge and learn just for the sake of their fame, and make others spell-bound on them. And now, our current world similar to al-Ghazali's time and we need of his inspired guidance.

Al-Ghazali began his work *Ihya Ulum al-Din* by making a description of knowledge. Because he looked at the words of the Prophet s.a.w. and how knowledge be the most important things in this life.

“Seeking knowledge is the duty of every Muslim.”

He also mentioned in first chapter of *Ihya' Ulum al-Din* about the priority of knowledge, praiseworthy and reprehensible knowledge, its parts and laws, knowledge that is considered commendable when in fact it is not, tendency to caliphate problems and love to debate, manners of a student and teacher, knowing the scholars of the hereafter and the scholars of the world (deviant), the division of reason, knowing the truth and its glory.

To ensure that the goal of knowledge is obtained, al-Ghazali thinks that persistence and effort by all parties is closely related to the education process. He has stated in *Ihya' Ulum al Din* about the ten functions and responsibilities of students. Thus, there are ten points of students' obligation, that the students must follow (Nur Aeni Jam'iyah, 2001)[5] :

- i) cleanse the heart of despicable traits
- ii) reduce worldly affairs
- iii) do not be arrogant or fight against the teacher
- iv) the opposition of worldly and ukhrawi knowledge
- v) learn all the subjects
- vi) prioritizing the most important fields of knowledge
- vii) deepen knowledge gradually
- viii) recognize the factors that lead to the most important knowledge
- ix) adorning the heart and beautifying the heart
- x) knowing the relationship between knowledge and its purpose

Through *Ihya Ulum al Din*, al-Ghazali also emphasized the need and importance of the teacher's job who will play an important role and shoulder heavy duties because it is considered a trust from God to mankind. Al-Ghazali (1898) distinguishes the following eight standards of behavior for teachers in his masterpiece *Ihya ulum al- Din* book 1 titled book of knowledge[6]. This has been supported by Osman Bakar (2001) stated that the code of ethics or professional duties that teachers (educators) must follow consists of eight items[7] :

- i) Give love for students
- ii) follow the footsteps of Rasulullah s.a.w
- iii) always give advice to students
- iv) preventing students from misbehaving
- v) do not harass subjects
- vi) try to summarize the subject

- vii) guide disadvantaged students
- viii) the teacher must practice his knowledge

4.2 Students' Commitment Towards E-Learning During COVID-19

Kumar (2015) stated that technical issue being a challenge for student in cope e-learning [8]. In contrast, Rovai et.al (2007) stated the benefits of online instruction include increased educational possibilities, flexible teaching and learning methods, and convenience of access for students[9]. In addition, several research provided by Ammar & Albraa (2020) the evidence of most influential factors for e-learning during pandemic COVID-19 which are technology management, support from management, increased student awareness to use e-learning systems, and demanding a high level of information technology from instructors, students, and universities[10]. Besides, students said that the internet environment provided a more conducive social environment for the expression of their views and beliefs (Rovai & Baker, 2005)[11].

Moreover, the other factors that lead to student satisfaction are lecturer support (Areti, 2006)[12]. Previously, researcher found that student achievement in online courses was impacted by their learning preferences (Graff, 2003)[13]. Meanwhile, research by Hermawan (2017) explored learning is the transfer of knowledge from teacher to student [14]. Al-ghazali emphasis on the teacher-student relationship. Thus, al-Ghazali (1898) mentioned the student gains guidance and support as he matures morally, and the teacher gains the opportunity to fulfil his moral obligation to pass on his wisdom and understanding.

5. CONCLUSION

Through al-Ghazali's approach, e-learning proficiency cannot be solved directly but through the application of the roles of teachers and students. With the actions of teachers who have the personality outlined by al-Ghazali, they can understand the situation of students who have problems during the e-learning session in addition to providing other initiatives to the students, and indirectly the students feel given space and motivated to continue to commit to the e-learning session.

Al-Ghazali also mentions the role of students who need to reduce contact with the busyness of the world, family and hometown. Students need to avoid and reduce worldly affairs and relationships with the world as best as possible. One of the reasons for resistance is because it neglects and interferes with concentration in seeking more knowledge. This is proof that e-learning is not suitable to be conducted at home. Meeting teachers helps to improve one's education. It is accepted as an alternative while COVID-19 recovers, but to be adapted indefinitely is not suitable for the reasons mentioned by al-Ghazali. Online learning is can be used just as an alternative to traditional learning not to replace permanently.

Any change in the education system, should take time for acceptance. In addition, several research provided by Ammar & Albraa (2020) the evidence of most influential factors for e-learning during pandemic COVID-19 which are technology management, support from management, increased student awareness to use e-learning systems, and demanding a high level of information technology from instructors, students, and universities. Student commitment cannot be measured by simply looking at the presence of a virtual class, as there can be problems and disruptions of internet access that make them unable to attend classes.

The researchers were able to prove that positive teacher-student relationships provide the foundation for motivation, learning, and enjoyable learning environments. And this is parallel with al-ghazali education theories about the role of teacher as motivator. As instance, the other factors that lead to student satisfaction are lecturer support (Areti, 2006; Chen 2005;

Sahin, 2007). This show that al-ghazali approach as mediator role towards e-learning and commitment of students under current learning session in Malaysian public universities.

According to Al-Ghazali, education is a process that must lead human beings to the Creator's consciousness in order for them to obey His commands. As previously stated, Al Ghazali views education holistically and defines in detail the aims and objectives of education, as well as the function and responsibilities of the teacher and students in acquiring education. It has been observed that Al Ghazali stood for the passionate pursuit of learning on the part of students, as well as the passionate facilitation of learning on the part of teachers. Muslims require a new model that is independent of Western influence and is based on fundamental assumptions about the Muslim's life.

6. IMPLICATIONS

These findings have implications for body of knowledge, the present research is expected to enhance further the existing body of knowledge regarding the al-Ghazali approach that can significantly impact e-learning and student's commitment, especially among students at public university in Malaysia. Next, this will encourage MOHE to deal more effectively with the process of establishing a good plan to overcome the problem of student commitment when undergoing e-learning sessions and provide the best alternative for students. Furthermore, this research also could help the students to identify the way to increase the meaningfulness of seeking knowledge and success in higher education level though they have to face the new of learning environment blended with technologies and systems. And lastly, this research will benefit to government in providing the sustainable learning climate under new set of environment that prolong the meaningfulness' of lifelong learning system that can be used at any need time.

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IMPLEMENTATION OF VIRTUAL LABORATORY IN STEM EDUCATION AS ONLINE DISTANCE LEARNING: A NARRATIVE REVIEW

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ABSTRACT - The application of technology in education has arisen over the years from the development of teaching aids to be used in schools or institutions to the implementation of technology in online distance learning. From online video to virtual reality, these applications had been widely used as tools to convey learning to students notably during and after the occurrence of COVID-19. As it is easier for students to learn new knowledge remotely using these applications, the development of virtual laboratories for STEM subjects is currently ongoing. However, many researches were focused on enhancing conceptual understanding using virtual laboratories, and a few emphasized other aspects such as scientific skills, thinking skills, and cognitive aspects. The purpose of this paper is to explore the effect of the implementation of virtual laboratories in STEM education especially in improving online distance learning. The data were obtained from Scopus database (2019 to 2022), sifted to 15 articles, sorted using Matrix Table, and later reviewed into three main themes. Findings show that virtual laboratory not only benefitted students in enhancing conceptual understanding, but also their self-efficacy, interest, and motivation, and also decreasing their anxiety in performing real laboratory. Virtual laboratories are also effective as a tool to help in developing students' science process skills as well as critical and creative thinking skills. For educators, virtual laboratory greatly assists them in teaching laboratory activities remotely and thus, helps in planning and preparing their lessons. Virtual laboratories are effective in channelling the learning of laboratory activities and improving the quality of education specifically in STEM.

Keywords: Virtual laboratory; virtual reality; online distance learning; open education resources; STEM education.

1. INTRODUCTION

The emergence of virtual technology had a great impact on the development of many fields. This new cutting-edge innovation has been implemented in education throughout the years but recently surfaced numerously to be a useful tool to elevate teaching and learning quality (Kounlaxay et al., 2022). Utilizing virtual technology has opened up the neoteric context for the development of virtual laboratories to assist students in learning abstract and complex theories, and experimenting online (Hanafi et al., 2019; Iordache, 2021). Iordache (2021) also stated that the virtual laboratory provides a fun learning activity because of the appealing features and interactivity. Furthermore, a virtual laboratory is convenient for gaining knowledge and laboratory skills as users can wield the objects in the virtual application (Ernawati & Ikhsan, 2021). Hence, educators may use virtual laboratories as an alternative method for conveying knowledge to students more engagingly.

During COVID-19, educational institutions were forced to be operated without risking educators and learners being exposed to the virus. Learning knowledge and theories can be done online but practical laboratory seems impossible. Creating a virtual laboratory offers an opportunity to conduct experiments similar to a real laboratory but in a safe manner and low cost that is also accessible anytime and anywhere (Dustman et al., 2021). Through interactions and features in the virtual laboratory, learners can acquire spatial and motor skills and gain conceptual understanding (Edwards et al., 2019). Therefore, experiments can still be done without face-to-face interaction.

2. OBJECTIVES

Virtual laboratories had impacted STEM education in many forms and aspects. From teaching the concepts and theories to experimenting and applications in daily life, the main purpose of this paper is to explore the effect of the implementation of virtual laboratory in STEM education especially in improving online distance learning. The objectives of this paper are to study how virtual laboratory is being developed, to study the effects of the implementation of the virtual laboratory on students, and to evaluate students' responses to utilizing the virtual laboratory.

3. METHODOLOGY

This study, which focuses on exploring the effect of virtual laboratories in online distance learning, involves articles obtained from the Scopus database from the year 2019 until 2022. The articles were listed using the keywords "virtual laboratory", which were then sifted to 15 articles based on the relevance to the objectives of this paper, which included only articles from journals. These articles were sorted using Matrix Table. Later, they were reviewed by following these three main themes: development and implementation of virtual laboratories in STEM education, effects of virtual laboratories in online distance learning, and students' acceptance of using virtual laboratories.

4. RESULT AND DISCUSSION

The findings of this study are grouped into three themes and the explanations are as follows.

4.1 Development and Implementation of Virtual Laboratory in STEM Education

Virtual laboratory is the result of finding the solution to conduct experiments which provide safe, cost-efficient, solving lack of materials and apparatus, time-constraint-free, environmentally friendly, accessible laboratory anytime and anywhere, and performing hazardous experiments (Ernawati & Ikhsan, 2021; Hanafi et al., 2019). While other researches were conducted on physically and mentally capable students, (Lu et al., 2021) and (Gavronskaya et al., 2021) focused on using the virtual laboratory for handicapped students and obtained positive result.

The developments of virtual laboratories were either online applications, virtual reality, augmented reality, or simulation. Findings show that virtual laboratory is user-friendly and beneficial to educators and learners in encouraging the learning of STEM subjects (Kounlaxay et al., 2022; Sriadhi et al., 2022). Thus, a virtual laboratory is capable to assist students in learning laboratory events.

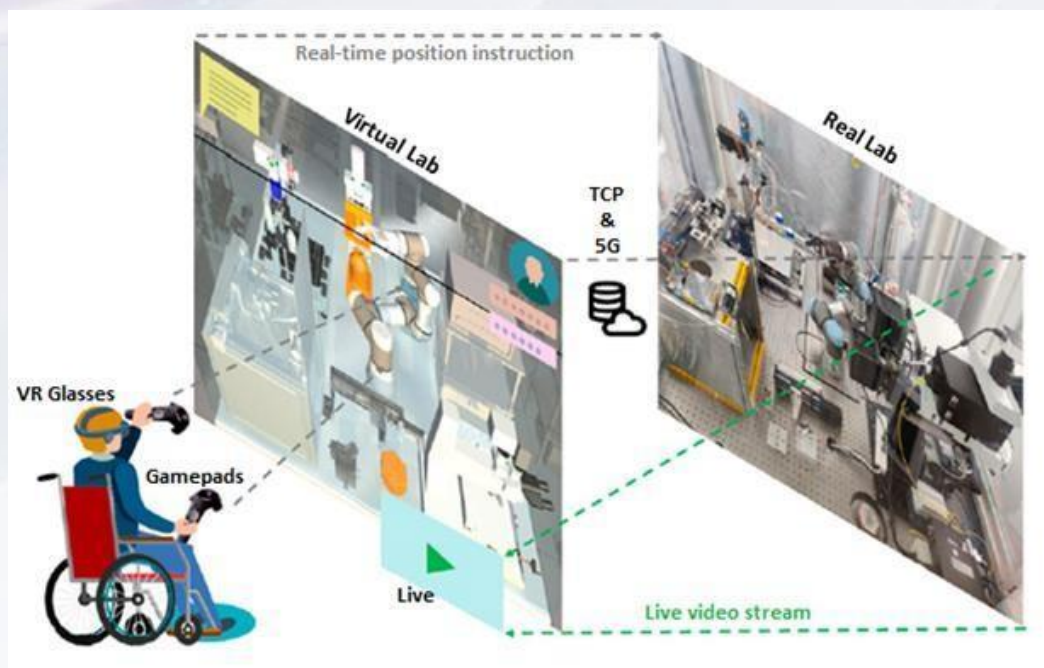


Figure 1. User use VR glasses and gamepads to conduct the virtual lab. (Lu et al., 2021)

4.2 Effects of Virtual Laboratory on Online Distance Learning

There are varied effects of virtual laboratories on students. As virtual laboratory enhances students' achievements and conceptual learning in STEM subjects (Abdullah et al., 2022), it also positively affects other aspects. Some studies show that virtual laboratory increase students' scientific skills and thinking skills (Sapriadil et al., 2019). Students also gain motivation to learn, and show a positive effect towards self-efficacy and attitude after they used virtual laboratory (Abdullah et al., 2022; Brown et al., 2021; Gungor et al., 2022; Iordache, 2021). Moreover, students become less anxious to perform experiments when they use virtual laboratories (Gungor et al., 2022). In contrast, students performing virtual laboratory using VR may exhibit cybersickness (Broyer et al., 2021). This shows that virtual laboratory has side effects despite their many positive outcomes.

4.3 Students' Acceptance of Using Virtual Laboratory

Complimenting the use of technology in education, students found that virtual laboratory is practical and efficient in learning experiments (Brown et al., 2021; Kounlaxay et al., 2022). Students also become intrigued to learn STEM subjects via the virtual laboratory (Abdullah et al., 2022; Edwards et al., 2019; Gungor et al., 2022). Virtual laboratories are also viable for school and university students (Sriadhi et al., 2022; Suleman et al., 2019). These positive feedbacks exhibit the possibility of virtual laboratories in encouraging more students to learn STEM subjects.

5. CONCLUSION

This study has provided that virtual laboratories helped students increasing many aspects from students' achievement to their skills and self-development. Virtual laboratories should be used widely as students exhibit positive feedbacks from using it. It can be concluded that virtual laboratories had been implemented in many forms either as virtual reality, augmented reality or simulations, that involving school and university students, as well as special needs students. For future research, it is suggested to improve the features of

the virtual laboratories and its implementation whether as educational aid or to replace some experiments which cannot be conducted in real laboratories.

6. IMPLICATION

The globalization of Sustainable Development Goal (SDG), Industrial Revolution 4.0 (IR 4.0), and 21st century learning has become a priority in developing tools in education especially in promoting STEM education. As virtual laboratories support active learning (Broyer et al., 2021) and help students develop understanding through a variety of learning styles (Edwards et al., 2019), this study provides knowledge on the future development of a more complete virtual laboratory that is not only emphasizing to increase the students' conceptual understanding but also in terms of scientific skills, thinking skills and other cognitive aspects. Hence, the education quality can be elevated.

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EXPLORING SCIENCE ON TIKTOK: A COMPREHENSIVE REVIEW

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ABSTRACT - Millions of people's everyday lives have transformed as a result of the rapid expansion of online social networks and social media like Twitter, Facebook, Instagram as well as Tik Tok. Education is evolving as well, where blended or online learning is becoming more popular, and social media is redefining educational settings. The influence of social media has been studied in the past and has been demonstrated to have both positive and negative components. Students have dramatically increased their use of social media as a source, provided that the educational system evolves throughout time. Even though there are numerous books and studies about social media and prior efforts, not many focus on Tik Tok and how it affects students' wellbeing from an academic and social/emotional perspective. The academic achievement of the students is impacted by a variety of factors. Nevertheless, the goal of this study is to determine whether Tik Tok possess an effect on students' performance and wellbeing, particularly in the science stream. In this research, to explore the benefits of exploring science on Tik Tok, a well-known database, Scopus, was used to discover articles. All the articles included were between the years 2018 and 2020 only. This study gives an exhaustive review of past studies and proposes a direction for the future development of interesting teaching aids. Tik Tok is a cutting- edge instructional approach for delivering useful science knowledge. Students were able to use their generation's information systems to practice and improve their scientific communication abilities. As a result, the knowledge gained from this study on the advantages of investigating science on Tik Tok can also serve as a guide for policymakers and educators interested in finding new educational tools to facilitate teaching and learning.

Keywords: TikTok, social media, educational tools, science education, benefit

1. INTRODUCTION

The rapid growth of Web 2.0 technology constantly produces innovative and exciting ways for students to take part in learning and satisfy the expanding demands of education. However, traditional teaching techniques or even current software tools are almost invariably ineffective (Yoder et al., 2021). According to the National Research Council (NRC) (“National Research Council (NRC),” 2021), Science Education is regarded as one of the most integral parts of today's education; this is because it is responsible for creating scientifically literate citizens and promoting crucial 21st-century skills like adaptability or problem-solving (Rapporteur, 2010). As a result, there has been a lot of interest in the educational theories that are incorporated into the tools and methods that encourage scientific thinking. (Hayes et al., 2020a; Khlaif & Salha, 2021)

Since social media is something that students are familiar with and is also something that attracts their attention, many researchers have found it to be an exciting topic (Crăciun & Bunoiu, 2015; Gunawan et al., 2021; Ma et al., 2016). Additionally, integrating social media in science education, it can support scientific thinking compatible with methodologies, scientific theories, and learning strategies related to education and social networking (Aburagaga et al., 2020; Agarwal, A; Alrowaili, 2020; Barak et al., 2011; Bowen, G.A., Gordon, N.S., Chojnacki, 2017; Escamilla-Fajardo et al., 2021; Garrido Martínez Salazar F., García Fernández P.M., Gamba Arzoz M.I., Moreno Villares J.M., 2021; Lopez V., 2018; Thomas et al., 2020). New social networking applications like TikTok are subsequently taking a seat at the table. Students today are more likely to use TikTok than other social media platforms like Twitter, Facebook, and Instagram (Figal, 2021; Ghani et al., 2022; Khlaif & Salha, 2021)

The Learn on TikTok programme, which consists of educational video to support learning during COVID-19 lockdowns, was introduced by TikTok in May 2020 (A).

Hutchinson, n.d.). These videos were created by experts from many fields, students, and other users who shared their knowledge with the viewers of this social network. The videos associated with the hashtag #learntiktok were all produced by its users and cover a variety of subjects, including chemistry experiments, cooking instructions, health advice, and learning foreign languages.

2. OBJECTIVES

The influence of social media has been studied in the past and has been demonstrated to have both positive and negative components. Students have dramatically increased their use of social media as a source, provided that the educational system evolves throughout time. Even though there are numerous books and studies about social media and prior efforts, not many focus on Tik Tok and how it affects students' wellbeing from an academic and social/emotional perspective. The academic achievement of the students is impacted by a variety of factors. Hence, this review aims to discover how Tik Tok possess effect students' performance and wellbeing, particularly in science education.

3. METHODOLOGY

In this research, to explore the benefits of exploring science on Tik Tok, a well-known database, Scopus, was used to discover articles. The searching words in Scopus is TikTok AND Science Education. All the articles included were between the years 2018 and 2020 only, which were then shifted to 40 articles based on the relevance to the objectives of this study.

4. RESULT AND DISCUSSION

4.1 Benefits on integrating TikTok in Science Education

One of the major benefit integrating TikTok application in teaching and learning can improve students' scientific reasoning skills (Escamilla-Fajardo et al., 2021; Hayes et al., 2020b; Radin & Light, 2022) and also enhancing inquiry learning (Bokosmaty et al., 2019; Pietarinen et al., 2019; Radhamani et al., 2021) among students. During the lockdowns teacher creatively create the experimental video (Altawalbeh & Al-Ajlouni, 2022; Liang et al., 2020; Priyantini et al., 2021; Wisanti et al., 2021) and posted it to TikTok account to encourage students to do home based experiment at home. Teacher also encourages students to communicate each other at the chat column. The educational video on TikTok does not overwhelm or stress out the student about the learning process (Fiallos et al., 2021; Hsin & Cigas, 2013; Jung & C, 2019) and also can stimulate higher order thinking skills (HOTS) (Gunawan et al., 2021; Ichsan et al., 2020). This is because implementing blended learning with face-to-face lessons on higher order thinking skills in science learning, using multiple representations in science learning, constructing science learnings' themes, integrating science learning, and continuing with online learning by web-based (social media), can improve HOTS abilities in students. The results of a study done by Hayes et al (Hayes et al., 2020b) utilising a TikTok account with 16 instructional videos illustrating scientific experiments that the target audience could readily repeat at home indicated that the students responded very positively to the content.

Students prefer using TikTok compare to other social media platform because the usage of video mini lectures via TikTok can increases participant satisfaction (Guseva & Kauppinen, 2018) and motivation (Hsin & Cigas, 2013), according to earlier studies. So that,

this will enhancing conceptual understanding(Barak et al., 2011; Lin & Wu, 2021; Vel et al., 2004) among students. Learning science especially chemistry is challenging since many chemical processes occur at the molecular level (Jye et al., 2020; Niaz & Rodriguez, 2000; Pulukuri & Abrams, 2021; Sirhan, 2007; Sunoqrot et al., 2020) and some previous study reveal student that feel anxiety when learning chemistry (Faulconer & Griffith, 2022; Jegede, 2013; Kamaruddin et al., 2019; Pangestika & Wiyarsi, 2021). So that, by apply creative educational video on TikTok can reduce students' anxiety and thus learn the subject in a more effective and meaningfully (Hight et al., 2021; Ismail et al., 2021; Noryana Mohd Nor, Corrienna Abdul Talib, Nur Wahidah Abd Hakim, Marlina Ali, 2019)

The science teachers felt that incorporating different science topics, following courses, having discussions, responding to assessments, and validating lesson plan items were all beneficial. TikTok was created with the intention of quickly sharing information and ideas (Fihal, 2021; Hamadi et al., 2021; Swathi et al., 2020). Each teaching TikTok focused on a single key idea and highlighted scientific principles(Hayes et al., 2020b) that could be best understood through visual assistance (Radin & Light, 2022), so that it can also reach public Therefore, TikTok is recommended as teaching learning tools because can promote students' motivation, create an engaging learning environment, and encourage the development of skill such as creative and critical thinking skills (Khlaif & Salha, 2021; Scherr & Wang, 2021).

5. CONCLUSION

Introducing new educational and science-based videos to viewers on the application may therefore be challenging, especially if users have never used TikTok for educational purposes or to view chemistry or science-based videos. TikTok's potential drawbacks include the difficulty of initially reaching a global audience, particularly when producing videos that serve as "For Your Page" (FYP) recommendations. However, releasing an innovative and engaging science video on TikTok can get better ratings than on other platforms (Hayes et al., 2020b). The video can reach a global audience by applying the right hashtag #.

As a result, it is suggested that the following researcher conduct research on how to make educational videos on Tik Tok become easily to FYP and easy to reach a global audience. These videos might never be seen by the target audiences unless platform users actively use the search feature to find them, diverting their attention from the "distractive swipe-up" recommended content.

6. IMPLICATION

Through the fourth industrial revolution (IR 4.0), the world is advancing toward utilising the most recent technical innovations. Therefore, education is incorporating new teaching and learning methods that take advantage of emerging technologies to provide students the knowledge and skills they need to succeed in the era of machines. It is apparent that using online social media helps people achieve their goals, which is in line with MOE Malaysia's (2013)(Kementerian Pendidikan Malaysia, n.d.) blended learning and flipped classroom approaches. Therefore, the knowledge gathered from this study on the benefits of researching science on is the key contribution of this review. Tik Tok can also be a resource for decision-makers and educators looking for innovative teaching resources.

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IN-SERVICE TEACHERS' PERCEPTIONS ON UTILISING TECHNOLOGY AND CONTENT KNOWLEDGE: MALAYSIAN CONTEXT

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ABSTRACT - Teachers as professionals face the issues of incorporating technology in teaching while maintaining a thorough understanding of subject-matter material in reaction to technological advances in educational environments. In order to develop such technology-friendly learning environments, teachers' good exposure to and implementation of technology are deemed important. This research examines Malaysian teachers' knowledge of the three fundamental elements of the TPACK framework, which comprise technology, pedagogy, and content. This study utilised a quantitative research design. A total of 292 computer science (CS) teachers were chosen and completed a 23-item survey instrument. The survey instrument was calibrated primarily by content validity ratio (CVR) and confirmatory factor analysis (CFA) to determine its validity and reliability. Most teachers reported having a high confidence rate in their seven-dimension knowledge of the TPACK framework. Nine hypotheses were introduced in the research results gathered by partial least squares structural equation modelling (PLS-SEM). Generally, the TPACK elements are interrelated and considered a valid model to describe the knowledge of Malaysian teachers in teaching Computer Science, where PCK has been reported as the strongest predictor ($\beta=.424$). However, TCK had no direct effect on their TPACK practices. Aside from that, the Ministry of Education should prioritise adequate training for teachers.

Keywords: Computer Science; Inservice Teacher; Secondary School; TPACK

1. INTRODUCTION

Malaysian Education Ministry's efforts to introduce computer science (CS) into school curricula are commendable with numerous benefits. When students join the marketplace, exposure to fundamental CS skills will simultaneously be an opportunity and a necessity. After the government has spent substantial funds on this mission, inherent challenges must be addressed to ensure that CS curricula are widely accepted in secondary schools across the country to widen participation and stimulate enthusiasm in CS classrooms. The successful implementation of the CS curriculum is dependent on teachers' levels of pedagogical and content knowledge (Riese & Kann, 2020). However, minimal research has examined teacher knowledge across CS disciplines in utilising technology tools to integrate digital literacy (Nordén et al., 2017).

In addition, Mishra and Koehler (2006) asserted that teachers should have a unified understanding of technology pedagogy and content knowledge (TPACK), which comprises teaching, material, and technology, as it is highly valued according to scholarly data on technical expertise. In Malaysia, technology-integrated learning and teaching are becoming more common. Mobile technology, social media, smart classrooms, and flipped learning are some examples of technologically advanced learning environments (Mei Kin et al., 2018; Yuan & Cao, 2019). In order to such a technology-friendly learning environment, teachers' good experiences with and use of technology are considered crucial (Mei Kin et al., 2018). However, those studies summarised the impacts of specific TPACK elements on integrating technology in education. As a result, this study aims to elaborate on the interconnection of seven TPACK elements from the perspective of CS teachers. The following research questions have been developed to assess teachers' knowledge.

RQ1: What is the level of CS teachers' knowledge of technology, pedagogy, and

content, as well as combinations of these domains?

RQ2: What is the interconnection of TPACK elements in teaching computer science subjects?

2. METHODOLOGY

The instruments were given to the respondents once the face and content validity checks were completed. This study's population comprises about 1141 computer science (CS) teachers from Malaysia's 16 states (KPM, 2013). Meanwhile, this study's target population included all Malaysian CS teachers. Using stratified sampling, we separated the target population by state (Creswell, W. John & Creswell, 2018). The questionnaire instrument utilised in this study was adapted from previous similar research (Schmid et al., 2020) with 7 elements, and 26 items were produced at this stage. There is a Likert scale from 1 to 5 for this self-assessment survey, with 1 representing 'strongly disagree' and 5 representing 'strongly agree'. The instruments were then evaluated for face and content validity by discussion and content validity ratio (CVR) for social, cultural, and setting variations (Lynn, 1986).

A panel of five users, all of whom are CS teachers, discussed the adapted instruments for face validity. The procedure was carried out through an interactive group discussion. Subsequently, the instruments were discussed with three Malaysian experts for content validity. Associate professors in educational technology and educational policy contributed as experts. Following the discussion, several items were amended, and two were removed since it was invalid for the Malaysian educational setting, leaving 24 items for further validation.

The instruments were distributed to five experts in curriculum instructional technology. The expert panel was asked to rate each item on a scale of 1 to 3: essential, useful but not essential, and not necessarily calculated in the following way: $CVR = (N_e - N / 2) / (N / 2)$, where N_e is the number of panellists who indicated "essential", and N is the total number of panellists. Lawshe (1975) proposed the CVR as a linear transformation of a proportionate degree of agreement on how many experts in a panel evaluate an item "essential". Note that CVR values range from -1 to 1 (Lawshe, 1975). High CVR scores suggest that members agree on the necessity of an item in the instrument (Ayre & Scally, 2014). When more than half of panellists rate an item as "essential" but less than all, the CVR is between 0 and 0.99. If none of the raters classifies the item as "essential", the CVR is 0. Following that, Lawshe's colleague, Lowell Schipper, established critical values for a selection of subject matter expert (SME) sample sizes to allow significance testing (Guion, 1974). According to Schipper's table, the critical CVR for the items at $\alpha = .05$ for five panellists is 0.99. However, PK4 was eliminated since its CVR value was below the threshold.

In addition to examining the face and content validity of the instruments, a confirmatory factor analysis (CFA) was conducted using the partial least squares structural equation modelling (PLS-SEM) method. Due to all items in the CFA fulfilling the loading value, the evaluation of CVR and CFA remains 23 indicators in seven elements.

The following processes were used to examine the collected data. First, we implement descriptive statistics using Statistical Package for Social Sciences (SPSS) version 26 to measure the level of CS teachers' TPACK. Descriptive statistics are summary statistics that quantitatively describe the characteristics of a set of data. It intends to summarise the sample rather than learn about the population from the data assumed to represent it (Hahs-Vaughn, 2016). The diversity of levels researchers seeks to explore during the descriptive stage, whether low, medium or high, is called variation. The technology pedagogy and content knowledge (TPACK) level were examined using this variation's mean and standard

deviation. Apart from that, we utilised mean and standard deviation analysis. It aims to explain variable attribute stages that must be observed, such as identifying variables examined, sorting data, and utilising suitable statistical approaches for data description.

Second, we used partial least squares (PLS) modelling using the SmartPLS 3.0 version as a statistical tool to assess the measurement and structural model since it does not require normality assumption because survey research is generally not distributed normally (Chin et al., 2003). The structural links between the seven elements in this study were investigated using structural equation modelling (SEM). Furthermore, SEM can analyse the integrated connection between all variables in this study and estimate the relationships between variables that have been controlled for random error and construct-irrelevant variance (Hahs-Vaughn, 2021; Tomarken, 2015). In addition, SEM corrects for unreliability within the concept and gives more accurate estimates of the link between the latent variable and the criteria using multiple indicators to assess the impacts of latent variables (McCoach et al., 2007).

3. RESULT AND DISCUSSION

The outcomes were generated using teachers' technology pedagogy and content knowledge (TPACK). Participants were given various statements regarding all domains and asked to choose the one that best matched them.

RQ1: What is the level of CS teachers' knowledge of technology, pedagogy, and content, as well as combinations of these domains?

To determine the level of teachers' knowledge about TPACK and all elements of TPACK, the mean and standard deviation for each domain were calculated as shown in Table 1. From a variance range between 1 and 5, a median is 3.0. Teachers considered their TPACK level, which is high ($M = 4.09$, $SD = .43$). The overall mean of the seven-element is higher than the median. In summary, most teachers were self-assessed as high in most of the domains examined in this study, including pedagogical knowledge (PK), content knowledge (CK), technological knowledge (TK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), pedagogical content knowledge (PCK) and TPACK. Conversely, they rated themselves as the highest level in PCK and the lowest level in TPACK. Thus, results showed that CS teachers had a significantly higher level of all TPACK elements.

Table 1. Mean and standard deviation for each domain

Domains	<i>M</i>	<i>SD</i>
Pedagogical Knowledge (PK)	4.23	0.48
Content Knowledge (CK)	4.01	0.59
Technological Knowledge (TK)	4.03	0.55
Pedagogical Content Knowledge (PCK)	4.00	0.50
Technological Pedagogical Knowledge (TPK)	4.19	0.48
Technological Content Knowledge (TCK)	4.18	0.59
Technological Pedagogical Content Knowledge (TPACK)	3.96	0.59

Overall mean

4.09

0.43

RQ2: What is the interconnection of TPACK elements in teaching computer science subjects?

The inter-relationship of TPACK elements during the teaching of computer science Disciplines is discussed further in subsections 3.1 and 3.2.

3.1 Measurement Model

VAs suggested by Anderson and Gerbing (1988), a two-step strategy was utilised to test the model. Following the guidelines of Hair et al. (2019) and Ramayah et al. (2016), the measurement model for the validity and reliability of the instruments used was first examined. Correspondingly, we ran the structural model to test the hypothesis established. This procedure focused on four evaluations of reflective measurement models: reflective indicator loadings, internal consistency reliability, convergent validity, and discriminant validity.

In reporting the reflecting indicator, we applied the partial least squares structural equation modelling (PLS-SEM) result format. Table 2 shows the detailed findings of seven constructs' reflective measurement model evaluations. For the measurement model, the loadings, average variance extracted (AVE), and composite reliability (CR) were evaluated. The loading values should be ≥ 0.5 , the AVE should be ≥ 0.5 , and the CR should be ≥ 0.7 (Hair et al., 2019). Thus, Table 4 displays that the details of AVEs are more than 0.5, and the CRs are higher than 0.7.

To test the consistency of findings across instrument items, internal consistency reliability was used. Composite reliability was assessed in this study using the PLS-SEM technique (Hair et al., 2019). Internal consistency reliability values range from 0 to 1, with a greater number indicating a better level of validity. Table 2 shows the composite reliability values for most constructs were stable, equivalent, and had strong internal consistency reliability above the suggested value of 0.708 but falling short of the maximum value of 0.950 (Hair et al., 2019).

Regarding convergent validity, AVE values must be presented as the metric to measure (Hair et al., 2019). Hence, we utilised the PLS-SEM technique to compute the AVE. The minimum acceptable AVE is 0.5 or higher, explaining 50% or more of the variance in the construct's elements. In this study, all constructs had AVE values more than 0.5 or explained 50% or more of the variance of the items for the construct (Table 2).

Table 2. Measurement Model for TPACK construct

Constructs	Indicators	Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
PK	pk1	0.869	0.907	0.764
	pk2	0.881		
	pk3	0.872		
CK	ck1	0.845	0.889	0.728
	ck2	0.866		
	ck3	0.849		
TK	tk1	0.794	0.897	0.686
	tk2	0.890		
	tk3	0.798		
	tk4	0.827		
PCK	pck1	0.769	0.865	0.682
	pck2	0.836		
	pck3	0.869		
	pck4	0.840		
TPK	tpk1	0.857	0.825	0.612
	tpk2	0.738		
	tpk3	0.745		
TCK	tck1	0.812	0.865	0.682
	tck2	0.835		
	tck3	0.830		
TPACK	tpck1	0.869	0.905	0.760
	tpck2	0.916		
	tpck3	0.829		

Discriminant validity is “the extent to which a construct is empirically distinct from other constructs in the structural model” (Hair et al., 2019, p.13). Discriminant validity was then examined in step 2 using the Heterotrait-Monotrait Ratio of Correlations (HTMT), (the main consideration for the discriminant validity) criterion proposed by (Henseler et al., 2015) and modified by (Franke & Sarstedt, 2019). The HTMT values should be ≤ 0.85 for the stronger criterion and ≤ 0.90 for the more lenient criterion. As reported in Table 3, the

HTMT values were all less than the tougher threshold of 0.85, implying that the respondents comprehended that the seven constructs are different. Therefore, when both validity tests are combined, they indicate that the measuring items are valid and reliable.

Table 3. Discriminant Validity (HTMT)

	CK	PK	PCK	TK	TCK	TPK	TPACK
CK							
PK	0.477						
PCK	0.433	0.506					
TK	0.575	0.775	0.602				
TCK	0.444	0.736	0.466	0.703			
TPK	0.566	0.666	0.579	0.671	0.686		
TPACK	0.549	0.646	0.730	0.888	0.784	0.899	

3.2 The Structural Model

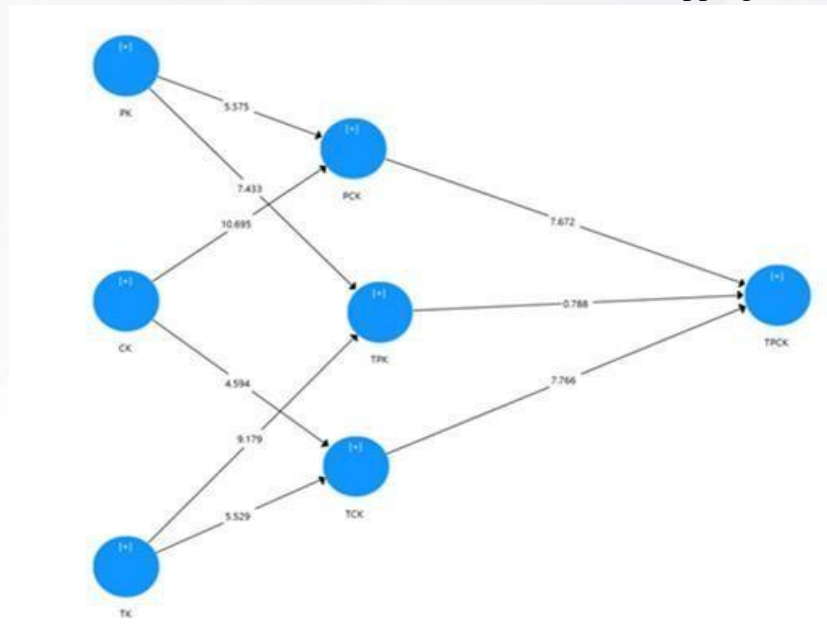
We evaluated multivariate skewness and kurtosis as recommended by Hair et al. (2019) and Cain et al. (2017). The results revealed that the data we collected did not meet the criteria for multivariate normality, Mardia's multivariate skewness ($\beta = 35.379, p < 0.01$), and Mardia's multivariate kurtosis ($\beta = 316.002, p < 0.01$). Thus, we reported the path coefficients and p -values for the structural model using a 5,000-sample re-sample bootstrapping procedure (Ramayah et al., 2014). Based on Hahn and Ang's (2017) critique that p -values are not good criteria for assessing the significance of a hypothesis, it is proposed that a mix of criteria such as p -values and effect sizes be used. Table 4 summarises the criteria we employed to assess the hypothesis.

This study is suggested to investigate the interconnection among TPACK elements of Malaysian CS teachers. We used bootstrapping samples of 5000 to determine if the relationships between an independent variable and dependent variables in this study are significant. Note that all relationships proposed by the structural model are significant at a 5% level except for the relationships between TPK \rightarrow TPACK. Furthermore, the PLS-SEM results inform the significance of all suggested relationships supporting H1, H2, H3, H4, H5, and H6 in terms of the relationship between core knowledge bases (TK, CK, PK) and second-level bases of knowledge (TCK, PCK) supporting H8, and H9.

Table 4. Bootstrapping results

Hypotheses	Path	Path coefficient (β)	p -value	Significance
H1	TK -> TPK	0.454	$p < .01$	Yes
H2	TK -> TCK	0.370	$p < .01$	Yes
H3	CK -> TCK	0.301	$p < .01$	Yes
H4	CK -> PCK	0.524	$p < .01$	Yes
H5	PK -> TPK	0.376	$p < .01$	Yes
H6	PK -> PCK	0.288	$p < .01$	Yes
H7	TPK -> TPACK	0.047	0.204	No
H8	TCK -> TPACK	0.418	$p < .01$	Yes
H9	PCK -> TPACK	0.424	$p < .01$	Yes

Note. We use a 95% confidence interval with a bootstrapping of 5,000.

**Figure 1.** The model and t-value

In particular, TK has been shown to have a substantial influence on TPK ($\beta = 0.454$; $p < 0.01$) and TCK ($\beta = 0.370$; $p < 0.01$). Furthermore, CK is important in influencing TCK ($\beta = 0.301$; $p < 0.01$) and the most significantly PCK ($\beta = 0.524$; $p < 0.01$). It also has the

strongest correlation of all offered theories in this investigation. The last core base, PK, has been found significantly predicts TPK ($\beta = 0.376$; $p < 0.01$) and PCK ($\beta = 0.288$; $p < 0.01$). Other than that, the second-level bases of knowledge (TPK, TCK, and PCK) are claimed to have a considerable impact on TPACK that support H8 and H9. However, H7 is rejected. TCK predicts TPACK significantly ($\beta = 0.418$; $p < 0.01$) and the strongest relationship arises between PCK and TPACK ($\beta = 0.424$; $p < 0.01$) for second-level bases of knowledge. Figure 1 and Table 4 show the entire display of the bootstrapping findings.

Table 5. R^2 value

	R^2	Consideration
PCK	0.485	Weak
TPK	0.483	Weak
TCK	0.364	Weak
TPACK	0.602	Moderate

The coefficient of determination (R^2) is a metric that reflects the model's predictive accuracy. It is derived as the square's correlation between the actual and anticipated values of a certain endogenous construct or dependent variable (Sarstedt et al., 2022). R^2 values range from 0 to 1, with a higher value indicating greater prediction accuracy. Note that the R^2 value of 0.75 is considered significant, 0.50 is considered moderate, and 0.25 is considered weak (Hair et al., 2019). Table 5 shows the R^2 results: PCK (0.485, weak), TPK (0.483, weak), TCK (0.364, weak) and TPACK (0.602, moderate). This data in this study has a high level of predictive accuracy.

Table 6. f^2 value

	f^2	Effect size
CK -> PCK	0.438	Large
PK -> PCK	0.132	Small
CK -> TCK	0.089	Small
TK -> TCK	0.135	Small
PK -> TPK	0.231	Medium

TK -> TPK	0.336	Medium
PCK -> TPACK	0.234	Medium
TCK -> TPACK	0.248	Medium
TPK -> TPACK	0.002	No effect

The effect sizes (f^2) represent the influence of a predictor construct on an endogenous construct that evaluates the change in R^2 values when a certain exogenous construct is removed from the model. Besides, f^2 measures the true influence of an exogenous construct on an endogenous construct. A value of 0.02 is regarded as a little effect, a value of 0.15 is considered a medium effect, and a value of 0.35 is considered a strong influence (Hair et al., 2018). Except for TPK, all exogenous constructs or predictors have f^2 matching endogenous constructs (Table 6).

The primary purpose of this study was to investigate the interconnection between technology pedagogy and content knowledge (TPACK) elements and their functions in predicting TPACK from the perspective of Malaysian computer science (CS) teachers. First, research instruments were adapted to assess TPACK using face validity, content validity ratio (CVR), and confirmatory factor analysis (CFA). After preparing the data, we examined the model's reflecting indicator loadings, internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2019). In this process, no indicators were dropped because their values were above the threshold. Consequently, 23 indicators remained for the structural model's evaluation.

TPACK was highly predicted by PCK during the evaluation process, while CK was the strong predictor of PCK. CK also predicts TCK. TCK, on the other hand, is usually predicted by TK. Some relationships are comparable to those found in previous research, but others are not. However, the results from Pamuk et al. (2015) showed that TCK was a strong predictor of the presence of TPACK than any other feature. Furthermore, they discovered that PK highly predicted TPK. In this study, TK was identified as the best predictor of TCK. In contrast, Koh and Chai (2016) reported that TPK, TCK, and PCK did not predict TPACK; nevertheless, PK and CK were shown to be associated with TPACK.

From the perspective of CS teachers, only a few research informed the link between TPACK complete paths. As a result, we filled the gap by investigating TPACK interconnection. PCK is the strongest predictor of TPACK, followed by TCK. On the other hand, TPK has been proven to have no relationship with TPACK practices. Apart from that, the TPACK model has helped in gaining insight into how well CS teachers perform in the classroom. Teachers' TPACK self-assessment level was generally high, particularly in technology-related areas.

4. CONCLUSION

This study's core objective is to analyse technology pedagogy and content knowledge (TPACK) elements and their functions in predicting TPACK from the perspective of Malaysian computer science (CS) teachers. The data analysis implies that although the current TPACK format provides graphically verified linkages across knowledge bases observed by CS teachers in Malaysia and implies that they all had comparable effects on the

formation of TPACK, findings suggest that relationships among TPACK elements are complicated, involving nine hypotheses. The model is also statistically valid and reliable, indicating that pedagogical content knowledge (PCK) is the best predictor to Technological Pedagogical Content Knowledge (TPACK), followed by technological content knowledge (TCK).

This research focuses on a few potential consequences as well as some potential limits. A deeper understanding of CS teachers' perspectives of TPACK can assist in improving the efficiency of technology integration initiatives. Developing awareness of the demands of the new educational system regarding technology integration into teaching should be the primary purpose of teacher education programs. Finally, the findings and suggested model are valid and dependable in the context of Malaysian education and CS teachers. As a result, future research should compare nations and majors in different circumstances.

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PENGURUSAN SISA MAKANAN OLEH ISI RUMAH DI MALAYSIA

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ABSTRAK - Peningkatan sisa makanan setiap hari di Malaysia menggugat keselamatan bekalan makanan dan kestabilan ekosistem negara. 38.23% dari 37,890 tan sisa makanan harian disumbangkan oleh isi rumah. Penularan isu ini akan menyukarkan negara mencapai matlamat pembangunan kelestarian atau *Sustainable Development Goal* (SDG) dalam usaha memelihara alam sekitar. Justeru itu kajian kuantitatif ini dijalankan untuk mengenal pasti tahap pengurusan sisa makanan dalam kalangan isi rumah di Malaysia dari aspek perancangan, penyusunan, kepimpinan dan pengawalan; perhubungan di antara empat aspek pengurusan; dan perbezaan pengurusan sisa makanan mengikut jantina. Seramai 385 isi rumah dipilih secara rawak sebagai sampel kajian. Borang soal selidik yang mengandungi 28 item digunakan sebagai instrumen kajian. Nilai kebolehpercayaan instrumen kajian, α ialah 0.944. Data dianalisis menggunakan statistik deskriptif, ujian-t dan Korelasi *Pearson* yang dibantu oleh perisian komputer *Statistical Package for the Social Science* (SPSS) versi

26.0. Dapatan kajian menunjukkan tahap pengurusan sisa makanan tertinggi adalah perancangan diikuti penyusunan, kepimpinan dan pengawalan. Tidak terdapat perbezaan pengurusan sisa makanan dari empat aspek pengurusan mengikut jantina isi rumah. Kajian ini mendapati isi rumah bijak merancang namun tidak mengamalkan apa yang dirancang dalam menguruskan sisa makanan dengan baik. Dapatan kajian ini boleh digunakan untuk merangka modul latihan bagi mendidik isi rumah menjadi masyarakat yang bijak menguruskan bahan makanan, mengelakkan pembaziran, dan menguruskan sisa makanan dengan betul untuk mencapai matlamat SDG.

Kata Kunci: Pengurusan; Sisa Makanan; Isi Rumah; Sustainable Development Goal; Keselamatan Makanan

1. PENGENALAN

Tabiat membazir makanan dalam kalangan rakyat Malaysia sangat membimbangkan. Sebanyak 3,000 tan daripada 15,000 tan sisa makanan di Malaysia merupakan makanan yang masih boleh dimakan tetapi telah dibuang di tempat pembuangan sampah setiap hari (Razak *et al.*, 2018). Pembuangan sisa makanan harian pada tahun 2019 adalah sebanyak 37,890 tan dengan setiap individu menyumbang sebanyak 1.17 kilogram (Anuar, 2019). Jumlah ini meningkat sebanyak 65% (30,000 tan), menjadikannya 17 juta kilogram pada tahun 2020 (Khor, 2014).

Kesan jangka panjang *trend* peningkatan sisa makanan ini menggugat pembangunan dan keselamatan makanan dan kestabilan ekosistem negara. Kegagalan proses penguraian makanan pada tempoh waktu yang panjang menyebabkan pemanasan global dan perubahan iklim dunia (Al-rumaihi, Mckay, dan Mackey, 2020). Pereputan sisa makanan di tapak pelupusan sampah telah menyebabkan penghasilan Gas Rumah Hijau (GHG) dan kekurangan sumber makanan (Graham-Rowe, Jessop, dan Sparks, 2019).

12% daripada pembebasan gas rumah hijau disumbangkan oleh penguraian sisa makanan manakala tapak pelupusan sampah pula menyumbang sebanyak 47% pelepasan gas metana (JPSPN, 2016). Gas metana boleh menyebabkan kerosakan lapisan ozon utama, peningkatan suhu bumi, merosakkan taburan hujan dan berlakunya ribut di seluruh Dunia. Ini mengganggu pengeluaran makanan dari sumber pertanian dan ternakan (Hamid, 2016).

Bagi mengelakkan pembukaan lebih banyak tempat pelupusan sampah, maka setiap individu perlu mengurangkan penjanaaan sisa makanan bermula di rumah. Di Malaysia, 50% sisa makanan dihasilkan oleh isi rumah (Zainal dan Hassan, 2019). Oleh itu, kajian ini

dijalankan untuk mengenal pasti tahap pengurusan sisa makanan dalam kalangan isi rumah di Malaysia.

2. OBJEKTIF

Kajian ini mempunyai empat objektif iaitu untuk:

- (a) Mengenal pasti tahap perancangan pengurusan sisa makanan dalam kalangan isi rumah.
- (b) Mengenal pasti tahap penyusunan pengurusan sisa makanan dalam kalangan isi rumah.
- (c) Mengenal pasti tahap kepimpinan pengurusan sisa makanan dalam kalangan isi rumah.
- (d) Mengenal pasti tahap pengawalan pengurusan sisa makanan dalam kalangan isi rumah.

3. METODOLOGI

Kajian kuantitatif ini melibatkan 385 orang sampel kajian mewakili isi rumah di Malaysia. Bagi populasi (N) 32.75 juta maka bilangan sampel (n) ialah 384. Mereka dipilih secara rawak. Borang soal selidik yang mengandungi 28 item digunakan sebagai instrumen kajian. Nilai kebolehppercayaan instrumen kajian, α ialah 0.953 (rujuk Jadual 1).

Jadual 1. Nilai kebolehppercayaan mengikut pemboleh ubah kajian

No	Konstruk	Nilai Kebolehppercayaan, α
1	Perancangan	0.867
2	Penyusunan	0.836
3	Kepimpinan	0.932
4	Pengawalan	0.946
Purata Keseluruhan		0.953

* Nilai kebolehppercayaan keseluruhan item, $\alpha = 0.953$

Data dianalisis menggunakan statistik deskriptif, yang dibantu oleh perisian komputer *Statistical Package for the Social Science (SPSS)* versi 26.0.

4. DAPATAN KAJIAN DAN PERBINCANGAN

Dapatan kajian menunjukkan majoriti isi rumah bersetuju bahawa jenis sisa makanan yang paling kerap terhasil di rumah ialah sisa dapur seperti usus ikan, kulit buah, akar sayur dan tulang ayam. Ini kerana isi rumah sentiasa memasak di rumah. Makanan dibazir pula adalah jenis sisa makanan yang paling minimum berada di rumah. Ini menunjukkan bahawa isi rumah sentiasa menghabiskan makanan yang dibeli untuk mengelakkan pembaziran makanan dan terbentuknya sisa makanan.

Terjadinya sisa makanan mengikut turutan di rumah adalah makanan yang tidak habis dimakan merupakan penyebab utama pembentukan sisa makanan, makanan yang tidak tahan lama dan untuk disimpan dalam tempoh masa yang panjang. Sebagai contoh, hidangan

makanan tengah hari tidak tahan lama untuk dimakan pada waktu malam dan berakhir di dalam tong sampah dan menyebabkan terhasilnya sisa makanan.

Secara keseluruhannya, tahap pemboleh ubah pengurusan sisa makanan iaitu perancangan, penyusunan, kepimpinan dan pengawalan berada pada tahap yang tinggi. Namun begitu, pemboleh ubah perancangan berada pada tahap yang lebih tinggi dengan nilai min 4.12. Manakala, pemboleh ubah pengawalan (min=3.88) diikuti dengan kepimpinan (min=3.78) dan penyusunan (min=3.68). Ini menunjukkan bahawa isi rumah merancang dengan lebih baik berbanding penyusunan, kepimpinan dan pengawalan dalam mengurus sisa makanan. Perancangan sangat penting untuk memastikan pengurangan penghasilan sisa makanan dalam kalangan isi rumah.

Hasil keseluruhan analisis tahap pengurusan sisa makanan dalam kalangan isi rumah di Malaysia bagi aspek perancangan, penyusunan, kepimpinan dan pengawalan adalah seperti Jadual

Jadual 2. Tahap Pengurusan Sisa Makanan Mengikut Pemboleh Ubah kajian

Pemboleh Ubah	Min	Sisihan Piawai	Tahap Min
Perancangan	4.12	0.513	Tinggi
Penyusunan	3.68	0.647	Tinggi
Kepimpinan	3.78	0.734	Tinggi
Pengawalan	3.88	0.700	Tinggi
Purata keseluruhan	3.87	0.649	Tinggi

Jadual menunjukkan secara keseluruhannya, tahap pemboleh ubah pengurusan sisa makanan iaitu perancangan, penyusunan, kepimpinan dan pengawalan berada pada tahap yang tinggi. Namun begitu, pemboleh ubah perancangan berada pada tahap yang lebih tinggi dengan nilai min 4.12. Manakala, pemboleh ubah pengawalan (min=3.88) diikuti dengan kepimpinan (min=3.78) dan penyusunan (min=3.68). Ini menunjukkan bahawa isi rumah merancang dengan lebih baik berbanding penyusunan, kepimpinan dan pengawalan. Perancangan sangat penting untuk memastikan pengurangan penghasilan sisa makanan dalam kalangan isi rumah.

Perancangan merupakan fasa pertama dalam proses pengurusan sisa makanan. Perancangan dapat membantu isi rumah mengurangkan penghasilan sisa makanan dengan cara merancang pembelian yang sistematik dan afektif. Tahap perancangan isi rumah tinggi. Ini menunjukkan majoriti isi rumah bijak merancang perbelanjaan mereka bagi mengurangkan pembentukan sisa makanan. Kebanyakan isi rumah membeli makanan yang tarikh luputnya masih panjang supaya sempat menghabiskannya. Ini membantu isi rumah mempunyai masa yang panjang untuk menghabiskannya tanpa perlu dibazirkan.

Penyusunan adalah fasa kedua bagi proses pengurusan sisa makanan. Penyusunan merupakan proses mengatur sumber dan tindakan berdasarkan perancangan yang telah dirancang (Point, 2018). Dapatan kajian ini menunjukkan tahap penyusunan adalah rendah dalam kalangan isi rumah. Ini menggambarkan isi rumah kurang kemahiran dalam mengatur strategi untuk menggalakkan isi rumah menguruskan sisa makanan dengan lebih baik. Mereka tidak menyediakan dan tidak mengamalkan jadual pembuangan sisa makanan di rumah serta tidak mengasingkan sisa makanan mengikut kategori. Faktor ini menyebabkan pengumpulan sisa makanan di rumah bertambah setiap hari. Oleh itu, isi rumah perlu memperbaiki kemahiran dan strategi penyusunan pengurusan sisa makanan mereka.

Kepimpinan berada di fasa ketiga dalam proses pengurusan sisa makanan. Kepimpinan merupakan tindakan isi rumah untuk menguruskan sisa makanan dengan betul (IeduNote, 2021). Dapatan kajian mendapati tahap kepimpinan pengurusan sisa makanan isi rumah adalah kedua tertinggi. Ini menunjukkan isi rumah telah menjalankan tanggungjawab untuk mengurangkan penghasilan sisa makanan. Mereka memastikan setiap isi rumah melibatkan diri dalam pengurusan sisa makanan; memaklumkan kepada setiap isi rumah lain yang tinggal sebumbung berkaitan cara untuk mengelakkan berlakunya lebih makanan yang boleh membawa kepada pembaziran; dan berusaha memastikan sisa makanan dapat diuruskan dengan lebih baik.

Pengawalan adalah fasa terakhir dalam proses pengurusan sisa makanan. Pengawalan perlu dilakukan untuk memastikan aktiviti pengurusan sisa makanan dilaksanakan mengikut perancangan yang telah ditetapkan (IeduNote, 2021). Dapatan ini menggambarkan isi rumah peka untuk mengurangkan penghasilan sisa makanan; memastikan setiap isi rumah yang tinggal di dalam rumah yang sama mengambil kuantiti makanan mengikut kemampuan untuk menghabiskannya; dan melihat bagaimana setiap isi rumah menjalankan tanggungjawab mereka dalam menguruskan sisa makanan dengan lebih afektif bagi mengelakkan pembentukan sisa makanan. Tahap pengawalan isi rumah berada pada tahap yang tinggi.

5. KESIMPULAN

Tahap pengurusan sisa makanan oleh isi rumah di Malaysia adalah tinggi. Tahap ini akan dapat ditingkatkan dengan memberi kesedaran akan kepentingannya dan tunjuk cara pelaksanaannya dalam kehidupan seharian. Usaha berterusan untuk meningkatkan pengurusan sisa makanan sangat digalakkan bagi memperoleh kesan jangka panjang kepada negara. Dapatan kajian ini dapat digunakan oleh pihak berkepentingan dalam memperbaiki kelemahan yang telah dikenal pasti bagi menangani masalah pengurusan sisa makanan bermula dari rumah. Dengan adanya kajian sebegini dapat membantu menyediakan data untuk negara ke arah mencapai *sustainability development goal* (SDG) menerusi pengurangan penghasilan sisa makanan pada masa hadapan.

6. IMPLIKASI KAJIAN

Dapatan kajian ini boleh digunakan untuk merangka modul latihan bagi mendidik isi rumah menjadi masyarakat yang bijak menguruskan bahan makanan, mengelakkan pembaziran, dan menguruskan sisa makanan dengan betul untuk mencapai matlamat *sustainability development goal* (SDG).

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FACTORS INFLUENCED TOWARDS TEACHERS' READINESS IN IMPLEMENTING THE TEACHING OF DESIGN AND TECHNOLOGY

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ABSTRACT - This study was conducted to identify the factors that influence the readiness of teachers in teaching Design and Technology (RBT) in the fourth year of the Primary School Standard Curriculum (KSSR). The descriptive quantitative study of this survey involved 368 teachers of RBT subjects in the fourth year of KSSR in Peninsular Malaysia. Cluster and simple random sampling were used to select the sample for this study. The research instrument consists of a set of questionnaires containing 114 items modified from previous researchers. The results of the study show that the overall mean for readiness is high. Mean for the aspect of reasoning knowledge was ($M=3.82$, $SP = .57$) and PBS skills was ($M=3.92$, $SP=.58$). This finding gives the impression that the respondents have a high willingness to teach RBT. In addition, reasoning knowledge and PBS skills are also high. This gives the impression that teachers are capable and have the skills to implement RBT teaching in the fourth year of KSSR. The results of the regression analysis of various entry methods show that all four factors significantly contribute to teacher readiness by 40.4%. In conclusion, the findings of this study give an impression that the component of teacher readiness is very important to be taken into account in the formulation of a new curriculum. The factors of self-efficacy, intrinsic motivation, ICT skills and support training should be given attention because the findings of the study show that all of these factors contribute to teachers' readiness in implementing RBT teaching. Therefore, this study is expected to provide guidance to policy makers and curriculum planners of the Ministry of Education Malaysia (KPM) to pay attention to the aspect of teacher readiness when introducing new subjects.

Keywords: Teacher readiness, Design and Technology, Primary School Standard Curriculum

1. INTRODUCTION

The implementation of KSSR in 2011 has created another transformation in education in this country. Changes in national education policy are seen to have a positive effect on the sustainability of the education system, but sometimes it is difficult for teachers to adapt to these changes. The difficulty and complexity of change causes teachers to face a dilemma between familiar practices and new ideas (Trombly, 2014). Various reforms of the education system contribute to the pressure of teachers because they have to adapt to meet the requirements of the new system (Tajulashikin, Fazura & Mohd Burhan, 2013).

Past findings show that teachers are not ready with the changes introduced due to several factors such as intrinsic motivation (Nirwana, 2013), found that teachers are not sufficiently prepared and competent to implement changes in smart education. Studies abroad also show the same pattern where teachers are not fully prepared when there is a change in education in that country itself like done by Joza (2015) from Arab Saudi besides Ekwueme and Meremikwu (2013) in Nigeria. In the context of fourth year RBT subjects in particular, the main changes that are emphasized are from the aspect of reasoning skills and assessment skills using PBS to implement curriculum innovation. This change will definitely challenge the teacher to apply it since the teacher does not fully master both aspects.

Deci and Ryan (2000) insisting that intrinsic motivation is a natural tendency and an important element in the cognitive, social and physical development of individuals. They added that through intrinsic motivation, a person develops in terms of knowledge, skills and attitudes. Individuals who are intrinsically motivated will be pro-active in exploring new learning and doing academic tasks on their own accord and producing quality and creative findings. (Deci & Ryan, 2000). Therefore, this study was carried out in more detail to examine

the readiness of teachers from the aspect of reasoning knowledge and PBS skills. In addition, this study was also conducted to determine the contributing factors to teacher readiness.

2. OBJECTIVES

- a) Identifying the readiness of teachers from the aspect of knowledge and skills in the implementation of RBT teaching in the fourth year of KSSR.
- b) Determining the factors that contribute to teachers' readiness in implementing RBT teaching in the fourth year of KSSR.

3. LITERATURE REVIEW

According to Van Tassel-Baska et al. (2005), if the teacher is not yet or less prepared but is forced to do it, then the effort to implement RBT KSSR teaching will not produce something good and perfect. Fullan (1993), insisting that educators are the driving force that plays a role in determining the quality of the implementation of any new education policy. Whereas, Wearmouth, Edwards and Richmond (2000), explained that the failure in an educational change is due to the lack of attention given to aspects of implementation such as the needs of implementers as well as the latest training for implementers.

Studies on the readiness of teachers in various fields of education have been carried out in this country. However, it was found that there is a lack of research on teachers based on the teaching and learning process of RBT KSSR. A study on teacher readiness was conducted by Maizura (2010) showing that the majority of respondents were at a low level of readiness for content knowledge. The findings also showed that there is a significant difference in the level of readiness of teachers who have followed training and those without training.

Rahimah's research (2012) shows that the self-efficacy of teachers in implementing family teaching is at a moderate level. Research done by Kotaman (2010) explains that the mean self-efficacy of pre-school teachers increases in line with the increase in the teacher's teaching experience. Demir (2011) explains that the mean self-efficacy of pre-school teachers increases in line with the increase in the teacher's teaching experience. While the teacher's intrinsic motivation is the best predictor of student engagement. Abu-Obaideh, Ab. Rahim, Ramlah dan Shuib (2012) found that the study showed that teachers' ICT skills were at a moderate level. The results of the study also show that there is a significant difference in terms of the teacher's gender in ICT readiness from the aspects of knowledge, skills and attitudes. Teachers also show a positive attitude towards ICT.

Previous studies have shown that teacher involvement in support/professional training and staff development programs is proven to improve teacher teaching (Cetin, 2016). The findings of previous studies confirm that there is a relationship between training programs and staff development courses with teachers' willingness to teach. Ruzidah (2000) found that staff development courses or programs can help improve teaching skills.

4. METHODOLOGY

This study uses a survey design to examine the factors that contribute to teachers' readiness in implementing RBT teaching in the fourth year of KSSR. Survey research is able to describe issues and problems in various perspectives, especially those involving attitudes, views, behaviors and perceptions (Creswell, 2013). In addition, this study also examines the level of teacher readiness in terms of reasoning knowledge and PBS skills. The population of this study consists of RBT teachers who teach the fourth year of primary school in Peninsular Malaysia totaling 7089 (Bahagian Perancangan Dan Penyelidikan Dasar Pendidikan,

Kementerian Pendidikan Malaysia, 2016). Sample selection uses cluster sampling and simple random sampling. The study sample totaling 364 was calculated using Cochran's formula (1977). However, as many as 450 sets of surveys were distributed to respondents by post due to the possibility of instruments not being returned or returned incomplete.

This research instrument contains 6 parts modified from the previous researcher's questionnaire. Part A contains 11 items to obtain demographic information. Part B contains 21 items modified from the questionnaire Adediwura (2012) using a 5-point Likert scale. Part C contains 24 items modified from the Teachers' Sense of Efficacy Scale questionnaire developed by Tschannen-Moran and Woolfolk (2001) with a 9-point Likert scale. Next, Part D consists of 21 items modified from the Intrinsic Motivation Inventory (IMI) questionnaire developed by Deci and Ryan (1985) using a 7-point Likert scale. While part E consists of 22 items developed by Isiaka (2014) using a 4-point Likert scale and Part F contains 15 items modified from the Bayar (2014) questionnaire using a 4-point Likert scale. For the purpose of content validity, the questionnaire was sent to seven experts in the relevant field before the pilot study was conducted. All suggestions, improvements and experts' agreement about the appropriateness of the content and scale used in the measuring instrument studied are taken into account to ensure the validity of the research instrument. The reliability of the instrument was measured using the α coefficient as recommended by Creswell (2013). Cronbach's Alpha value (α) of the whole instrument is 0.95. The analysis of the research data is carried out in two stages, namely the analysis using descriptive statistics and inferential statistics. The software used to analyze the research data is the Statistical Package for Social Science (SPSS).

5. RESULTS AND DISCUSSION

5.1 Teachers' Readiness in Implementing the Teaching of RBT Year Four KSSR

Descriptive analysis in Table 1 shows the overall mean for the reasoning knowledge aspect is 3.82 (SP= .57). This gives the impression that the respondents have high reasoning knowledge and are ready to implement RBT teaching in the fourth year of KSSR. The item with the highest mean value indicates that respondents clearly understand the goals of the RBT subject (M= 4.15, SP = .49). Next, respondents were also seen to be able to master the topics in RBT subjects (M=3.88, SP=.60) and able to guide students while teaching RBT subjects so that they have reasoning skills (M=3.84, SP=.59). In the meantime, the lowest mean refers to the respondents' agreement regarding their knowledge of the types of reasoning skills to use when teaching RBT (M=3.68, SP=.62). This finding means that the respondents' readiness in terms of knowledge about the types of reasoning skills to use when teaching RBT is still weak compared to other aspects of reasoning knowledge.

Table 1. Readiness of teachers in terms of reasoning knowledge

	Item	Mean	Standard Deviation
B1	I clearly understand the objectives of RBT subjects	4.15	.49
B2	I have mastered the topics in the RBT subject	3.88	.60
B3	I clearly understand the meaning of reasoning as an additional element when teaching RBT	3.80	.56
B4	I am knowledgeable of the basics reasoning skills to use when teaching RBT	3.80	.56
B5	I am knowledgeable in the types of reasoning skills to use when teaching RBT	3.68	.62
B6	I am knowledgeable in using reasoning skills in problem solving when teaching RBT	3.74	.60
B7	I am knowledgeable in using reasoning skills in decision making while teaching RBT	3.76	.56

B8	I am knowledgeable in using teaching techniques that promote students' reasoning skills when teaching RBT	3.76	.57
B9	I am knowledgeable in planning teaching activities that involve reasoning skills when teaching RBT	3.82	.56
B10	I am able to guide students to have reasoning skills when teaching RBT	3.84	.59
	Overall mean	3.82	.57

Table 2 shows the mean value for aspects of school-based assessment skills (PBS). The overall mean value of the PBS skill aspect is 3.92 (SP= .58). This value shows that the respondents have moderately high PBS skills. The item with the highest mean value (M=4.06, SP=.51) is that respondents are skilled in giving instructions to students to perform tasks correctly. Next, respondents were also found to be skilled in explaining assignment criteria (M=4.01, SP=.55) and also skilled in monitoring students carrying out course work (M=4.01, SP=.56). Nevertheless, the findings show that the respondents are still not proficient in each of the elements that must be presented in the RBT course work (M=3.74, SP=.60). The findings of the study also show that the readiness of teachers from the aspect of PBS skills is higher than that of reasoning knowledge. This gives the impression that respondents are more prepared in terms of PBS skills in implementing RBT teaching in the fourth year of KSSR compared to reasoning knowledge.

Table 2. Teachers' readiness in terms of PBS skills

Item		Mean	Standard Deviation
B11	I am proficient in the interpretation of proficiency level (TP) of RBT subjects	3.91	.57
B12	I am proficient in every element that should be present in RBT course work	3.74	.60
B13	I am skilled in assessing students' coursework according to the level of mastery (TP) set in the subject RBT	3.88	.60
B14	I am skilled in explaining the criteria of RBT course work assignments before being given to students	4.01	.55
B15	I am skilled in monitoring students to perform RBT coursework according to the set criteria	4.01	.56
B16	I am skilled in instructing students on RBT course work assignments according to correct procedures	4.06	.51
B17	I am skilled in guiding students to obtain the highest level of mastering (TP) in RBT coursework	3.86	.63
B18	I am skilled at determining the highest level of mastering that a student can achieve in RBT coursework	3.82	.62
B19	I am skilled at assessing each student as they go through the process in RBT coursework	3.96	.59
B20	I am skilled in assessing aspects that need to be assessed in RBT coursework	3.94	.59
B21	I am skilled at evaluating all students' RBT course work	3.96	.59
	Overall Mean	3.92	.58

5.2 Factors That Contribute To Teachers' Readiness In Teaching RBT Year Four KSSR

A multiple regression analysis was conducted to predict factors (self-efficacy, intrinsic motivation, ICT skills and support training) that affect teachers' readiness in implementing RBT teaching in the fourth year of KSSR. Assumptions for normality, linearity, homoscedasticity and independence of residuals have been complied with. Table 3 shows that all. The factors studied contribute as much as 40.4% (R square) to the variance of teacher readiness in implementing RBT teaching in the fourth year of KSSR.

Table 3. Summary of the regression model

R	R Square	Adjusted R Square	Std. Error of Estimate
.636 ^a	.404	.398	.31426

Dependent variable: Willingness

Constants: Self-efficacy, intrinsic motivation, ICT skills and support training

The results of ANOVA regression analysis (refer to Table 4) show a significant linear relationship between the independent variable and the dependent variable ($F(4,367)=61.638$, $p=0.000$).

Table 4. ANOVA regression analysis

	Sum of Squares	df	Mean Square	F	Sig.
Regression	24.349	4	6.087	61.638	.000
Residual	35.849	363	.099		
Total	60.198	367			

The estimation model for the coefficients (refer to Table 5) shows that the predictor variable that affects teacher readiness is self-efficacy with the highest Beta value (β) of .266 followed by intrinsic motivation ($\beta = .243$), support training ($\beta = .232$) and ICT skills ($\beta = .171$). The regression analysis equation is as follows:

$$= .139x_1 + .104x_2 + .110x_3 + .226x_4 + 1.339$$

Based on these values, it can be concluded that self-efficacy is the most important factor in influencing teachers' willingness to implement RBT teaching in the fourth year of KSSR.

Table 5. Estimation model for coefficients

	Unstandardized Coefficient		Standardized Coefficient Beta	t	Sig.
	B	Std. Error			
Constant	1.339	.171		7.840	.000
Self-efficacy	.139	.024	.266	5.766	.000
Intrinsic motivation	.104	.020	.243	5.106	.000
TMK skills	.110	.027	.171	4.050	.000
Support training	.226	.044	.232	5.080	.000

6. CONCLUSION

The findings of the study show that the perception of RBT teachers in Malaysia towards the readiness to implement the teaching of fourth year RBT subjects is high. The findings of the study also found that the four factors studied contributed as much as 40.4% to the readiness of teachers in implementing RBT teaching in the fourth year of KSSR. Intrinsic motivation makes the best contribution to teachers' readiness in implementing RBT teaching in the fourth year of KSSR which is 27.4% compared to other variables. This means that every unit increase in teachers' intrinsic motivation will be followed by an increase of 0.274 units in teachers' willingness to implement RBT teaching in the fourth year of KSSR. The rest is likely to be influenced by other factors in teachers' willingness to implement RBT teaching in the fourth year of KSSR. Overall, all the factors studied contribute to teachers' readiness in implementing RBT teaching in the fourth year of KSSR. This finding shows that the factors of self-efficacy, intrinsic motivation, ICT skills and support training need to be

taken into account when implementing curriculum changes so that teachers are more prepared to implement RBT teaching in the fourth year of KSSR so that teaching can be carried out effectively.

7. IMPLICATIONS

This finding implies that the aspect of teacher readiness as a whole is very important to pay attention to when the Malaysian Ministry of Education plans curriculum changes. The ICT skills aspect needs to be emphasized because it plays an important role in creating 21st century teaching and learning process environment. In terms of professional practice, the findings of the study give implications that teachers are not sufficiently prepared to provide exploratory learning centers to stimulate self-learning, develop methods or materials for students use, develop materials or procedures to assess students. Accordingly, it is suggested that teachers can improve themselves through professionalism improvement courses. Teachers need to challenge their own ability to change traditional teaching patterns to different teaching approaches so that the teaching and learning process becomes more effective.

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ADOPTING YOUTUBE VIDEO TECHNOLOGY USAGE AS AN INSTRUCTIONAL MATERIALS FOR TEACHING AND LEARNING PROCESS

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ABSTRACT - The technology of YouTube video is not only a place where people might upload, share, post, and comment, is also a platform where lecturers can use to facilitate teaching, learning and collaborate with their students. This research examines how YouTube educational materials could be adopted as instructional materials in the classroom situation. The main goal of this study is to provide well-informed and straightforward answers about how to adopt YouTube as an instructional material in classroom teaching process. This study used descriptive research design, whereby, 60 questionnaires were distributed to the respondents and 41 returned. The data collected was analysed using SPSS. The finding of the study revealed that lecturers agreed that, using YouTube as alternative instructional material improves students' performance. Five recommendations were made based on the findings. the study recommends that lecturers need orientation on the usage of YouTube as an educational resource, government should equip the college with educational materials and the college management should make it mandatory for every lecturer to adopt electronic instructional materials on every lesson.

Keywords: Adoption; YouTube; Instructional; materials; (ISM); Technology; ICT

1. INTRODUCTION

YouTube video technology is indispensable and inseparable portions of learners' life, since the beginning of pandemic era (COVID-19), and it will still be lingering up to the end of the World. This statement is explored to the curriculum design and stakeholders in the field of education to co-opt the technology in curriculum right from elementary school. When this technology is applied in the teaching process as an instructional material, it will streamline the teaching cycle. YouTube video technology clips attract students' devotion, through injecting sound clips of entertainment, or motivating and inspiring videos to the class, although covering every specific topic. The problem that researcher observed in Federal College of Education, Zaria, is that 95% of the college's teachers used to deliver their classes without ISM, which may cause poor students' academic performance.

Yes, the skill of stimulus variation in using YouTube as instructional material will manifest and would arouse and capture the interest of learners to the lesson. The study examines the impact of adopting YouTube video technology as an instructional material and how it can be instrumental as an educational resource that will guide, improve and increase students' understanding.

2. OBJECTIVES

- i. To examine the effects of YouTube adoption and usage on teaching-learning process
- ii. To evaluate the effects of YouTube as an instructional material in learning process
- iii. To investigate the impact of usage of YouTube on teachers' job performance

3. RESEARCH QUESTIONS

The following questions were raised to guide the studies

- i. Does YouTube adoption have any significant effect on teaching-learning process?
- ii. Does YouTube have any significant effect as an instructional material in learning process?
- iii. Does YouTube have any significant impact on students' academic performance?

4. LITERATURE REVIEW

YouTube video technology viewing has been increasingly used in the educational sector, especially by preserve teachers, and the professional development of in-service instructors and teachers(Gaudin). According to a scholar, review in all ranking levels, and from all corners of the globe, the YouTube video usage in training students now tries to become tradition. When instructional materials are used at the beginning of the lesson, they serve as preamble of the lesson, that is, the teacher is introducing the lesson and trying to capture the interest of the students to the topic that will be discussed. (Alshatri et al., 2019)

Instructional materials (ISM) are devices that are helping teachers deliver lessons in a systematic, hierarchical, and logical manner. When they are applied at the middle of the lesson they serve as expectations, elaborations, and clarifications of what had been earlier taught in the lesson. YouTube Video may be, especially, useful for students' preparation in science classrooms. (Karvonen et al., 2018). ICT in teaching-learning cycle Mayer (2017) believes that multimedia aids human brain functions, stating that students learn more effectively and thoroughly when given pictures and words in teaching. The YouTube technology contains all these items, whenever a teacher uses YouTube as his instructional materials, the understanding of the students could be different. Alshatri Barbour stated that YouTube video technology in the classroom as an instructional material has a significant role to play in learning process.

5. METHODOLOGY

The descriptive approach was applied using e-questionnaire in cadastral form as the methodology been used in the study. 60 teachers in the Federal College of Education, Zaria, were asked to participate in answering questionnaires. Only 41 teachers responded to the survey, and the results were examined.

6. RESULT

The study is focused on examining the impact of YouTube adoption usage on teaching learning process. A total of 50 questionnaires were administered out of which 41 were returned.

Gender	Frequency	Percent
Male	38	92.7
Female	3	7.3
Total	41	100.0

Table 1. Classifications of the Respondents by Gender

The classifications shown in the table indicated that, 38 (92.7%) of the respondents could be classified to be in the first stage of male, where the assessing adoption of YouTube

usage as instructional material for teaching and learning processes. Those who were female at the onset were 3 (7.3%) of the respondents.

Age	Frequency	Percent
20-30	1	2.4
31-40	18	43.9
41-50	18	43.9
51 and above	4	9.8
Total	41	100.0

Table 2. Classifications of the Respondents by Age

Table shows that, 1 (24.0%) of the respondents were aged between 20 and 30, and 18 (43.9%) were aged 31 to 50. Of the total respondents, and for those that are in range of above 51 years were 4 (9.8%) of respondents.

Year in Services	Frequency	Percent
1-5	3	7.3
6-10	15	36.68
11-15	11	26.8
16-20	6	14.6
21-25	4	9.8
26 and above	2	4.9
Total	41	100

Table 3. Classifications of the Respondents by Years in Services

In the table above, respondents who were assessing the adoption of YouTube usage on teachers' academic performance were 3 (7.3%) of the total. Those from between 6-10 years in usage are 15 (3.6%) and those of 11 (26.8%) were between 11-15 of the totals.

Hours	Frequency	Percent
1-2	12	31.0
2-3	7	18.0
3-6	8	19.4
7-10	5	12.2
11 above	8	19.4
Total	41	100.0

Table 4. Classifications of the Respondents by the type of Hours per Week

In terms of who is responsible for the hours per week spent for interaction in the social media in using YouTube in assessing the adoption in the study, 16 (39.0%) of the respondents were of the view that using YouTube is very essential for such decision with the number of hours

Platforms	Frequency	Percent
Facebook	4	9.8
Facebook, WhatsApp	4	9.8
Facebook, WhatsApp, Twitter	1	2.4
Facebook, YouTube, WhatsApp	4	9.8
Facebook, YouTube, WhatsApp, Instagram	2	4.9
Facebook, YouTube, WhatsApp, Instagram, Picture chart, Twitter	1	2.4
Facebook, YouTube, WhatsApp, Instagram, Twitter	1	2.4
WhatsApp	21	51.2
WhatsApp, Twitter	1	2.4
YouTube	1	2.4

YouTube, WhatsApp, Instagram, Twitter	1	2.4
Total	41	100.0

Table 5. Classifications of the Respondents by Platforms

WhatsApp has the highest total number of respondents in assessing and adopting as instructing material for teaching and learning processes in the objectives and research in YouTube, as teaching academic performance in the study. Table 4.8 shows the distribution of the respondents by to examine the effects of YouTube adoption, usage on teaching and learning processes and academic performance.

Sn	YouTube usage	H		L		M		N		Mean
		F.	%	F.	%	F.	%	F.	%	
1	I use YouTube videos for teaching purposes	18	43.9	4	9.8	15	36.6	4	9.8	2.1
2	YouTube videos are useful for my researche	17	41.5	2	4.9	19	46.3	3	7.3	2.2
3	I used YouTube for my classrooms teaching	11	26.8	12	29.3	12	29.3	6	14.6	2.3
4	YouTube videos make me more engaged in my academic activities	12	29.3	8	19.5	20	48.8	1	2.4	2.2
5	The use of YouTube videos by me is beneficial to in my career	19	46.3	5	12.2	16	39.0	1	2.4	1.9
6	As an academic I will be more productive if YouTube videos were used by me	19	46.3	4	9.8	16	39.0	2	4.9	2.0
7	Actively participate on YouTube channels for my academic activities	6	14.6	11	26.8	20	48.8	4	9.8	2.5
8	I applied relevant online video platforms as a tool for academic learning, as part of my teaching strategy	12	29.3	5	12.2	21	51.2	3	7.3	2.4
9	I think that an online video platform, such as YouTube can be applied as a tool for academic learning	25	61.0	3	7.3	12	29.3	1	2.4	1.7
10	I consider using YouTube as an academic tool where students and lectures can engage in group work discussion related to the subject	20	48.8	2	4.9	18	43.9	1	2.4	2.0

Table 6. Opinions of the Respondents on Assessing and Adoption of YouTube

Among the objectives of the research is to examine the effects of YouTube instructional materials for teaching and learning processes in the study area. 18 (43.9%) and 15 (36.6%) of respondents highly preferred and moderately preferred. Only 11 (26.8%) and 12 (29.3%) were the only ones that moderate preferred and highly preferred. In item 5 of the table, 19 (46.3%) and 16 (39.0%) of the respondents highly preferred and moderately preferred instructional material for teaching and learning processes. But 1 (2.4%) and 5 (12.2%) with the lowest frequency and percentage in not preferred and low preferred.

7. DISCUSSION

This study investigated the assessing and adoption of YouTube usage as instructional material for teaching and learning processes. The respondents were of the view that their YouTube were generally contented or satisfied. Among the measures of satisfaction were the opinions that YouTube videos were able to achieve their long-term goals.

8. CONCLUSION

The extent of YouTube satisfaction depends to a significant extent on the life cycle of the teachers' academic performance. YouTube type has significant influence on their usage practices. YouTube requires some forms of financial literacy because its acquisition or knowledge has positive and significant impact on their material satisfaction. YouTube's financial literacy significantly influences their practices in Geo-Political Zone.

9. RECOMMENDATION

The college management should make it mandatory that every teacher should use ISM when moving to classroom for teaching. The government should provide teaching aids and fund schools to innovate unavailable and inadequate instructional materials.

10. SUGGESTION FOR FUTURE RESEARCH

The population of the study is too small, another research on using YouTube as instructional material in all topics should be done in all fields and at all stages of schooling, with more variables included to improve the college students' results and awareness.

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A QUALITATIVE ANALYSIS OF AWARD-WINNING INSTRUCTION DESIGN OF COLLEGE ENGLISH “GOLDEN CURRICULUM”

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ABSTRACT - The paper aims at a qualitative analysis on award-winning instructional design from the perspective of gold course A-C-C standard, namely being advanced, creative, and challenging. Based on the analysis of the unique features of those award-winning design, a discussion is followed to reveal the instructional design elements from the perspective of systematic design of instruction. Finally, it examines the six dimensions of the content to suggest further attention paid to the integration of technology into college English teaching which may facilitate gold course construction from the perspective of instructional design.

Keywords: Golden Curriculum; ACC characteristics; instructional design; College English

1. INTRODUCTION

In June 2018, the Ministry of Education of China proposed the implementation of first-class curriculum, focusing on implementing quality courses, to address the “shortcomings” and “bottlenecks” in university education and effectively improve the quality of course teaching (Wu, 2018). This has led to a series of discussions on the implementation of “Golden Curriculum” in English as a Foreign Language (EFL) education, from the connotation of “golden Curriculum” (Feng, 2020), distinguishing the concept of “Golden Curriculum” from the previous Classic Curriculum (Wen, 2019), developing technology-driven Golden Curriculum (Tan, 2019), to the practice of blended Golden Curriculum in EFL curriculum (Zhang, 2021). In order to implement a Golden Curriculum that meets the requirements of being “ACC”, that is, Advanced, Creative and Challenging, this paper analyses the award-winning instruction design schemes of national university EFL teaching competition, and summarizes the quality teaching design schemes based on the “ACC” characteristics and course design elements to improve the effectiveness of EFL curriculum teaching, and facilitate the implementation of Golden Curriculum from the perspective of curriculum design.

2. QUALITATIVE ANALYSIS OF THE WINNING TEACHING DESIGN PROGRAMS

The Golden Curriculum ACC characteristics is the baton of curriculum design (Qu & Zhou, 2020). One of the standards of award-winning instruction design is to integrate ACC, which means the course needs to be advanced, such as setting higher order thinking skills in objective; pedagogically creative; and challenging in both teaching materials and evaluation. According to the interpretation of ACC (Wu, 2018), “A” refers to being advanced or higher order, which is a holistic integration of knowledge, skill, and quality in terms of teaching materials, learning objectives and the setting of specific tasks or projects for the sake of cultivating students’ comprehensive ability to solve complex problems and improve advanced thinking. “C” refers to being creative. This creativity or innovation is focusing on the latest and cutting-edge teaching materials, interactive teaching and learning methods, and the inquiry and personalization of learning results, which require a second development of the teaching content in terms of choosing, adapting, replacing, and deleting materials to suit

for the need of students. In addition, the assessment of learning outcomes is diagnostic and personalized. The other “C” refers to being challenging, which means the content and assessment need to be challenging for both teachers and students to devote time and effort to accomplish. Thus, the design of the EFL curriculum with the ACC characteristics offers an important measurement to evaluate the quality of the course.

Therefore, by analysing the course objectives, teaching content, teaching method and assessment of the award-winning instruction design of the university EFL teaching competition will reveal the specific elements of how ACC is being adopted in teaching practice to implement Golden Curriculum.

3. METHODS

Current curriculum design is conceptually and concretely complex, and there are many different opinions on how to design a curriculum; however, curriculum design must reflect the vision of educational meaning and purpose, and its complexity is due to the many educational visions, which require careful consideration of the basic concepts, attitudes, and skills conveyed by curriculum design (Ornstein & Hunkins, 2018). Therefore, instructional design ability is a combination of various psychological qualities such as teachers’ professional knowledge, teaching skills, personality, and educational philosophy (Guan & Huang, 2021). As a comprehensive manifestation of teachers’ professional abilities, the award-winning teaching design plan of the teaching competition not only focuses on teachers’ teaching abilities, but also provides a framework for the implementation of quality English teaching. At present, studies on foreign language teaching competitions in colleges and universities mainly focus on the setting of teaching objectives and design of teaching activities (Shu, 2014), the way of teacher planning and evaluation (Xu, 2014), effective foreign language teaching (Shu, 2017) and the impact of competitions on teachers’ professionalism (Xu & Liu, 2020), etc. Few qualitative analyses have been conducted on award-winning teaching design programs from the perspective of ACC characteristics.

In this paper, we use the NVivo software to analyse the quality of teaching design solutions and provide concrete operational solutions for the “Golden Competition for teaching to implement Golden Curriculum” (Xu & Liu, 2020). Therefore, this paper conducts a qualitative analysis of the winning teaching design schemes of the 2020 Teaching Star National Teaching Competition with the help of NVivo software, aiming to build a first-class teaching design scheme of university English with school-based characteristics and provide reference for teaching practice.

4. DISCUSSION

The official website of FLTRP Advanced English News (an influential publication house of China for English materials) published 18 winning teaching design proposals of the 2020 Teaching Star National Teaching Competition, including one winner, two runners-up, three third runners-up and twelve first prizes. In addition to the basic information, team information and design features, the curriculum design plan and unit design plan adopt the “most common and widely used subject-centered design approach” (Ornstein & Hunkins, 2018): the curriculum design part consists of four parts: curriculum orientation, curriculum objectives, curriculum content and curriculum evaluation. The unit design plan consists of unit design objectives, unit teaching process, and unit teaching evaluation.

4.1 ACC characteristics represented in the award-winning teaching design

The qualitative analysis of the design plan is helpful to understand the success of the quality design plan and to discover the concrete presentation of the ACC characteristics in

the design plan. Therefore, in this paper, 31 nodes were created in NVivo for the design features of the design solutions, and the winning solutions were coded as A1, B1-2, C1-3, and D1-12 according to their rankings. The winning proposals were coded according to the criteria and a matrix was generated for subsequent analysis.

Although only four of the winning proposals addressed innovation, higher order, and challenge (A1, C2, D2, and D4), as many as 15 proposals (except B2, C3, and D12) explicitly identified innovation in the integration of language and human development, as innovation was the focus of the design features. Six programs mentioned the high quality, depth, and breadth of the content, instructional objectives, and output tasks in terms of higher order, choosing to design instructional objectives for higher order skills above the students' current level. At the same time, not only did they mention that the content was challenging for students, but also two programs (D1 and D12) focused on teaching methods that were challenging for teachers, and the design of the program required more knowledge and adaptability from teachers. The design of the instructional programs was more demanding in terms of teachers' knowledge and adaptability.

4.2 Analysis of instructional elements in the characteristics of instructional design

In June 2018, The characteristics of instructional design programs focus on the following instructional elements: instructional methods, instructional content, instructional modes, assessment, objectives, outcome-based tasks, instructional/activity/instruction design, student needs and levels, educational technology, and cultivating talents concept.

According to Dick, Carey, and Carey's systematic instructional design philosophy, it is necessary to first determine the instructional purpose of the course. The nature of instructional purpose directly influences instructional strategies and assessment methods (Dick & Carey, 2010). At the same time, instructional purpose will become the criteria for selecting instructional materials, outlining instructional content, forming instructional steps, and preparing tests and examinations (Tyler, 1981).

A total of nine out of eighteen instruction plans (See Figure 1) focus on the characteristics of instructional purpose, which fully reflects the important status of the teaching objectives. There are two lines of thoughts to describe instructional objectives in the programs, such as the key words "integration" in B1 and "cultivation" in D2, both of which are expressions of knowledge and target behaviours, focusing on the instructional design process. This proportion is smaller compared with "outcome-based tasks", which focuses on the intellectual competencies that Dick, Carey, and Carey refer as "product-oriented" (Dick & Carey, 2010), such as the instruction plans A1, B2, C1, C2, D2, D6 and D11.



Figure 1. Teaching elements shown in the section of Uniqueness Instructional Design

In summary, to analyse award-winning teaching design plans from the perspective of the “ACC” characteristics, we find that the characteristics of ACC of the Golden Curriculum are reflected in the following aspects: 1. the teaching objectives and teaching contents focus on the characteristic of being advanced with higher order thinking skills or tasks or contents; 2. teaching strategies (including methods and modes), teaching contents, teaching evaluation and teaching objectives focus on the characteristic of being creative; 3. teaching objectives, which are mainly reflected in the “outcome-based task”, focus on increasing the degree of challenge.

5. CONCLUSION

In this paper, we analysed the teaching characteristics of the award-winning English teaching design plans according to the ACC characteristics of the Golden Curriculum, and found that the teaching design plan integrates ACC in teaching purpose, teaching strategy, teaching content and teaching evaluation, which fully reflects the concept of systematic teaching design.

6. CONCLUSION

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A QUALITATIVE ANALYSIS OF AWARD-WINNING INSTRUCTION DESIGN OF COLLEGE ENGLISH “GOLDEN CURRICULUM”

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ABSTRACT - The study aims to uncover the general trends of published researches undertaken in the field of college English teaching in the context of “Golden Curriculum” implementation in China. To this end, journals with a “Golden Curriculum” title and keywords were scanned through CNKI database and analysed through the metrological software CiteSpace. In the study, 1,645 articles published between the years of 2018 to 2021 were suitable for scope of research and were analysed and classified in the study. In the analysis of the data, a review and descriptive statistics such as frequency is utilized. It was found that majority of the articles within the scope of the study were based on prescriptive analysis on Golden Curriculum construction highlighting the importance of blended teaching mostly in public compulsory courses such as college English course in tertiary education. It is acknowledgeable that there is a shared view on implementing quality teaching and learning highlighting Advanced, Creative, and Challenging Golden Curriculum in college English teaching community.

Keywords: Golden Curriculum; College English; concurrence keywords

1. INTRODUCTION

21st century education highlights a combination of knowledge, specific skills, information literacy, problem solving, flexibility and adaptability, accountability, and proficiency in 4Cs (critical thinking, collaboration, creativity, and communication) necessary to success in work and life with global competitiveness (Menggo, Suastra, Budiarsa & Padmadewi, 2019). Major trend skills needed in the 21st century have been identified by organizations and projects such as the Partnership for 21st Century Skills (P21), the Assessment and Teaching of 21st Century Skills (ATC21S) (Fandiño, 2013), and China Education Innovation Institute of Beijing Normal University (Wei, et.al, 2020).

Responding to the 21st century skills, curriculum and instruction need to be supportive to lead to students’ 21st century outcomes today for tomorrow’s society. The Golden Curriculum can be seen as China’s initiative to incorporate 21st century skills into curriculum with the focus on higher order skills in an Advanced, Creative and Challenging (ACC) classroom. The concept of “Golden Curriculum” was firstly proposed in June 2018 and written into government document of Accelerating the Construction of High-level Undergraduate Education and Comprehensively Improving Talent Cultivation Ability (No.2 [2018] of the Ministry of Education) aiming at improving teaching quality by comprehensively eliminating the old curriculum which has been watered-down and implementing “Golden Curriculum” with the characteristics of being advanced, creative and challenging (Yu, 2020). Considering the proposal of “Eliminating the old curriculum which was watered-down (i.e. obsolete contents and inadequate teaching methods) and implementing Golden Curriculum (featured with being Advanced, Creative and Challenging)” for the development of quality undergraduate programs and curriculums, the term “Golden Curriculum” has then triggered a heated discussion centering on its rationale and significance in higher institutions, especially among university EFL teaching community (Cai, 2018; Lu, 2018; Wu, 2018).

There have been plenty of studies conducted regarding “Golden Curriculum”, such as the interpretation of “Golden Curriculum” requirements (Innovative, Challenging and Advanced; and the current situation, problems and countermeasures related to the current university curriculum quality.

This present research was undertaken to review the current literature on Golden Curriculum by CiteSpace 5.7.R5 to highlight the top-ranked item by centrality to indicate the focus and trend of Golden Curriculum study. Hence, the research questions of the study were formulated as follows:

- a. What are the most frequently studied keywords in research articles titled in “Golden Curriculum”?
- b. What are the characteristics of Golden Curriculum distributed in the articles?
- c. Where is the status quo and research trends related to Golden Curriculum in the context of college English teaching field?

2. MATERIALS AND METHODS

The present study was conducted via a descriptive and critical analysis based on the publication classification form adopted by Yavuz (2021) with some revisions. The classification form consisted of (1) author(s) and title of the articles, year of study, (2) method, (3) purpose and (4) conclusion.

The chosen articles were published in the journals indexed in the databases of China National Knowledge Internet (CNKI), the most commonly-used database in Chinese. The time interval was chosen as four years between 2018 and 2021 since “Golden Curriculum” proposal was initiated in 2018 and the retrieval data was collected on July 19, 2021. A total of 1,645 articles were obtained by searching “jinke” (Golden Curriculum) by title and keywords. The searching steps are as follows:

- a. Search keywords “jinke” (Golden Curriculum) in CNKI between the year 2018 and 2021.
- b. Export the searching results in the form of Refworks and convert the format in CiteSpace 5.7. R5, a literature metrological software.
- c. Import converted references into CiteSpace 5.7. R5 with Time Slicing between 2018 and 2021, ticking Keywords for Term Source and Node Types.
- d. Generate keyword concurrence map for further analysis.

3. RESULTS AND DISCUSSION

As shown in Figure 1 below, 339 nodes were generated which means a total number of 339 keywords identified with a density of 0.0248. The Modularity $Q=0.3743$, larger than 0.3, which means a significant clustering structure; the Weighted Mean Silhouette $S=0.69$, larger than 0.5, which means a reasonable clustering.



Figure 1. Keywords for “Golden Curriculum” concurrence map examined in articles

There are 40 keywords after merging similar keywords with frequencies of more than 10. The top ten keywords following “Golden Curriculum” (1108) are blended teaching (224), Golden Curriculum construction (174), teaching reform (129), higher institutions (117), MOOC (111), vocational colleges (87), curriculum construction (79), college English (66) and Ideological and Political Education Course (63).

Among these top ten keywords, “blended teaching” ranks the second as the most frequently mentioned teaching mode related to “Golden Curriculum”. Together with “MOOC”, the massive opening online courses as the sixth hot word, it can be argued that the current research on Golden Curriculum study focus more on the improvement of the teaching mode by integrating information technology into teaching to make teaching reform happen. Since both “higher institutions” and “vocational colleges” are top ranking keywords, the Golden Curriculum construction is mostly initiated in tertiary education. As can be seen from the two keywords “college English” and “Ideological and Political Education Course”, these two heatedly-discussed public compulsory courses may indicate the urgency of curriculum reform on quality teaching for compulsory courses for all college students.

3.1 Golden Curriculum characteristics distributed by keywords

The “Golden Curriculum” characterized by ACC, that is, being advanced, creative and challenging was interpreted by Wu (2018) as follows: an advanced course is the integration of knowledge, ability and attitude, aiming at fostering comprehensive ability of solving complex problems and high-order thinking; a creative course is represented in three perspectives, namely, the content is new and recent, the teaching method is advanced and interactive, and the learning outcomes are explorative and individualized; a challenging course requires both the teacher and students to spend time and effort (Qin, 2019).

Therefore, Golden Curriculum matches some of the core 21st century skills highlighting high-order thinking such as critical thinking ability, creativity, and problem-solving to implement effective classroom instruction. Since classroom instructional quality and its relationship to learning outcomes serve as a critical lever for educational change (Kim, 2019).

The ACC characteristics of Golden Curriculum were frequently mentioned in 2019 as a holistic concept since the first article on “Golden Curriculum construction” published in Chinese University Teaching in 2018. Each characteristic was discussed individually mainly in 2019 with the characteristic of being creative mentioned more than another two standards, which may indicate the importance of creativity for the Golden Curriculum.

3.2 Research trends related to Golden Curriculum in context of college English teaching field

Golden Curriculum refers to any subject offered in universities. Based on the articles examined, there are 29 subjects with a total occurrence of 221, among which College English course ranked the first with the occurrence of 66. Since College English course has become a research hotspot, a literature matrix of 14 articles chosen from 2018-2021 is performed. It can be argued that most papers are cantered on the interpretation of Golden Curriculum and its characteristics, the application in college English teaching from a macro view. Only one article is a case study on the curriculum design of Golden Curriculum to focus on teaching mode, which shows that the Golden Curriculum study is on the initial stage of theoretical discussion and curriculum planning. Therefore, future studies could focus on specific course design, teaching and learning mode, instructional skills which demonstrate the three perspectives of being innovative, advanced, and challenging.

4. CONCLUSION

A review analysis was conducted in accordance with Golden Curriculum studies published in the last four years via the software CiteSpace. It was found that majority of the articles within the scope of the study were based on prescriptive analysis on Golden Curriculum construction highlighting the importance of blended teaching mostly in public compulsory courses such as college English course in tertiary education. Future studies may focus on various aspects of Golden Curriculum implementation in China.

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