DEVELOPMENT OF AN ONLINE CASE-BASED PROBLEM-SOLVING MODULE FOR ESL WRITING INSTRUCTION

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Abstract

In Malaysia, efforts to increase the quality of students' learning and achievement, and teachers' quality of delivery and instruction have been ongoing as documented in the National Education Blueprints 2015-2025. The complex nature of the teaching profession requires problem-solving skills to be instilled in teachers to ensure they are able to face the demands of the teaching profession and increase the quality of their instruction. However, research has shown that higher education has not adequately prepared pre-service teachers with problem-solving skills, pedagogical content knowledge, ability to bridge theory and practice, and to be adequately prepared to teach. Hence, this study is carried out to develop an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction to enhance problem-solving skills and other vital skills that can increase the competency of Teaching English as a Second Language (TESL) pre-service teachers. This study adopts the design and developmental research. It is carried out in three phases: needs analysis, design and developmental, and implementation and evaluation. The needs analysis phase obtains the perspectives of 121 TESL pre-service teachers from two universities through surveys on their level of problem solving skills, and their acceptance of using an online case-based learning module in their course curriculum. The design and developmental phase obtain the views of 18 panel experts through the Fuzzy Delphi Method on the design of the OCBPS module specifically the case criteria, curriculum aspects and media design. The module is implemented in an ESL writing methodology course in a Faculty of Education of a public university in the Klang Valley amongst 22 Teaching English as a Second Language (TESL) pre-service teachers. The module is evaluated through surveys, interviews, and pre-and post-reflective essays by the teacher educator

and pre-service teachers who participated in the implementation phase. The evaluation focuses on the usability of the module, which includes the technical aspects, strengths, and attitude towards the module, problems, challenges, suggestions, and the effects of implementing the OCBPS module. The needs analysis findings show that the TESL pre-service teachers need a higher level of problem-solving skills. They perceive problem-solving as important in life, for learning and professional purposes. The needs phase found that the pre-service teachers have a high acceptance of case-based learning, and show interest in viewing online cases for problem-solving purposes. The findings for usability indicate that the OCBPS module has the strengths, and the potential of developing vital skills in ESL pre-service teachers like problem-solving skills, pedagogical content knowledge, ability to bridge theory and practice and preparation for teaching amongst others.

Pembangunan Modul Penyelesaian Masalah Berasaskan Kes Atas Talian Dalam Pengajaran Penulisan Bahasa Inggeris Sebagai Bahasa Kedua

Abstrak

Meningkatkan kualiti para pelajar dan guru adalah initiatif yang telah dijalankan dan salah satu agenda penting dalam Malaysian National Education Blueprints 2015-2025. Profesion perguruan memerlukan para guru mempunyai kemahiran penyelesaian masalah agar mereka dapat menempuh tugas seharian yang semakin kompleks dan juga meningkatkan kualiti pengajaran dan pembelajaran. Namun, kajian lepas menunjukkan bahawa pengajian tinggi belum sepenuhnya dapat meningkatkan kemahiran penyelesaian masalah, ilmu perguruan, kebolehan menghubungkan jurang antara teori dan praktis, dan persediaan untuk mengajar. Jadi, kajian ini dijalankan bagi tujuan membangunkan Modul Atas Talian Berbentuk Pembelajaran Kes Bagi Penyelesaian Masalah dalam Pengajaran dan Pembelajaran Bahasa Inggeris Sebagai Bahasa Kedua (OCBPS). Kajian ini bersifat penyelidikan rekabentuk dan pembangunan. Kajian ini dijalankan dalam tiga fasa: analisis keperluan, rekabentuk dan pembangunan, implimentasi dan penilaian. Fasa analisis keperluan bertujuan memperolehi persepsi 121 guru-guru pra-perkhidmatan Pengajaran Bahasa Inggeris Sebagai Bahasa Kedua (TESL) dari dua universiti melalui survei mengenai tahap penyelesaian masalah mereka, dan penerimaan mereka terhadap pembelajaran secara kes. Fasa rekabentuk dan pembangunan bertujuan memperolehi pendapat 18 pakar melalui Teknik Fuzzy Delphi mengenai rekabentuk modul OCBPS iaitu kriteria kes, aspek kurikulum, dan rekabentuk media. Susulan daripada implementasi modul OCBPS di dalam kursus metodologi penulisan Bahasa Inggeris sebagai Bahasa Kedua, 22 orang responden yang terlibat dalam implementasi modul menilai modul tersebut melalui survei, temuramah dan penulisan refleksi awal

dan akhir proses implimentasi. Fokus penilaian adalah pada aspek teknikal, kekuatan modul, sikap terhadap modul, permasalahan yang timbul, cabaran, cadangan, dan kesan daripada pelaksanaan modul OCBPS tersebut. Dapatan kajian analisis keperluan menunjukkan bahawa tahap penyelesaian masalah guru-guru pra-perkhidmatan TESL masih dalam tahap sederhana dan perlu dipertingkatkan. Mereka berpendapat bahawa kemahiran penyelesaian masalah adalah penting dalam kehidupan, untuk pembelajaran, dan juga pekerjaan. Mereka juga berminat untuk belajar melalui pembelajaran kes, dan menggunakan kes dalam bentuk video untuk tujuan pembelajaran penyelesaian masalah. Dapatan kajiaan fasa penilaian menunjukkan modul OCBPS mempunyai kelebihan, dan berpotensi membangunkan kemahiran penting guru-guru pra-perkhidmatan TESL, seperti kemahiran penyelesaian masalah, menambah ilmu perguruan, kebolehan menghubungkan jurang antara teori dan praktis, persediaan untuk mengajar dan lain-lain.

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ESL	English as a Second Language
FDM	Fuzzy Delphi Method
DDR	Design and Developmental Research
MOE	Ministry of Education
MOHE	Ministry of Higher Education
MUET	Malaysian University English Test
OCBPS	Online Case-Based Problem-Solving
PCK	Pedagogical Content Knowledge
PSI	Problem-Solving Inventory
ROS	Rancangan Orientasi Sekolah (School Orientation Program)
TESL	Teaching English as a Second Language
TPACK	Technological Pedagogical Content Knowledge

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Chapter 1 Introduction

Background of the Study

Malaysia is heading towards developing its human capital in its aspiration to achieve a developed nation status (New Straits Times, October 14, 2010). The 10th Malaysia Plan (2011-2015) and the 11th Malaysia Plan for Education (2016-2020) outlines the Malaysian government's focus to develop human capital for a skilled workforce (Ministry of Education [MOE], 2016). It is the government's aspiration to raise the bar of our education system to international standards to boost the economy and be prepared for a competitive future.

The question arises on whether the current education system is effective for producing citizens who possess knowledge and skills to compete globally. The 2012 Programme for International Student Assessment (PISA) scores released by the Organisation for Economic Cooperation and Development (OECD) show that Malaysia is placed in the bottom third in the survey ranking 52 out of 65 countries. There is a decline in the Reading and Science scores from 2009 to 2012 (OECD, 2013). The 2015 PISA scores amongst Malaysian 15 year olds improved from 2012 for Math, Reading and Science, yet it is still below the global average scores. Malaysia still ranks 52 out of 76 countries in 2015 for education quality (OECD, 2015). Malaysia is gearing up efforts to improve the ranking to place Malaysia in the upper thirds of the PISA benchmark (MOE, 2016).

In addition, Malaysian students seem to lack problem-solving skills. The PISA 2012 scores for Creative Problem Solving which measures 15-year old students' skills in tackling real life problems, shows that Malaysia is in the bottom quarter and ranked fared poorly ranking 39 out of 44 countries (OECD, 2014; Zachariah, 2014). This

alarming result portrays Malaysian students lack an important skill needed in the workplace. Andreas Schleicher, acting Director of Education and Skills at Organisation for Economic Co-operation and Development (OECD), said that students with poor problem solving skills will become adults who will have difficulty getting or retaining a job. Hence, there is a need for policymakers and educators to review the curriculum towards developing students' problem solving skills, a crucial skill in today's economy (OECD, 2014). The Ministry of Education has geared up efforts to re-assess the curriculum to help students develop 21st century skills (MOE, 2014; MOE 2015), one being problem solving skill (OECD, 2014).

One of the shifts in the Malaysian National Education Blueprints 2013-2025 and 2015-2025 is to increase the quality of students' learning and achievement and teachers' quality of delivery and instruction (MOE, 2014; MOE 2015). Initiatives include moving away from instruction that makes students memorize contents for the purpose of scoring in examination to more problem-solving and project-based instruction and evaluation. The emphasis is on critical thinking and higher order thinking skills and not surface level learning. The Ministry of Education Malaysia has planned to introduce more higher order thinking skills gradually in the next few years for primary and secondary levels of education in the country (MOE, 2014). Hence, the focus of instruction will be more on developing students' critical and higher order thinking skills in all subjects especially the critical subjects like Mathematics, Science, Bahasa Malaysia and English. The Malaysian school curriculum will be revised to emphasize more on problem-based learning and project-based work to increase students' creative thinking, innovation, problem-solving, and leadership (MOE, 2016). This is part of the initiative to raise the current education standards to international benchmark.

In educating Malaysians in the 21st century, the knowledge, skills, attitudes and values has to be in tandem with the current global needs and the local and international landscapes. The world is becoming smaller as technological advancements have virtually brought people closer through internet connections via computer and smart phone technologies. The knowledge, skills, attitudes and values imparted to young Malaysians have to ensure that the domains imparted help them develop competencies and capabilities to become the future workforce, and leaders who contribute effectively to the social, economic and the overall wellbeing of the country (MOE, 2014; MOE 2015). The young generations are the driving force of the future progress of the country and how we prepare them today will determine the kind of local and global citizens they become tomorrow.

The Ministry of Education has a big responsibility of educating Malaysians towards achieving world class standards. Part of the initiative of the Ministry of Education Malaysia is to ensure that the curriculum and assessment is aligned with international benchmark to ensure that Malaysian students acquire the knowledge and skills necessary for their success in the 21st century and beyond (MOE, 2014; MOE 2015). In order to achieve this, teachers and instructors need to be competent in educating students to ensure they are educated towards achieving the short term and long term goals of the country's aspiration (MOE, 2014; MOE 2015). This has implications on teacher training institutions to produce teachers who are able to tackle issues in education and solve arising problems effectively.

Producing high quality teachers through professional development programs, life-long learning initiatives, and teacher education courses are part of the initiatives highlighted in the Malaysian National Education Blueprint 2013-2025 and 2015-2025 (MOE, 2014; MOE 2015). The most important element of quality education is the

quality of the teacher (Moore, 2014). Teacher education programs are expected to carry out the government's aspirations of producing high quality teachers who are competent in their job. There have been constant measures to upgrade teachers' competencies and efforts have been taken towards achieving this aspiration (MOE, 2014; MOE 2015).

Moore (2007) says that teachers have many significant roles to play to ensure the effectiveness of the instructional experience. As instructional experts, teachers plan, guide and evaluate teaching which means they make decisions on what to teach, the methods and approaches to employ, the selection of content, and make decisions on evaluation methods. Teachers' planning and executing are often based on curricular goals, teachers' knowledge, needs and abilities of students and the overall teaching and learning goals (Moore, 2007).

Moore (2007) added that as managers, teachers are expected to manage students' behaviour, which includes managing the classroom environment to maintaining order. Doing clerical work, such as, managing attendance, profile, forms, grades, files and letters are part of the job besides being responsible to the requirements of the school and curriculum (Moore, 2007).

According to Moore (2007), as counsellors, teachers need human relation and social skills that could be useful when dealing with students, parents, colleagues and administrators. When students need counselling, teachers have to provide the constructive support, guidance, advice and help (Moore, 2007). Teachers' roles are complex and multifaceted, and not being effectively trained for these various roles could cause novice teachers to struggle at their job (Nahal, 2010).

Teachers are the backbone of any education system. Their training and preparation need to focus on producing educators with contemporary skills that are

useful in this era. They need to reach their students through interesting content, engaging activities and varied pedagogies for effective delivery of lessons (MOE, 2014; MOE 2015). They are responsible for their students' progress and performance whether in academics or co-curricular activities, and educate students to become knowledgeable and skilful, with the ability to transfer the knowledge and skills learnt to solving real life problems. Teachers have many roles to play: as instructional experts, managers and counsellors (Moore, 2007). They have to be empathetic and sensitive to students' psychological, emotional, social and academic well-being. As specified in The National Education Philosophy of Malaysia (MOE, 2016), teachers are responsible for producing individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. In addition, teachers are expected to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high level of personal goals. The National Education Philosophy of Malaysia also attempts to produce citizens who are able to contribute to the harmony and betterment of the family, society, and the country (MOE, 2016).

Teacher education programs must look into ways to produce teachers who are well-qualified, competent and have the ability to work professionally to solve issues involving the multi-faceted dimensions of education. One central issue that should not be overlooked is teaching critical problem solving skills within various subjects and disciplines. In this study, problem-solving is related to ESL writing instruction. Writing skills is chosen because it is one of the most important skills taught in the Malaysian School English Curriculum. However, it is a difficult skill to learn and master (Kwan & Yunus, 2014; Nunan, 1999; White & Arndt; 1991). Nunan (1999)

states that producing coherent written discourse is challenging for many native speakers, and "for second language learners, the challenges are enormous" (p. 271). A study in Malaysia's TESL teacher education faculty found that Malaysian ESL pre-service teachers have not entirely mastered their writing skills what more teaching this skill to students. Writing is a skill that is difficult to teach and master, and teachers often face problems in teaching students on how to become skilful writers (Nguyen and Hudson, 2010). Many pre-service teachers are worried about teaching, and their students 'learning (Goh & Matthews, 2011; Greiberg & Driscoll, 2005).

In this study, problem-solving in the ESL writing instruction relates to pedagogical and content problems. Making PCK explicit to participants in interventions could help in the development of their PCK (Evens et al, 2015). The training, study and practice of PCK should be done in domain specific contexts to enhance PCK of the subject and skills the teachers are teaching (Xu, 2015).

In this study, pre-service teachers observe an authentic ESL writing lesson and engage in problem-solution analysis relating to pedagogy and content of ESL writing. These aspects are focused on because of the importance of pedagogical content knowledge (PCK) amongst teachers (Shulman, 1986; 1987). PCK makes a difference for instructional quality and student learning (Evens, Elen & Depaepe, 2015). PCK in teachers powerfully impacts students' progress and instructional quality (Baumert, Kunter, Blum, et al, 2010). Teachers' PCK also correlated with students' motivation and enjoyment to learn (Kunter et al, 2013). These show that attention should be given in the training and development of teachers' and future teachers' PCK to improve the quality of education (Evens, et al, 2015).

PCK is one of the theoretical foundations of this study. In addition, it was found that Malaysian pre-service teachers did not apply theory and practice during practicum

teaching, and struggled to apply pedagogical-content knowledge, whilst coping with workload not related to teaching, and practicum supervision (Ong, Ros, Azlian, Sharnti & Ho, 2004). Pre-service teachers also expressed concern about how and what to teach, choosing the appropriate and correct methodology, and using current and creative strategies of teaching (Goh & Matthews, 2011). These shows that there are pertinent issues that need to be addressed in the training of pre-service teachers.

Statement of the Problem

Teacher education programs should be effective in producing capable and well-prepared teachers (Norshiha & Norsiah, 2011) who are able to solve problems that they would possibly encounter in their future professional practice. According to Bereiter and Scardamalia (1993), an important aspect of professional practice is problem solving. The complex nature of the teaching profession requires problem solving skills to be instilled amongst teachers (Schon, 1987).

In addition, teacher education needs to bridge the gap between theory and practice by providing pre-service teachers opportunities to put theory into practice (Lee, 2004). There is a need for teacher education programs to reduce the gap between theory and practice by providing the opportunities for pre-service teachers to practice making decisions in different situations by applying theories and knowledge gained (Koc, 2012).

Furthermore, teacher education should train pre-service teachers to apply pedagogical and content knowledge. Yet, empirical research on intervention and developing PCK is scarce (Evens, et al, 2015). Shulman (1987) asserts that teacher education should provide pre-service teachers with pedagogical and content knowledge. His rationale is that pedagogical content knowledge enables teachers to

make connection between subject-matter knowledge and the best instructional strategies to use for effective instruction or pedagogical knowledge. He reiterates that it is essential for teachers to have a combination of pedagogical and content knowledge (PCK) to be competent in their jobs (Shulman, 1987).

However, the actual situation is that higher education has not prepared pre-service teachers adequately to bridge theory and practice, and apply pedagogical content knowledge to solve real-world problems (Choi & Yong, 2011; Mandl, Gruber & Renkle, 1996). Pre-service teachers lack content knowledge and do not know how to use suitable teaching methods (Darling-Hammond, 2006). The actual situation shows that many find it hard to teach effectively often due to lack of experience or even not being entirely prepared for the job (Nahal, 2010).

Malaysian novice teachers have been found to face problems teaching slow learners, students of different ethnicities, those from deprived background and handling large class size (Veenman, 1984). Malaysian ESL novice teachers have problems using different effective teaching methods and knowledge of subject matter that enables them to teacher confidently (Veenman, 1984 as cited in Senom, Zakaria & Shah, 2013). They also have problems teaching mixed-ability classes (Kabilan & Raja Ida, 2008). These issues are still prevalent because Norshiha and Norsiah's (2011) study found teacher education programs tend to be isolated from the issues that are prevalent in the classroom such as teaching the socially disadvantaged, new immigrants, and students with mixed abilities. It is found that pre-service teachers are unable to solve problems, resolve conflicts, and assume leadership (Norshiha & Norsiah, 2011).

Malaysian novice teachers, in their first year of teaching, having transitioned from teacher education to the teaching profession, are not adequately prepared for the

challenges of teaching (Senom, Zakaria & Shah, 2013). A nationwide study conducted by the Ministry of Education and The Ministry of Higher Education (2006) on Malaysian ESL novice teachers' readiness for their teaching profession, found that one of the problems faced is the difficulty in applying theory to practice, among other problems like curriculum specification, resources, teaching preparation, classroom teaching and management. An in-depth investigation found that students' low English proficiency is a frequent problem faced during their first years of teaching (MOHE & MOE, 2006).

Prospective teachers might face a complex situation and requires them to address complicated issues involving a range of variables and parameters (Nahal, 2010). In reality, teacher education covers a broad range of topics, and pre-service teachers have to be able to apply all the course contents, theories, principles and approaches as students and future teachers (Shulman, 1987). Classroom problem solving often requires making pedagogical and content decisions (Stuart and Thurlow, 2000). Sharing of perspectives, observation of real classroom teaching and openness to reflection and decision making can help pre-service teachers to re-evaluate and change their beliefs about teaching and become agents of change in their schools (Stuart & Thurlow, 2000).

Hence, teacher education programs should prepare pre-service teachers to be effective problem-solvers to cater to the current demands and needs of teaching. Teacher education programs need to better prepare pre-service teachers for the challenges of classroom instruction. Vaugn, Bos and Shuman (1997) reported that the novice teachers in their study found that their education programs do not adequately prepare them to face the increased demands of teaching (in Stuart & Thurlow, 2000).

Pre-service teachers need effective and relevant training in problem-solving and ample training in application of theory, content and pedagogy to teaching. One of the challenges that teacher education need to pay attention to is how to bridge the gap between training and the actual demands of the teaching profession (Lee, 2004). Many teacher education programs are moving towards reducing the theory-practice gap. Theory that relates to practice will help novice teachers develop intuitive skills in dealing with classroom-related issues (Nahal, 2010).

Pre-service teachers had wished that curricular content in preparation programs provided them with practical activities relevant to classroom teaching (Nahal, 2010). They had wished that they had learnt activities related to ready-to-use strategies, real-world applications, and classroom management. It would reduce the number of mistakes novice teachers make in addition to the problems encountered (Nahal, 2010).

It is evident that teacher preparation programs have problems and challenges that need to be addressed. Teacher education needs to engage pre-service teachers at a deeper level by using more authentic tasks to provide opportunities to foresee future professional problems and generate possible solutions (Kocyigit & Zembat, 2013). The pre-service teachers in Kocyigit and Zembat's (2013) study who received only topic-based lessons without practical applications were passive and bored in their methodology course. They envisioned discrepancy between classroom tasks and real-life ones. Their overall attitude did not change or they developed a negative attitude.

While many studies highlight the problems novice teachers face, many do not investigate how the teachers overcome challenges and solve the problems (Senom, Zakaria & Shah, 2013). In teacher education, pre-service teachers need to be trained to foresee future professional problems and how they can apply theoretical, pedagogical and practical strategies to solve the problems. In teacher education

training, pre-service teachers need to be given adequate examples. It is important to provide examples especially when teaching conceptual and complex materials (He, Yuan and Yang, 2013). They should be exposed to sufficient examples and case-based approach has been strongly recommended (He, Yuan & Yang, 2013). This approach has also been found to be effective in bridging the gap between theory and practice (Koc, 2012).

Choi and Lee (2009) states that despite the importance of developing students' ill-structured problem solving skills in higher education, many educators find it challenging to create such a learning environment. This could be due to the lack of research-based information and suitable resources available for educators to use as a model to redesign their instructional methods to promote problem solving abilities (Choi & Lee, 2009). As such, Choi and Lee (2009) recommended a need for more research on instructional design and implementation models for enhancing ill-structured problem solving skills in the higher education context to address these issues. It is essential to develop a case-based pedagogical model for filling a gap between higher education learning and real-world problem solving (Choi & Lee, 2009). This present research hopes to fill the gap in bridging higher education learning and real-world problem solving.

Previous studies on case based learning have used written real dilemma cases. Koc's (2012) study found written cases to be effective for connecting theory-practice divide, apply theories and content knowledge, and developing effective problem-solving strategies amongst early childhood pre-service teachers' Koc (2012) further suggested the use of video, multimedia and online cases in future research studies. This provides the benefit of accessibility of the participants and any interested party hoping to use cases as a pedagogical tool in teaching and learning.

In addition, video cases presented online can be used in teacher education to develop problem solving abilities. Wong and Hartley (2003) claim that video technologies serve as tools for pre-service teachers to view ill-structured problem scenarios explicitly and repeatedly to identify problems faced in the classroom with the potential of generating effective solutions to the problems identified. Kale and Whitehouse's (2012) study uses Social Studies video case taken from an online problem-based learning video case library. The participants are from various education majors like English, World Languages, Mathematics, general Science, Special Education, and early Childhood. However, the use of video cases in developing problem solving abilities needs to be further explored as there is lack of empirical support to measure its effectiveness (Kale & Whitehouse, 2012).

Kocyigit and Zembat (2013) promote the use of authentic tasks that present real-life conditions into pre-service teacher education to helps pre-service teachers to encounter possible future problems and make recommendations. They made use of computer-based presentations and video recording technology of real-life classroom teaching to analyse problems and discuss solutions. While Kocyigit and Zembat (2013) used participants from the Special Education Methods course offered in Pre-school education undergraduate program, they suggested that future investigations should be conducted in other courses.

Case-based learning is gaining popularity for its epistemological foundation that fosters learners' higher cognitive processes, meaningful learning experiences, and effective problem-solving capabilities (Choi & Lee, 2009; Koc, 2012; Kocyigit & Zembat, 2013). The use of cases in teacher education has been found in courses such as Classroom Management in Education Psychology, Early Childhood Education Programs, and Special Education Methods in Pre-school Education (Choi & Lee,

2009; Koc, 2012; Kocyigit & Zembat, 2013). However, there has not been any study done on using case-based learning in a writing methodology course in a TESL teacher education program.

The solution that this study proposes is the development of an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction to address the issues of enhancing problem solving skills, bridging theory and practice, application of pedagogical and content knowledge, and for ESL pre-service teachers to be adequately prepared for their teaching job. This study addresses the gap by providing the opportunity for ESL pre-service teachers to be trained for problem-solving through the OCBPS module. It aims to fill the gap on using online cases in a writing methodology course to help enhance pre-service teachers' problem solving abilities, develop the application of pedagogical content knowledge, develop the ability to bridge theory and practice and prepare them for writing instruction.

Rationale of the Study

This study aims to develop an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. The OCBPS module is to be integrated in a Teaching English as a Second Language (TESL) teacher education writing methodology course as a way to prepare pre-service teachers for authentic and ill-structured problems related to ESL writing instruction in secondary schools.

Pre-service teaching of writing courses need to incorporate teaching materials and classroom issues related to teaching writing such as writing genres, writing topics, how to motivate students to learn writing, and how to deal with mixed-level of students at secondary schools (Nguyen & Hudson, 2010). Pre-service teachers also need to be equipped with knowledge and skills to adapt to new teaching contexts with teacher

educators creating opportunities for developing such practices before entering field experiences (Nguyen & Hudson, 2010).

Case-based learning have been found to be effective in teacher education courses to help teachers take appropriate measures in seeking solutions to complex real-world problems in teaching and learning. (Jonassen, 1997; Choi & Lee, 2009, Koc, 2012). Case-based learning uses classroom cases in various formats to illustrate problems and dilemmas in teaching and learning (Arellano, 2002). It 'provides a tool through which teaching practices can be viewed with meaning and context' (Arellano, 2002, p. 137). Pre-service teachers can have a perspective of the scenarios and issues they will likely encounter in their prospective classrooms. It will give them the experience of solving problems they are likely to encounter in their profession.

Online cases have been used to present real-life problems (Choi & Lee, 2009). In the current study, the video case is recorded in a real classroom in a public secondary school for secondary education Teaching English as Second Language (TESL) pre-service teachers. The researcher captures a case in a writing classroom for the ESL writing methodology course participants with the hope that they can apply the theories and approaches learnt in the course for their problem-solving processes. The video case presented is generated from a localized professional setting and directly related to the participants' area of specialization for it to be domain specific. This current study is significant in that it develops situations that prospective teachers will likely encounter providing online resources that are authentic to the Malaysian context for teacher education programs especially the TESL program to use for instructional purposes.

Hence, this study focuses on the development of an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. This study employs

the design and developmental research approach (Richey & Klein, 2005) for the development of the OCBPS Module for ESL Writing Instruction. It is developed to enhance problem-solving skills among pre-service teachers by integrating an online case in a video format to be used as a problem-solving module in a teacher education TESL writing methodology course.

The rationale for selecting DDR for this study is because of its many strengths and applications. DDR can be utilized to address multiple problems faced by learners, educators and administrators. DDR is a form of rigorous scientific research or inquiry that is flexible and adaptable, yet reliable in developing theories (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013), and reliable for creating practical, context-specific knowledge and solutions (Richey & Klein, 2005).

The development of this module is aimed at developing problem-solving skills through constructive, collaborative discussion and decision making (Wang & Bonk, 2001; Benbunan-Fich & Hiltz, 1999), as well as critical and analytical reasoning skills through problem-solving processes (Merseth, 1999). Developing these skills in teacher education programs help produce teachers who are work-ready and who have skills needed in the current workforce. Pre-service education programs have a major role of producing highly qualified teaching workforce, which is significant in the development of the complex 21st century society (Young, Grant, Montbriand & Therriault, 2001).

Purpose of the Study

The purpose of this study is to develop an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction to train pre-service teachers' problem-solving skills in the Teaching English as a Second Language (TESL) writing

methodology course. This design and developmental research is carried out in three phases, which are the needs analysis phase, the design and developmental phase, and the implementation and evaluation phase (Richey & Klein, 2005).

The analysis phase is done to find out the pre-service teachers' perception of their levels of problem solving skills, whether they perceive their problem solving abilities to be high, medium or low level. The findings provide the status of the need to enhance pre-service teachers' problem solving skills in teacher education. The analysis phase also aims to generate the pre-service teachers' perspectives on their acceptance of using an online case-based module in their course curriculum. It intends to obtain their opinion on the potential of using case-based learning in helping them acquire problem solving skills. In addition, this phase aims to investigate if pre-service teachers have interests in viewing case-based videos online for learning purposes. It is important to investigate if pre-service teachers are interested in exploring the use of online case-based learning module in their course.

The purpose of the design and developmental phase is to obtain the panel experts' views on the design of the OCBPS Module for ESL Writing Instruction to enhance pre-service teachers' problem-solving skills. The input includes the criteria for selection of the case scenario, such as, the context, genre, level, proficiency of students, teacher's teaching experience, and the duration of the writing class in the selection of case scenario that is to be recorded. In addition, experts provide input on the curriculum aspects and media design of the OCBPS Module for ESL Writing Instruction.

The purpose of the evaluation phase is to implement the module, then evaluate it from the perspectives of the writing teacher educator and pre-service teachers who have used the OCBPS Module for ESL Writing Instruction. The evaluation focuses on

the usability of the module, which includes the participants' perception and attitude towards the module, and the effects of implementing the OCBPS Module for ESL Writing Instruction.

Objectives

The objectives encompass three phases namely, (1) needs analysis, (2) design and development, and (3) implementation and evaluation.

Phase 1: Need Analysis Phase

The objective is to:

1. determine the perception of pre-service teachers on their level of problem solving skills.
2. ascertain pre-service teachers' perception of the importance of problem-solving skills.
3. investigate the perspectives of pre-service teachers on their acceptance of using an online case-based problem-solving module.
4. find out the pre-service teachers' interests in viewing videos online.

Phase 2: Design and Development. The objective is to design and develop an Online Case-Based Problem-Solving Module for ESL Writing Instruction based on the views of a panel of experts for enhancing pre-service teachers' problem-solving skills.

Phase 3: Implementation and Evaluation. The objective is to evaluate the usability of the Online Case-Based Problem-Solving Module for ESL Writing Instruction after it has been implemented.

Research Questions

Phase 1: Need Analysis

1. What is the perception of pre-service teachers on their level of problem solving skills?
2. What is the pre-service teachers' perception of the importance of problem-solving skills?
3. What are the perspectives of pre-service teachers on their acceptance of using an online case-based problem-solving module?
4. What are pre-service teachers' views on their interests in viewing online case-based videos?

Phase 2: Design and Development. What are the panel experts' views on the design of the Online Case-Based Problem-Solving Module for ESL Writing Instruction in enhancing pre-service teachers' problem-solving skills?

Phase 3: Implementation and Evaluation. What are the pre-service teachers' and lecturer's opinion on the usability of the online case-based problem-solving module?

Significance of the Study

This study is significant to TESL teacher educators, TESL pre-service teachers, policy makers, English teachers, researchers, and those interested in developing instructional online case-based learning modules for improving content and pedagogical problem solving skills.

This study is significant to TESL teacher educators. The process in this study involves interviewing teacher educators and TESL pre-service teachers on the need for

case-based pedagogy to enhance problem-solving skills. This study generates data on the most suitable content and technological aspects of the case-based pedagogy. Teacher educators in the field of teaching English and instructional technology who serve as experts provide useful data to assist in the design and development of the case-based module. These data helps TESL teacher educators and TESL teacher education programs in preparing teacher candidates for teaching in the ESL writing class.

TESL teacher educators and TESL prospective teachers from teacher education institutes, public and private higher learning institutions may find the perspectives gathered on problem-solving through online case-based learning for ESL writing instruction useful in carrying out their academic responsibilities through the lenses of this study.

This study is significant for instructional designers. This study provides multiple perspectives on designing and developing the module. These help those interested in design and developmental research on the processes and procedures involved in developing and implementing an on online case-based instructional module.

This study can serve as a guide to those interested in the development of similar modules in that the process is explained in this research. The knowledge of the processes involved in module design and development can go a long way in making the task of developing a module easier. The process of module development is explained in detail and is helpful for educators, curriculum developers, teacher education, and anyone interested in the field.

In teacher education, preparing future teachers with skills that they can use in the future is crucial. There is a need to produce teachers who are intelligent with the ability to apply pedagogical content knowledge effectively, and adopt critical problem

solving skills when faced with real-world challenges so that they can make wise and informed decisions. This study is significant in that it provides information on the prospect of using a case-based pedagogy in TESL teacher education programs for developing problem solving skills, enhancing pedagogical content knowledge, bridging theory and practice gap, and in the process developing of higher order thinking skills. This study provides a prototype of an online case for engaging TESL pre-service teachers in problem-solving practices.

The module is developed to provide an online case of a real teaching scenario for analysis of problems, issues and solution generating processes to enhance problem solving skills and to help acquire pedagogical and content knowledge in ESL writing instruction amongst TESL pre-service teachers. It also provides a resource in the form of an online video case for easy retrieval and accessibility for instructional purposes in the TESL writing methodology course. Hence, this study is significant to teacher educators, pre-service teachers, policy makers, teachers, researchers, and those interested in developing instructional online case-based modules for improving pedagogical and content problem solving skills.

Limitation of the Study

There are several limitations of the study. Firstly, this study uses a single online case that is developed as a module for the second year pre-service teachers in a TESL teacher education program. It is carried out in an intact class. Hence, the findings of the study may not be generalized to other population unless the population has a similar background to the sample of this study.

The module is carried out in one teacher education TESL program's writing methodology course and is contextual in nature. The problem-solving processes are

focussed on the theories and principles of writing and education. The module and its implementation are specific to the TESL writing methodology context. It may be adapted to other disciplines but for the purpose of this study, the support and rationale for the problem-solution process is applicable to the ESL writing discipline.

Richey and Klein (2005) state that developmental research is context-specific, therefore limitations stem from the unique conditions that exist in a particular study. As such, the limitations that suffice are the extent to which the results, data and conclusions derived from this study may be generalized. The results may be applicable only in the situation studies or others with similar characteristic, rather than being generalizable to a wider range of instructional contexts (Richey & Klein, 2005).

The case for the module is a recording of a secondary school ESL English writing class using the Malaysian KBSM English Curriculum. The recording captures real life teaching in an ESL writing class by a qualified teacher. The study uses the actual teaching scenario keeping the authenticity of the recording to showcase an original context for the pre-service teachers' analysis. The problems are based on the single case presented. Other pertinent problems related to ESL writing instruction not identified in the case are not covered. Hence, the problems identified and discussed in the study are based exclusively on the single case presented.

The writing methodology course runs for fourteen weeks with a fixed weekly schedule and course contents and assessments included. To run the module in the course requires permission and a minor adjustment to the schedule. It has to abide to the conditions set by the faculty management and the lecturers involved. There are certain limitations that cannot be avoided. The study is careful not to disrupt the original schedule of the course thus it is implemented over two weeks with two classes per week for the collective duration of 6 hours face-to-face instruction. Since the

module is available online, a minimum of three hours is allocated for the online task. Taking into consideration the administrative procedure of the university's and faculty's schedule and the weekly schedule of the course, the module consists of only one case and the problem-solving processes are based on that single case. Hence, the development and implementation of the module takes into consideration the time limitation mentioned above. It considers minimizing any possible disruption to the pre-set schedule of the course.

Operational Definition

The following are significant terms used in this study and their definitions:

Authentic case: An authentic case in this study means real data obtained through the recording of an English teacher teaching writing to ESL students in a secondary school to be used as a case-based learning tool.

Authentic activities: Brown, Collins and Duguid (1989) define authentic activities as ordinary practices of a culture. "The activities of a domain are framed by its culture. Their meaning and purpose are socially constructed through negotiations among present and past members who move within the social framework. These coherent, meaningful, and purposeful activities are authentic" (p. 34).

Case-Based Learning (CBL): Case Based Learning (CBL) has been described as presenting students with a real world example based on real data and information which is considered a real case. This approach requires students to analyse information

about real cases so as to develop analytic, diagnostic, and decision-making skills (Institute of Teaching and Learning, Deakin University, 2014).

Cases: Cases as defined by Koc (2012) are tools for teaching to aid practicing and pre-service teachers study the realistic classroom environments, to provide concrete classroom situations, rather than imaginative cases.

Case-Based Problem-Solving for ESL Writing Instruction: In this study, problem-solving is the activity the pre-service teachers engage in as they analyse the pedagogical and content problems in ESL writing instruction depicted in an authentic case, and they provide possible solutions with support from literature.

Educational Technology: Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2008).

ESL Writing Instruction: ESL writing instruction is the learning and teaching of writing skills in English. In Malaysia, English is used and learnt as a second language. Teaching writing skills to ESL learners involve the application of theories, approaches and pedagogy of ESL writing.

Online Case-Based Learning: Online video cases are those that are shared on the Internet. Online video cases can be played directly from the Internet if the connection speed allows, or downloaded and played from a local hard drive (Ozkan 2002). In this study, a case depicting an authentic ESL writing instruction in a secondary school

classroom is presented in a video format on an online platform for TESL pre-service teachers to engage in problem solving processes through case-based learning

Pre-service teachers: In this study, pre-service teachers are students in higher learning institutions who are training to become teachers. TESL pre-service teachers are those who are undergoing a Bachelor in Education (TESL) course to become English teachers when they graduate.

Problem-Solving: "Problem-solving is the process by which an individual overcomes the hurdles encountered in attaining the target" (Temel, 2014, p. 2). "Problem solving proper means finding the best way to solve a problem by applying problem solving strategies and techniques" (Erozkan, 2013, p. 20).

Teacher Educators: Teacher educators in this study refer to lecturers or instructors who teach and train future teachers in teacher education programs. Writing teacher educators are lecturers or instructors who teach ESL writing methodology to TESL pre-service teachers for them to become future English teachers who are trained to teach writing skills.

Conclusion

It is vital for pre-service teachers to be trained to have problem solving skills that are specific to their job domain. Part of the training for TESL pre-service teachers involves teaching writing skills in the writing methodology course. Writing is a difficult skill to teach and it is important for the TESL program to fully prepare future English teachers who are able to meet the demands and ill-structured problems of

teaching writing. The Online Case Based Problem-Solving Module in this study is intended to be integrated in the TESL writing methodology course as a way for pre-service teachers to have exposure to the authentic ill-structured problems in ESL writing instruction. This study analyses, designs, develops, implements and evaluates the OCBPS Module in the domain of TESL writing methodology. Having provided the background, the statement of the problem, the rationale, purpose, the objectives, research questions, significance, limitations and operational definitions of the study in this chapter, the following chapter reviews the literature pertinent to this study to provide relevant information on case-based learning.

Chapter 2 Literature Review

Introduction

This chapter establishes the conceptual foundations of the study by synthesizing the literature on case-based learning for problem solving in teacher education using technology supported tools. Problem-solving in teacher education is reviewed as an important foundation of this study. Writing methodology in TESL is the subject matter for which the online case is featured and the problem-solving processes are focussed on. The theoretical foundations of the current study, role of technology in fostering problem solving, the case method, case-based learning in teacher education, online case-based video instruction, principles and model for problem-solving through online case-based learning, and other literature specific to this study are reviewed and synthesized.

Problem-Solving in Teacher Education

Problem-solving is an important cognitive process in education and should be emphasized in teacher education (Chwee, 2013). Beginning teachers face a plethora of problems relating to teaching (Chwee, 2013; Senom, Zakaria & Shah, 2013; MOHE & MOE, 2006). These problems are defined as ill-structured problems (Jonassen, 2011) because they are complex and embedded in practice. The problems are emergent and novice teachers have not experienced them before and have limited problem-solving mechanism to help them cope with the early years of practice. It is different from well-defined problems which have solutions in textbooks like a mathematical problem (Jonassen, 2011).

Jonassen (2002) defines ill-structured problems as those that are found in the workplace. They are difficult to solve due to the number of issues, functions and variables involved in the problem, and have many alternative solutions, multiple solution paths, and multiple criteria for evaluating solutions. Problem-solving requires a mental schema of the situation or the problem space (Newell & Simon, 1972; Jonassen, 2002). Jonassen (2002) added that manipulation of the problem space in problem-solution analysis process engages conscious activity.

Developing problem-solving skill in teacher education is important to help beginning teachers cope with problems and minimize high attrition rates as reported in several studies (Maistre & Pare, 2010). By learning through case-based problem-solving which involves observing experienced teachers' instruction, and engaging in collaborative, constructive and critical problem-solving analysis, pre-service teachers can be trained to deal with the ill-structured problems of initial practice. Experienced teachers can provide the framework for pre-service teachers to learn problem-solving strategies (Maistre & Pare, 2010).

Theoretical Perspectives of Online Video Case-Based Instruction in the Current Study

There are several theories that underpin this study and provide the framework for the development of an online case-based problem-solving module.

Pedagogical and Content Knowledge (PCK). Professor Lee S. Shulman (1986) coined the term pedagogical content knowledge PCK) to emphasize the significant relationship between the two domains. Through his concern of the aphorism by George Bernard Shaw which wrote, "He who can does. He who cannot, teaches" that he considers a "calamitous insult" to the teaching profession made him act upon

the demeaning image of teachers' competencies through research on the relationship between teacher knowledge and teaching effectiveness.

Shulman's (1986) initial argument is that it is important for teachers to demonstrate knowledge of the subject matter he or she is to teach. Subject matter knowledge is central to students' learning and associated with teacher effectiveness. Shulman (1986) argued that content knowledge, the "what" of teaching has been treated mutually distinct from pedagogical knowledge which is the "how" of teaching. Shulman (1986) contends that pedagogical knowledge needs to be integrated with content knowledge. The initial questions that guided his research on the contents of the lesson are: (1) Where do teacher explanations come from? (2) How do teachers decide what to teach, how to represent it, how to question students about it, and how to deal with students problems of misunderstanding? Teachers' perspectives on these issues are important to gauge their source of knowledge and other questions that hold the status of teacher knowledge of subject matter (Shulman, 1986).

Shulman (1986) focussed his research on content knowledge which he categorized into three in his article 'Those Who Understand: Knowledge Growth in Teaching'. The categories are (1) subject matter content knowledge, (2) pedagogical content knowledge, and (3) curriculum knowledge (Gess-Newsome & Lederman, 2001). His explanation of content knowledge is that it is "the amount and organization of knowledge per se in the mind of the teacher...Teachers must not only be capable of defining for students the accepted truths in the domain. They must also be able to explain why a particular proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions, both within the discipline and without, both in theory and in practice" (p. 9). Pedagogical knowledge is "…the dimension of subject matter knowledge for teaching – the ways of representing and formulating the subject

that make it comprehensible to others" (p. 9). Curricular knowledge is the knowledge of how to represent "a full range of programs designed for the teaching of particular subjects and topics at a given level, the variety of instructional materials available in relation to those programs, and the set of characteristics that serve as both the indications and contraindications for the use of particular curriculum or program materials in particular circumstances" (p.10).

Researchers have been concerned about teacher effectiveness and competencies (Shulman, 1986; Liu, 2013; Lee & Luft (2008). Shulman's (1986) study focussed on the development of secondary teachers in English, Biology, Mathematics and Social Studies. He was concerned about secondary teaching candidates who have completed a major in their subject speciality and transitioning from expert students to novice teachers. His research inquiry is guided by his concern of how a successful college student transforms his or her expertise in the subject matter into a form that high school students can comprehend. Also, how does he or she apply content expertise to generate new explanations, representations or clarifications? In addition, what are the sources of analogies, metaphors, examples, demonstrations, and rephrasing? Shulman's (1986, p. 8) question is, "How subject-matter knowledge translates to the process of teaching?"

Shulman (1986) asserts that mere content knowledge without pedagogical application to the subject matter is useless both ways. Content knowledge should be integrated with pedagogical understanding (Park & Oliver, 2008). They should not be treated as mutually exclusive. In teaching contents, pedagogical processes need to be present to help teachers transfer knowledge effectively according to their students' needs, characteristics and contexts (Shulman, 1986; Lee & Luft (2008). The effective

application of PCK impacts teaching quality and students' learning (Evens, Elen, & Depaepe, 2015).

Shulman's article on "Knowledge and Teaching: Foundations of the New Reforms" (1987), listed the categories of knowledge that underlie the teacher understanding to promote comprehension among students. They are:

- content knowledge;
- general pedagogical knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter;
- curriculum knowledge, with particular grasp of the materials and programs that serve as "tools of the trade" for teachers;
- pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding;
- knowledge of learners and their characteristics;
- knowledge of educational contexts, ranging from workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures; and
- knowledge of educational ends, purposes, and values, and their philosophical and historical grounds.

(Shulman, 1987, p.8)

In support of Shulman's (1986; 1987) PCK, Moore (2014) asserts that successful and effective teachers are knowledgeable in four areas. First is the knowledge of the content of what they are teaching. Second, is professional knowledge related to teaching, knowledge about the historical, philosophical and psychological aspects of schooling, students and education. Knowledge about learning, pedagogy, diversity, technology, legal issues, and roles and responsibilities of teachers and school personnel should be elements of teacher knowledge. Third, teachers must have

pedagogical knowledge. Pedagogical knowledge constitutes effective teaching concepts, theories, and research in the subject and grade level they are teaching. Fourth, is the application of pedagogical content knowledge in teachers' instruction. These are important knowledge base for teachers to be effective and successful practitioners.

There are several studies done on pedagogical content knowledge (PCK) in the domain of teaching English as a Second Language (ESL) (Liu, 2013; Faisal 2013; Moradkhani, Akbari, Ghafar Samar, & Kiany, 2013). Faisal (2013) states that PCK components in international and Indonesian teaching of English as a foreign language are knowledge of learners, subject matter, general pedagogy, and curriculum. His study identified this regulation and categorizes the concept of PCK into teachers' four competencies, namely pedagogical, professional, personal, and social competencies. Moradkhani et al's (2013) study on English language Teaching (ELT) teacher educators' PCK found that it encompasses eight macro categories; namely, knowledge of language and related disciplines, knowledge of ELT theories, skills, and techniques, knowledge of context and social relations, knowledge of class, time, and learning management, knowledge of research and professional development, knowledge of practicum, knowledge of teachers and their assessment, and knowledge of reflective and critical teaching.

Liu's (2013) study on pedagogical content knowledge in ESL teacher education found that pedagogical knowledge plays a more active role in ESL instruction, and suggested that ESL teacher education train pre-service teachers to develop PCK through standardized and easy-to-learn ESL pedagogical knowledge like meaningful and experiential learning. It is found that experiential learning can contribute effectively to the development of PCK (Liu, 2013). When pre-service

teachers learn from more experienced teachers from observation (Wang & Paine, 2003), and engage in active cognitive analysis, presenting viewpoints and reflection with colleagues, they are able to actively construct and internalize teacher knowledge (Liu, 2013).

Technological, Pedagogical and Content Knowledge (TPACK). Technology is flexible in use because it can be integrated with content and pedagogy. Educators need to be flexible and adaptive in employing various strategies in delivering content. Strategies integrating technology fascinate 21st century learners (Moore, 2014). Koehler and Mishra (2009) describe a framework for teacher knowledge for technology integration called technological, pedagogical content knowledge, also known as TPACK. This framework builds on Shulman's pedagogical content knowledge (PCK) and integrates technological knowledge. TPACK is important for effective teaching using technology (Koehler and Mishra, 2009).

Teachers need to have many kinds of specialized knowledge because classroom is a dynamic place and teaching is a complex practice. Shulman (1986, 1987) asserts that effective teaching demands interweaving of content, pedagogical and curricular knowledge. Koehler and Mishra (2009) added another dimension to teacher knowledge which is knowledge of technology. Teaching is complicated enough and the demand for 21st century instruction that should not ignore technology poses even greater challenges (Koehler & Mishra, 2009). According to Koehler and Mishra (2009), newer technologies demand new skills and training to upgrade technology knowledge is never static. Particular technologies have their own qualities, affordances and constraints and these provide options for certain tasks and only teachers can determine the suitability of a particular technology for their instruction (Koehler & Mishra, 2009). Furthermore, social and contextual factors should also be

considered in choice and decisions of integrating technology in lessons (Koehler & Mishra, 2009). These decisions require teachers have the interweaving knowledge of content, pedagogy, and technology (TPACK).

Many learning theories proof that merely delivering contents through lecture-style format with supplementary visual aid may not necessarily facilitate meaningful learning and higher-order thinking skills (Hammond and Manfra, 2009). Many think that basic PowerPoint skill is sufficient and what is more important is lecturer's expertise and experience in the subject matter. Hammond and Manfra's (2009) analogy to the PowerPoint delivery method is transmission or *giving*. It is considered traditional, didactic and passive. *Prompting* is better because teachers act as facilitators and encourage students to interact with content through questions, answers and discussion which align with the constructivist approach (Hammond and Manfra, 2009). *Making* is a more effective method to using technology in instruction because it promotes higher order thinking when students make, construct or create (Hammond and Manfra, 2009) for example, video production and editing.

Lecturers need to be aware that PowerPoint can be effective or less depending on the suitability of the contents, tasks, and the learning outcomes. Teaching is not merely transmitting or giving concepts and information but more than that. It is the ability to make students transform and make that knowledge meaningful through active, engaging, constructive and innovative practices. They need to be aware that whilst having content knowledge is valuable, as lecturers how the contents are shared with students is equally valuable; hence pedagogic knowledge is crucial to educators. Training on the effective integration of content and pedagogic skills is integral to effective instruction. 21st century pedagogical practice should not ignore technology as a significant approach. Technological, Pedagogical and Content Knowledge

(TPACK) in teacher training is important to reflect on the role of technology in one's own instructional practice, and decision-making.

Effective use of technology in instruction should begin with awareness of PAC and TPACK, which shows the complex interaction among content, pedagogy and technology (Koehler and Mishra, 2010). Lecturers should be made aware that having just content knowledge without pedagogical knowledge can be detrimental. Integration of technology should be creatively designed and structured for particular subject-matter and in specific classroom context. As educators, they need to use multiple approaches in imparting knowledge and skills, to cater to the dynamics of their students, the learning environment, and the multifaceted conditions that intervene with the instructional processes. It is then left to the teachers to apply the most suitable approach or a combination of approaches in their lessons to achieve the desired outcomes. Education should understand the approaches to successful technology integration.

Creating awareness on TPACK is crucial. If educators are to integrate technology in their lessons, they should understand the rationale and the underlying principles of using a particular technology. What technological knowledge do they need and to what extent? The training should encourage reflection and action among educators. They should be more open to change. Subsequent advance training should focus more on new skills for using technology for designing and *making* (Hammond and Manfra, 2009) instead of just using it as a *giving* and *prompting* mechanism.

In this study, a case in a video format serves as a tool with the affordances of computer technology and internet capabilities. The design of the tool goes through selection and multimedia design criteria to serve as a module. The module is intended for students to engage in constructive learning process through critical viewing and

sharing of perspectives in the process of problem solving instead of being passive consumers of multimedia. Students watch the video and engage in thinking and problem-solving processes in search of problems and solutions. The video becomes meaningful when students are actively involved in the activation, demonstration, application and integration of knowledge (Merril, 2002); in the process of identifying, analysing, reviewing, deliberating, presenting solutions and reflecting on the whole process (Choi & Lee, 2009; Jonassen, 1997). In this study, students are provided with the online video to watch the case scenario. The concept of *giving* can be reframed in this study since the online case-based problem-solving module serves as a tool for students to engage in active and meaningful problem-solving practices.

Constructivism. Dewey (1939) stressed on the importance of considering meaningful and relevant experience in any learning processes. The objective of school is to prepare youths for future responsibilities and for success in life through selected contents and skills to comprehend the subject matter. Teachers are the agent through which knowledge and skills are communicated and rules of conduct enforced (Dewey, 1938). In his criticism of traditional education in which the teachers impose subject matter knowledge, methods of learning, and standards of behaviour upon the young, he recommends a more progressive approach in the form of cultivating individual experience, acquisition of skills in context not in isolation, relevant goals and making the most of present life, and acquaintance with a changing world. In progressive education, abstract concepts become concrete when they are learnt through application. Concepts and principles should be taught within a framework that provides meaningful learning experience. The attention to the organization of subject matter, and the guidance of educators within the principles of learning that are relevant, meaningful, experiential, and constructive should not be overlooked (Dewey, 1938).

One approach that identifies with the progressive and post-progressive philosophy of constructivism is the case-based learning.

Constructivist learning environment can foster the application of tacit knowledge to real-world problem solving (Jonassen, Davison, Colins, Cambell & Haag, 1995). The constructivist learning approach engages learners in the process of constructing knowledge and making meaning of ideas and concepts through reasoning and reflecting. The underlying principle of constructivism is working with peers, teachers as well as related tools and resources to support the learning process. In the constructivist approach, authentic and collaborative learning will provide a more meaningful learning experience (Jonassen, Peck, & Wilsom, 1999).

Teacher knowledge is context-specific, non-stagnant, and evolving (Clark & Lampert, 1986), thus it should be learned in context rather than in complex abstraction (Ozkan, 2001). One way of learning in-context is through case observations rather than from textbooks. Constructivism supports pre-service teachers' acquisition of teacher knowledge because of its principles of combining theory and praxis (Ozkan, 2001).

Driscoll (2005) prescribed five principles of constructivism. The first is embedding learning in complex, realistic, and relevant environments. Second is providing for social negotiation as an integral part of learning. Third is supporting multiple perspectives and the use of multiple modes of representation. Fourth is encouraging ownership in learning, and fifth is nurturing self-awareness of the knowledge construction process.

Ertmer and Newby (1993) recommends employing the constructivist perspective for learners who have a higher level of prior knowledge and are working on higher level tasks, such as complex problem solving in ill-structured domains. Case-based learning in this research takes on the constructive perspective of learning.

Teachers and learners are collaborators in the learning process (Robinson, Molenda & Rezabek, 2008). Students have to play their part in constructing knowledge with the help of their teacher and peers.

Social Constructivism. Lev Vygotsky conducted many studies on children's thinking in Russia. Vygotsky believed that adults help children's cognitive development through engagement and involvement in various meaningful activities. He also believed that society and culture play an important role in promoting children's thinking processes (Vygotsky, 1978). His theory is also known as the sociocultural perspective.

In Vygotsky's perspective, adults pass to children much information in informal ways through social interaction and conversation in culturally and contextually relevant ways. In school, teachers are the adults who support and encourage students' cognitive growth through formal and systematic way of transmitting knowledge. When in groups, students engage in talks and discussion with their peers. They exchange ideas and perspectives and modify their perspectives accordingly. The more competent students are expected to help the less competent ones interpret facts and ideas in more effective ways. Thinking processes are influenced by the people students come in contact with.

For Vygotsky, language is a cognitive tool for interpreting meaning. It is an important means of shuttling information and knowledge through communication. When we listen to language we use external tools like culture, and symbolization to interpret what we hear. We construct knowledge as we listen and speak. Vygotsky suggested that many of our thinking depend on our communication with others. We mediate and convey meanings to each other through spoken and written forms. Vygotsky described thinking processes as sprouting from social activities (1978). As children develop, they internalize processes they use in social contexts and begin to use them independently. They deal with more challenging tasks and operate in what

Vygotsky called the zone of proximal development. With support, guidance, assistance or scaffold from parents, teachers, peers or knowledgeable others, children can complete challenging tasks in their zone of proximal development (ZPD). Children' ZPD will change over time as they begin to master tasks and continue to process more complex problems cognitively. Scaffolding or support mechanisms can promote better cognitive growth. The social constructivism theory can be applied in case-based learning through the following principles:

- Learning is best achieved with the support of others
- Learning is a reciprocal process between two or more people (supports Socrates dialogic view of learning by asking open-ended questions)
- Instruction should be learner-centered
- Perspectives of others can serve as a mechanism for further clarifying points of view or constructing new ideas
- Learners construct their own meaning while receiving appropriate scaffolding from peers, instructors or even technological tools.

Situated Cognition. Brown, Collins and Duguid (1989) "argue that knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used" (p. 32). The learning (know what) should not be separated from the use (know how). Also called situated learning, the proponents believe that the traditional didactic education is ineffective as it separates the knowing and doing, treating knowledge as an integral, self-sufficient substance, theoretically independent of the situations in which it is learned and used. The role of education seems to have favoured abstract, decontextualized formal concepts without direct link to how it should be applied in actual situations. "Situations might be said

to co-produce knowledge through activity…learning and cognition …are fundamentally situated" (Brown et al, p. 32).

In situated learning, activity, concept and culture are interdependent. Teaching abstracted concepts as fixed, independent entities that can be read in textbook examples and exercises will not help retain knowledge for use in situations outside of school. Teaching should be embedded in the culture and authentic activities of members of that culture to provide important insights that learners need.

Situated learning supports online case-based learning because it gives pre-service teachers the opportunity to observe a practitioner engage in the relevant domain culture of teaching in a classroom. They observe an authentic practice to expose them to the use of a domain's activity, concept, culture and tools to help them wrestle with problems of their future world. This engagement in problem solving activity of an authentic situation can be deeply informative and meaningful in a way that textbook examples and declarative explanations are not. Learning is situated in realistic problems, providing a platform for students to experience the same professional dilemmas facing teachers in actual classroom instruction.

Anchored Instruction. Anchored instruction is a constructivist theory by John Bransford and The Cognitive and Technology Group at Vanderbilt (CTGV, 1990). A group of cognitive scientists, educational researchers and teacher educators working in Vanderbilt University in Nashville, Tennessee teamed up with design researchers, practitioners and graduate students to form the Cognition and Technology Group at Vanderbilt (CTGV). They were concerned with a major problem in education, that students are often unable to solve real world problems as opposed to the ones found in their textbooks (McKenney & Reeves, 2012). The phenomenon of inert knowledge is apparent in that students can often show that they possess certain

kinds of knowledge when they are given tests shortly after a unit of instruction or even asked to apply it to situations identical or very similar to the contexts in which it was taught, but these same students cannot recall or use the knowledge to solve never-seen-before problems that are somewhat removed from the original context even though the knowledge is directly relevant to the new problems (McKenney & Reeves, 2012, p. 51). There is a major difference in the way experts and novices apply usable knowledge, the former have usable knowledge that they can readily access to solve novel problems, whereas the latter possess poorly organized inert knowledge that they usually fail to apply when needed (Bransford, Brown, & Cocking, 2000).

The CTGV conducted educational design research to help students develop problem-solving capabilities and to reduce the problem of inert knowledge. Two major products of this large scale design research projects were a teaching model called anchored instruction and the Jasper video (McKenney & Reeves, 2012). The video acts as an "anchor" based on a contextualized problem situation or case study that learners can actively explore for higher order learning outcomes such as problem-solving (McKenney & Reeves, 2012).

Anchored instruction is a technology supported learning approach which values complex problem-solving around an anchor which can be a story or real situations that relates to the students' learning domain. The goal of anchored instruction is to create interesting, realistic contexts that encourage active construction of knowledge by learners. Anchors were stories in the form of interactive videodisc instead of lectures to be used by teachers and students to pose and solve complex, realistic problems (CTGV, 1990). It is a form of situated learning using authentic data as an anchor to expose students to realistic situations for a more meaningful learning.

An ‘anchor’ can be in the form of audio visual aids or media technology, for example, a video, to create a shared experience to be explored and discussed among learners to enforce learning. The use of online case-based video as an anchor in this study can create a shared experience among learners in the process of problem solving. The video can be watched repeatedly to help with students’ understanding as they engage in reasoning and analytical as well as critical negotiations.

Theoretical Framework of The Study

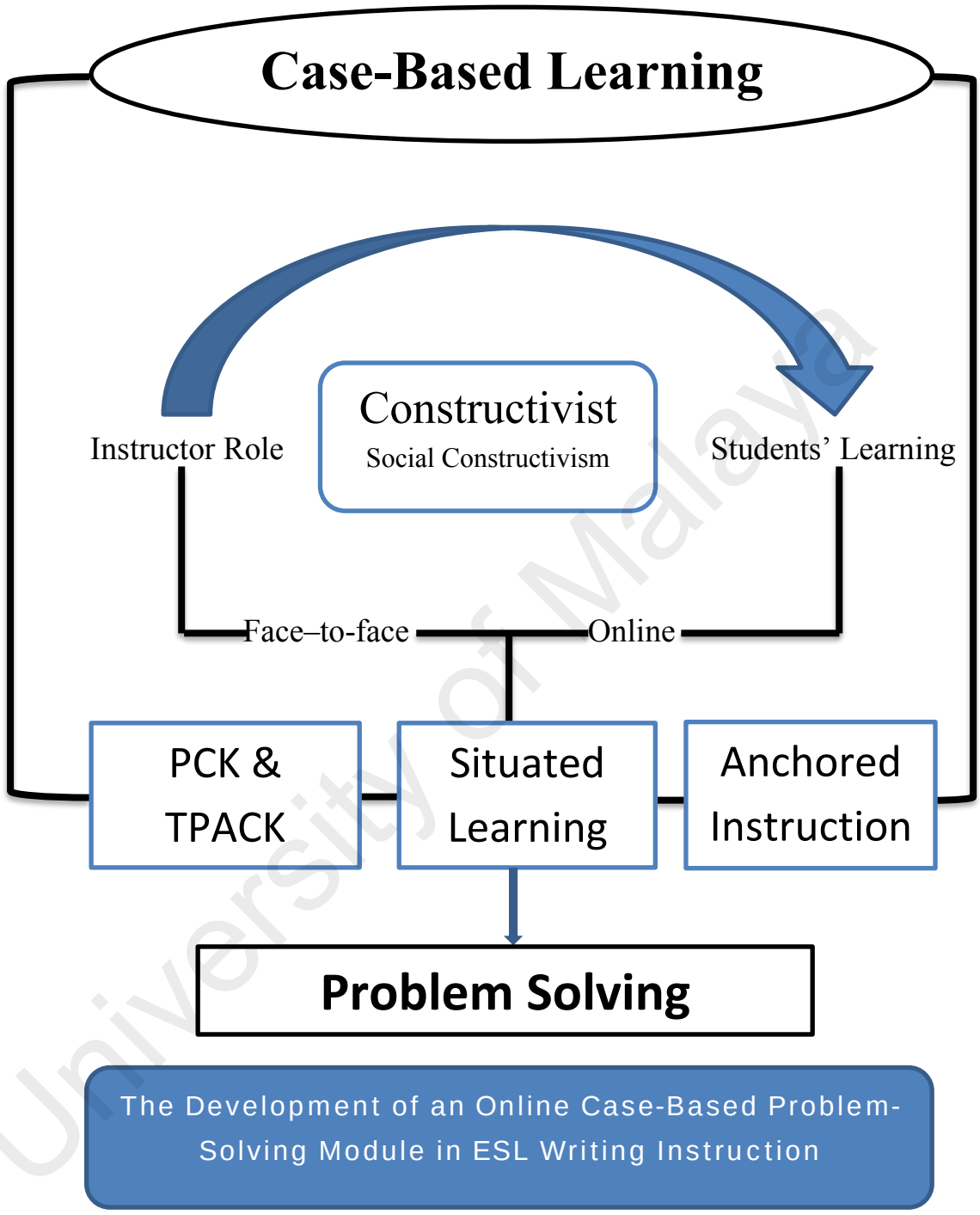


Figure 1.1. Theoretical Framework

Case-based learning is framed by several theories that share similar philosophical principles. Teacher education has to prepare pre-service teachers who can attend to students learning problems through application of content and

pedagogical knowledge (PCK) (Shulman, 1987). Another important dimension to teacher knowledge is knowledge of technology proposed by Koehler and Mishra (2009). The amalgamation of technological pedagogical content knowledge (TPACK) is important for teachers to provide effective instruction using technology. The module is developed to promote the application of TPACK. The application of TPACK cannot be ignored in the training of pre-service teachers. New trends are developing, new ways of instruction emerge, changes are inevitable, hence educators have to keep up with the change and be creative and innovative to face the challenges in their profession. Instruction should include activities that prepare students best for their profession (Glasgow, 1997).

TPACK is important for effective delivery of lessons using technology. The development of an online case-based module in this study is intended for pre-service teachers to be trained to attend to problems providing justification through synthesizing content and pedagogical resources related to ESL writing instruction. Video and online technology is important in the development of the module. It provides pre-service teachers a platform to view an authentic scenario through technological means. It gives them the opportunity to use technology actively and critically as they engage in the viewing of the case-based video. In the learning process, the participants are expected to look for information and synthesize various literatures related to the problems they are attempting to solve. Instead of being passive consumers of technology, they are actively immersed in a virtual space in the process of completing tasks. The online case-based module provides training for the pre-service teachers to develop technological pedagogical content knowledge (TPACK).

The progressive and post-progressive views of learning are for instructional experience to be constructive. Constructivism is a theory adopted in this study for its

philosophical principles that learning should be relevant and meaningful because students construct their own meaning through student-centred activities. In the constructivist approach, instruction moves away from the didactic traditional approach to active student involvement with facilitation by the teacher. The role of teacher shifts from that of a sole transmitter of knowledge to one who co-constructs knowledge with students. Constructivism is adopted in the development of the case-based problem-solving module because it fosters the application of tacit knowledge to real-world problem-solving (Jonassen, Davison, Collins, Camblell & Haag, 1995). The module provides meaningful, relevant and authentic learning experience for students' active learning and co-construction of knowledge.

Thinking processes sprouts from social activities (Vygotsky, 1978). In social constructivist theory, when students collaborate and co-construct knowledge, they receive scaffolding from their friends and teacher. Scaffolding or support mechanisms can promote better cognitive growth (Vygotsky, 1978). Social constructivism derives from constructivist principles. In social constructivism, students engage in learning activities in groups working on authentically based inquiries. Collaboration helps to improve communication skills, problem solving and creative thinking skills, as well as cooperation in students (Robinson, Molenda & Rezabek, 2008).

Case based learning supports the five principles of constructivism suggested by Driscoll (2005). The five principles are (1) embedding learning in complex, realistic, and relevant environments, (2) providing for social negotiation as an integral part of learning, (3) supporting multiple perspectives and the use of multiple modes of representation, (4) encouraging ownership in learning, and (5) nurturing self-awareness of the knowledge construction process. Other instructional strategies

derived from Driscoll's principles that support case-based learning are situated cognition, and anchored instruction (Robinson, Molenda & Rezabek, 2008).

Situated cognition or learning can provide a frame of reference to the development of the module in this study. The online case-based module gives pre-service teachers an opportunity to observe a practitioner teaching in a real classroom. This is to expose them to the use of a domain's activity, concept, culture and tools to help them wrestle with problems of their future world. The participants view a video depicting an authentic case. The problem-solving activity is embedded in an authentic situation. Hence, learning is situated in realistic problems, providing a platform for students to experience the same professional dilemmas facing teachers in actual classroom instruction.

Anchored instruction is another theoretical framework for this study. The development of the online case-based module in a video format serves as an anchor to the problem-solving process. Anchors can be stories in the form of interactive videodisc instead of lectures to be used by teachers and students to pose and solve complex, realistic problems (CTGV, 1990). Anchored instruction creates interesting, realistic contexts that encourage active construction of knowledge by learners. It is a form of situated learning using authentic data as an anchor to expose students to realistic situations for a more constructive learning.

In this study, constructivism serves as the main theory with its principles influencing other theories like social constructivism, situated learning and anchored instruction. These theories provide a framework for the development of an online case-based problem solving module for pre-service teachers' preparation for their profession. Pre-service teachers will face problems that need to be attended to and exposing them to problem-solving practices will give them the skills and experience

to apply strategies for solving real classroom problems. Case-based learning provides opportunity for thinking strategically and critically about ways to solve ill-structured problems applying tacit knowledge of theories and approaches learnt.

Education and Instructional Technology in Case-based Learning

Conception of education technology is evolving and continues to evolve. Current research trends in educational technology are the use of authentic environments and the voices of practitioners, users and researchers (Januszewski & Molenda, 2008). More recent studies have seen a growth and change in major theoretical positions exploring cognitive and constructivist learning theories emphasizing on learning than teaching. More attention is given to learners' perspectives, preferences and ownership of the learning process (Januszewski & Molenda, 2008). Case-based learning is in line with the current trends in research seeking to explore students' active participation and construction of their own meaning in the learning process using technology as a support mechanism in support of constructive and cognitive theoretical orientations.

In the constructivist learning approach success in instruction using technology is measured in terms of "knowledge that is deeply understood, experienced, and able to be applied to real world problems as opposed to less authentic or embedded measures of learning, such as objective tests" (Januszewski & Molenda, 2008, p. 6). Robinson, Molenda & Rezabek (2008) contend that educational technology through various formats can facilitate learning within the concept that emphasizes the understanding that learners control and own learning. With this rationale, case-based learning is important in the current research using instructional technology in teacher education.

In this study, a case in a video format serves as a tool with the affordances of computer technology and internet capabilities. The design of the tool goes through selection and multimedia design criteria to serve as a module. The module is intended for students to engage in constructive learning process through critical viewing and sharing of perspectives in the process of problem solving instead of being passive consumers of multimedia. Students watch the video and engage in thinking and problem-solving processes in search of problems and solutions. The video becomes meaningful when students are actively involved in the activation, demonstration, application and integration of knowledge (Merril, 2002); in the process of identifying, analysing, reviewing, deliberating, presenting solutions and reflecting on the whole process (Choi & Lee, 2009; Jonassen, 1997). In this study, students are provided with the online video to watch the case scenario.

Technology and the Online Case-Based Problem-Solving

Technology has revolutionized the way people learn. Teachers and students use mobile devices and computers for many purposes, most common ones being to access vast stores of information available on the internet, to communicate, and to generate creative solutions to complex problems (Parkay, Hass & Anctill, 2010). Through the affordances of mobile devices, computer and internet technology, learning, communication, and exchanges of information can be done virtually. These affordances can provide platforms for the restructuring of traditional pedagogical approaches to innovative and creative curriculum and instructional reforms.

The rapid advancement of technology implicates today's curriculum development. A critical form of literacy emerges and should be integrated in the

curriculum, that is, the ability to use computers for learning and solving problems. The curriculum should prepare children, youth and adults for the present and the future.

An important criterion for curriculum planning that illustrates the influence of social forces on curriculum is the development of problem-solving skills (Parkay, Hass & Anctill, 2010). An integral question is whether the curriculum and the teaching of that curriculum help learners identify and clarify problems and develop appropriate problem-solving strategies. This includes learning goals that help learners acquire problem-solving skills they will need now and in the future (Parkay, Hass & Anctill, 2010). "The curriculum should help learners participate in the development of the future through their involvement in meaningful, authentic learning experiences in the present (Parkay, et al, 2010, p. 61).

Authentic learning experiences lead to higher order thinking, depth of knowledge and understanding, and connectedness to the real world (Anctill, 2010). Instruction should move beyond rote memorization to transfer of knowledge, and producing new knowledge by discovering relationships, solving problems, constructing explanations, and drawing conclusions. Authentic tasks can be designed through the use of media and technology, for example using authentic videos to present real scenarios for case-based instruction.

In teacher education, video cases can be used to develop problem-solving skills (Kale & Whitehouse, 2012). In order to be more prepared for the teaching profession, pre-service teachers need to reflect on other teachers' experiences before they experience teaching themselves. Video cases can supplement field experiences through observation, analysis, and reflection of actual teaching situations (Kale & Whitehouse, 2012).

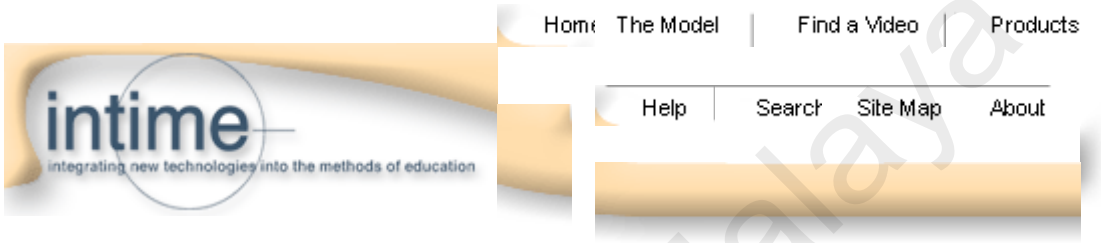
There are a few commercial video cases developed by teacher education schools available online. The one developed by the Curry School of Education in The University of Virginia was initially called the CaseNET, which contains multimedia online cases for teacher education students and educators. CaseNET has since been called CaseNex, a commercial education company that emerged in 2000 (Ozkan, 2001). The products consist of case studies of problems in K-12 schools developed by experienced team to provide best examples (Ozkan, 2001). CaseNEX supports the case-based approach through online mechanism by providing multimedia cases that connect professional learning and the complex school environment. The problem-solving model proposed in this website is engaging, collaborative, and effective (CaseNEX, 2014). Library of case studies are provided with a fee.

Figure 2.2. CaseNex (http://www.casenex.com/casenet/index.html)

IN TIME is another website that offers online video cases. The University of Iowa developed IN TIME as its initiative to support technology use and integration in teacher education programs through Preparing Tomorrow's Teachers to Use Technology (PT3) funded by the American Federal Government grant (Ozkan, 2001). IN TIME has video cases for K-12 teachers and is one of the largest and most sophisticated online resources for video cases (Ozkan, 2001).

According to the website, IN TIME resources are useful for teacher educators creating case studies, pre-service teachers learning about effective pedagogical techniques, in-service teachers searching for ideas and independent

professional development, professional developers seeking resources to demonstrate good teaching and technology integration, and administrators developing teacher quality initiatives and mentoring programs (IN TIME, 2014). This website was developed in 1999 till 2002. The videos can be accessed for free online according to grade level, content area, learning element, along with several other dimensions (IN TIME, 2014).



Find a Video from INTIME Website

Figure 2.3. IN TIME (**http://www.intime.uni.edu/video.html**)

Video technologies provide descriptive visuals of teaching situations that can be repeatedly examined in the process of identifying problems and generating appropriate solutions (Wang & Hartley, 2003). This is helpful in preparing pre-service teachers for the ill-structured problems of their profession (Jonassen, 1997). Hence, a review of the well-entrenched case-method is required, and whether technology, namely online case-based videos, is able to reinvent this method for the acquisition of 21st century knowledge and skills.

The Case Method

The case method has been considered the best teaching method in a number of professional schools, including Harvard's law, business and medical schools for its effectiveness in preparing students for the world of practice (Garvin, 2003). This method began in the Harvard's law school in 1870, when the then newly appointed dean, Christopher Columbus Langdell, the pioneer of the case method used it to break the norm from the traditional lecture, reading cases, and drill method (Garvin 2003). He came up with a collection of cases based on real legal documents and court decisions, as teaching materials to educate law students on the principles and concepts of law at they are applied in the legal profession. He used the Socratic method of question and answer format in lessons (Garvin 2003).

The Harvard Business School (HBS) followed suit in 1908 when Edwin Gay, the first Dean of the school, who referred to the case method as the "problem method" and recognized it as valuable in producing leaders who are able to adjust to the volatile business climates (Harvard Business School, 2014). The second Dean of HBS, Wallace P. Donham, also supported the use of the case method (Garvin, 2003). He was a graduate of Harvard Law School who later practiced law and had taught corporate finance at the business school. He said that business cases should describe real problems and students should be able to size-up situations and decide on proper actions (Garvin, 2003). In 1920 with the support of other faculty members, HBS adopted the term case method to replace the "problem method" used earlier. He initiated the help of Melvin Copeland, a noted marketing professor, to compile a collection of business problems which in 1920 was published as the first business casebook. The 1920s saw HBS using the case method as its core teaching approach (Garvin, 2003).

The Harvard Medical School saw the value in using cases in cementing students' understanding of science by linking it to practical problems through case histories of patients. It was used in the 1980s as the foundation of the school's "New Pathway" curriculum which adopted active learning strategies instead of merely lectures (Garvin, 2003). The process is similar to "problem-based learning" which was first developed in McMaster Medical School, University in Canada, in the 1960s and 1970s (Garvin, 2003).

The pedagogical principles behind case method is that, first, cases are the main vehicles for teaching without over-reliant on lectures; second, students engage in the learning process by teaching themselves and each other (HBS, 2014). The Harvard Business School's Christensen Center for Teaching and Learning website explains the core principles of the case method:

> *"It is a form of instruction guided by discussion based learning. It introduces complex and often ambiguous real-world scenarios into the classroom, typically through a case study with a protagonist facing an important decision."*
>
> (Harvard Business School, 2014)

In case methods, the experiences in the field serve as knowledge towards professional practice. Through cases, we view the problems we are likely to face through the lenses of experienced professionals who have developed "knowledge of the kinds of problems they are likely to encounter, what these problems actually look like, what usually causes them, and which approaches are likely to be productive in solving the problems" (Kleinfield, 1990, p. 1). They are encouraged to use theoretical concepts to clarify practical problems. This method expands students understanding of the profession through the experiences of professionals (Kleinfield, 1990).

The Harvard schools were the catalyst of the case method, widening the use of this educational innovation to other domains. It is still evolving and being modified to

cater to the needs of the 21st century learners and educators. In teacher education, the case method serves as a valuable option to prepare future educators for the multi-faceted issues in their profession (Shulman, 1987). At work, problems should be dealt with professionally. This is what teacher educators should impart to prospective teachers in dealing with problems in teaching and learning.

Through the case method, students are given models of how to think about problems professionally (Kleinfield, 1990). Novice teachers often face problems teaching in rural schools. For example, Kleinfield's (1990) review found that those teaching in remote Alaskan villages with Yupik and Athabascan Indian populations have encountered problems that are unique and no curriculum materials were previously available to guide instruction. Cases were developed by local teachers, faculty and graduate students to provide the actual scenarios in such situations for analysis and learning purposes (Kleinfield, 1990). The cases developed in Alaska would be able to provide rich descriptions of the kind of problems prospective teachers might encounter in rural teaching or in small schools with ethnic minorities (Kleinfield, 1990). Often, such schools are inaccessible for practical teaching due to distance from universities. Case methods are especially valuable in rural education and can serve as models to examine situations from multiple perspectives, evaluate actions and reflect from other teachers' experiences (Kleinfield, 1990).

Case-based Pedagogy in Teacher Education for Problem-Solving

Teachers are faced with ill-structured problems in their job and they need to know what to do to resolve conflicts (Jonassen, 1997, 2000; Choi & Lee, 2009; Koc, 2012). Teachers must have the capability to resolve ill-structured problems and dilemmas they are faced with (Jonassen, 1997). Teacher education programs need to

appropriately train and prepare future teachers to resolve problems that they are bound to face in their future professional practice (Koc, 2012). Case-based pedagogy has been suggested for pre-service teachers' training for solving ill-structured real world problems (Lundeberg, 1999; Choi & Lee, 2012). Research has shown that case-based learning develops higher order thinking processes and effective learning practices such as:

1. engagement in multiple analysis of problems and justification of solutions (Choi & Lee, 2013; Pierce, 2002; Merseth, 1999; Harrington, 1995)
2. enhancement of critical thinking (Choi & Lee, 2013; Merseth, 1999)
3. application of theories to the learning process (Choi & Lee, 2013; Koc, 2012; Henson, Kennett & Kennedy, 2003; Merseth, 1999)
4. active involvement in the learning process (Merseth, 1999; Pierce, 2002)
5. analytical problem solving and decision making (Henson, et al, 2003; Pierce, 2002)
6. reasoning clearly and logically (Pierce, 2002)
7. development of collaborative and communication skills (Henson et al, 2003; Pierce, 2002)

Choi and Lee (2012) have been advocating the use of case-based learning to train pre-service teachers develop the abilities for solving ill-structured problems. Their research on online case-based learning in teacher education classroom management courses have helped pre-service teachers develop skills in using multiple analysis of problems and solutions, justification, critical thinking, application of theories and resources in the process of finding solutions to ill-structured problems in classroom management.

Pre-service teachers need to build their knowledge and experiences from authentic sources so that they can solve real-life problems, and be better prepared to guide their future students (Kocyigit & Zembat, 2013). Harrington (1995) found that using dilemma-based cases in teacher education programs help pre-service teachers deliberate on tentative solutions and actions, whilst providing training on how to analyse evidence-based resources in seeking solutions.

Cases as defined by Koc (2012) are "teaching tools to help practicing and pre-service teachers study the realistic classroom environments, so they provide concrete classroom situations, rather than imaginative cases" (p. 3155). Koc's study promoted the use of written cases to enable pre-service teachers in an early childhood education course to work individually and think deeply while reflecting on the written case. The main aim of Koc's (2012) study is to investigate the effect of using case analyses on pre-service teachers' skills on connecting theory and practice, and to find out their abilities in solving ill-defined problems in teaching young children. The qualitative study on 46 early childhood education pre-service teachers required them to analyse a case of teacher who is having a dilemma with a 4 year old student who seems to need special education. They need to find the best solution for this case using theories to support their solution. The finding showed that the use of written case was effective in promoting theory-practice connections. The data from written reflections identified a variety of effective problem-solving strategies and solutions supported by theories and principles the subjects have acquired in the early childhood courses. Using a "real dilemma case allowed the pre-service teachers to develop ideas that were original, sensitive and contain traces of their background knowledge" (Koc, 2012, p. 3161)

Strengths of the Case-Based Pedagogy

Case-based pedagogy has been considered an effective educational vehicle for dealing with some of the basic educational challenges (Shulman, 1996). Case pedagogy provides students with the opportunity to enhance their judgement and critical thinking skills by participating in the analysis of problems and solution-seeking processes, applying theory into relevant practical situations, and being active in the learning process (Merseth, 1999).

According to Pierce (2002), undergraduate students can acquire several important skills with multiple exposures to case-based structured conflict environment such as analytical, problem solving and decision making skills. "Students' analytical skills are enhanced through reasoning clearly and logically and then presenting and defending those perspectives to their peers" (p. 739). Students feel motivated by a supportive environment and their self- confidence is enhanced by the repetitive opportunities to identify, analyse, and debate critical issues (Pierce, 2002). The learning experience becomes a personal asset because the undergraduate students have acquired the ability to take on future tasks and the ability to effectively tackle complex problems and make decisions (Pierce, 2002). "Students are able to manage time, think independently, work cooperatively, make oral presentations, effectively advocate their personal views, see all sides of important issues, and appreciate the value of alternative perspectives" (Pierce, 2002, p. 740).

Henson et al (2003) found case studies to be effective in marketing programs. Case-based learning has helped students become more capable at problem solving, applying theories to problem-solving, develop communication and interpersonal skills.

According to Merseth (1996), using cases in teacher education is beneficial because of first, "the ability of cases to help develop problem solving and decision-

making skills"; second, "the ability of cases to increase awareness of multiple perspectives and other educational settings"; third, "the ability of cases to enhance beliefs about personal authority and efficacy"; and fourth, "the ability of cases to form habits of reflection" (p. 731).

Quek and Wang (2010) explained that case-based learning has been found to help beginning teachers develop expertise and professionalism that experts usually gain through the accumulation of experiences. The situated learning experience and inquiry gained through case discussion have potentially contributed towards building the personal knowledge of novice teachers (Quek & Wang, 2010). Pedagogical design of the environment allows for active learning and co-construction of knowledge among learners (Quek & Wang, 2010).

Challenges in using Case-Based Pedagogy

Despite case-based pedagogy being a proven pedagogical approach, it offers challenges to the instructor. Case-based pedagogy challenges the traditional approach to learning when the instructor becomes a facilitator rather than the sole transmitter of knowledge (Barnes, Christensen & Hansen, 1994). Other challenges are managing classroom activities, and providing cases that address current issues in a specific professional field. In addition, "identifying suitable cases to meet the needs of the students across the wide variety of industries increases the difficulties in using case studies effectively" (Henson, Kennet, & Kennedy, 2003, p. 250).

Kleinfield (1990) sees case-based pedagogy or case method teaching as she calls it as "not a systematic means of transmitting facts, organizing knowledge, teaching concepts and pedagogical methods" (p. 2). Another problem stems from the fact that a good case material is sometimes difficult to find. Teaching a case can pose

a problem when instructors are not sure how to go about teaching a case with fear that discussion will turn to superficial exchange of personal opinions (Kleinfield, 1990). To prevent this, Kleinfield (1990) suggested that "faculty must think through what they are trying to accomplish, what issues the case illuminates, what theoretical concepts it illustrates, and what understanding the case can develop" (p.3).

Using Online Video Cases for Problem Solving in Teacher Education

Teacher education is adopting the use of video cases as an approach to develop pedagogical problem solving skills in pre-service teachers (Kale & Whitehouse, 2012). It is difficult to place each one of them in an exemplary classroom for this purpose hence using videos to show cases from real world scenario may provide an alternative measure for training in problem solving skills. According to Kale and Whitehouse (2012), careful scaffolding is needed to foster cognition and metacognition in the pre-service teachers' development of instructional strategies for ill-structured problem solving. Their literature review found that in using video cases effectively in achieving higher order thinking and pedagogical problem-solving is through the use of question prompts in video analyses, multiple perspectives in the problem solving process, focus on grade-level, and structure the video based on multimedia and cognitive learning to help them process the content (Kale & Whitehouse, 2012).

Kale and Whitehouse (2012) investigates how structuring video cases with question prompts and expert teachers' perspectives helped fourth-year elementary education pre-service teachers' and secondary education pre-service teachers' in problem solving abilities processes as measured by their teaching knowledge components and teaching knowledge levels. Teaching knowledge components are students, the environment, teacher and content. The teaching knowledge levels are

surface, isolated, integrated and transformed. The video case was taken from PIHnet a website of case library for problem-based learning. The ways the video case was presented was, first, watching the entire video, second, watching it in three segments, and third, watching it in four sequences. Each segment and sequence is followed by question prompts. Their answers are analysed to determine their teaching knowledge components and teaching knowledge levels.

The finding shows that there are no significant difference between the entire presentation and the segmented one. Seeing the problem and the case teachers' solution continuously may be more beneficial than segmenting the problem first then the solution later. Being exposed to the teacher solution immediately after the problem provides a more timely layered resource. This helps participants to relate problem and solutions in one viewing.

The sequenced presentation was more effective than the entire presentation. The pre-service teachers were able to apply contextual factors when considering instructional solutions. They were able to apply higher amount of knowledge components and higher knowledge level in the case presentations where teacher perspective is presented sequentially with the classroom videos. Watching the sequenced presentation of expert teachers' reflection helped the pre-service teachers to think about the students' learning problems differently and led them to consider alternative solutions drawing from more knowledge components increasing teaching knowledge levels at the reflection stage.

The elementary education majors were able to achieve a significantly higher level of teaching knowledge than the secondary education majors at the generating solutions stage in terms of drawing from various knowledge components (student, environment, teacher, content) when they generated solutions. The elementary major

in the context of this study may be more knowledgeable about diverse instructional techniques whereas the secondary education majors may be conditioned to employ whole-classroom instruction in teaching content-areas (Kale & Whitehouse, 2012).

The criticism of this study is that the video case is not recorded in an authentic classroom setting that is more localized to the participants' context of professional practice, but taken from a video case library on a problem-based learning website. The subject matter is Social Studies, more suitable for history domain. The participants of Kale and Whitehouse's (2012) study are from various specializations like English, World languages, Mathematics, General Science, Social studies, Special Education and Early Childhood. The video cases shown should directly be related to the participants' area of specialization. For example, Math majors need to analyse problems in a Mathematics class. Then, there will be direct links between theory and practice relating to curricular-specific subject-matter to the participants' major. Interestingly, this study is able to show the different ways of presenting the video case and to what effect. It certainly provides implications in providing options as to the ways video cases can be presented online.

Research has shown that online video cases can support problem solving skills (Choi, 2007; Choi & Johnson, 2007). A study by Choi (2007) found that problem-based video instruction was preferred by students because it made learning more interesting and enjoyable.

Problem- based video instruction has been found to be more effective than problem-based text instruction for better comprehension and learner satisfaction (Choi & Johnson, 2007). Pre-service teachers' perception towards problem-based video instruction has been found to be positive in that learning becomes enjoyable and students are motivated (Choi, 2007). Presenting authentic situations through video has

been found to be more effective than presenting it through text with Special Education students in that the former promotes more significant learning outcomes, higher comprehension scores, and was able to enhance learners' satisfaction and empathy (Choi & Yang, 2011).

Choi and Yang (2011) raised an interesting point in their study on problem-based video instruction with Korean pre-service teachers. They believe that the eastern and the western classroom culture and communication styles are not identical. As such, research on the use of problem-based video instruction in the Korean setting is very much needed. Similar to their rationale, this research is conducted in the Malaysian teacher education context with its classroom culture and other factors different from the western context, with the aim of exploring if case-based video instruction is effective in enhancing problem solving skills in pre-service teachers in Malaysia. Using online video to present teaching scenarios is a kind of media literacy that promotes critical and analytical viewing, instead of students being passive audiences.

Online Video Case-Based Problem-Solving Module

In this study, case-based learning is a method through which an online video depicting a case presents authentic problems to be viewed by pre-service teachers. Authentic tasks allow students to work on real-life problems and encourage them to think critically to find solutions, collaborate with peers, revisit their ideas, and find the best solutions (Kocyigit & Zembat, 2013).

In Kocygit and Zembat's (2013) study, the participants are third-year pre-service teachers of Pre-school Education taking a course called Special Education Methods I. The design used is an experimental design of two control groups and one experimental group. It is to investigate the effects of using video recorded real teaching

scenario (authentic tasks) on pre-service teachers' attitudes towards the course and problem solving skills.

In their study, teachings of the pre-service teachers were recorded and later brought into class to be viewed by the experimental group (Kocygit & Zembat, 2013). The video were teachings in a genuine setting in the course revealing the problems and shortcomings that were unknown or had not been anticipated. The video presentations were viewed and problems emerged were discussed. The pre-service teachers engaged in proposing solutions, alternatives and interpretations. The control group received traditional topic-centred, teacher frontal lessons. The study was carried out over fourteen weeks with pre-test given in week 1 and post-test on week 14 (Kocygit & Zembat, 2013).

The findings revealed by the experimental group of 35 pre-service teachers who viewed video presentations of their practicum teaching in public schools and taking part in the process of analysing and discussing arising issues and problems and collaboratively proposing solutions to be positive (Kocygit & Zembat, 2013). The pre-service teachers had positive attitudes towards the course. They developed problem-solving skills, participated actively, were careful and showed interest in the course as they evaluated themselves and their peers. They felt challenged and motivated because the tasks were authentic, and gained permanent knowledge while having fun (Kocygit & Zembat, 2013).

This study revealed that using authentic tasks in the form of technology supported presentations of real teaching scenarios is more effective in developing problem solving skills than topic-based pedagogy (Kocyigit & Zembat, 2013). Presenting situations in the form of technology supported online video case-based pedagogical module provides authentic learning opportunities for pre-service teachers

to observe and analyse possible future problems common in the context of their professional practice, and to create various new solutions to real problems.

Instructional Methods in Online Case Based Learning: Principles and Models for Solving Ill-Structured Problems

There are several principles and models for solving ill-structured problems:

Problem-Solving through Case-Based Learning and Problem-based Learning (PBL). Glasgow (1997, p. xvii) suggest that looking at the real world for guidance and inspiration can create more relevant educational environments and this should be considered when reforming, restructuring and fine-tuning education. Problem-solving are the requirements of life, hence classroom activities should reflect a greater connection to the conditions found in students' outside experience (Glasgow, 1997, p. xxi). Wee (2004) asserts that PBL is not about rote learning but applying knowledge to accomplish a problem-solving goal. According to Glasgow (1997) the problems must come from the industry and the types of problems "must be a reflection of contemporary situation or a creative juxtaposition of contemporary understanding and past understanding" (p. 58).

Case-based learning (CBL) shares the same epistemological principles as Problem- Based Learning (PBL) in that learning should enhance problem-solving skills. Both approaches move away from traditional instruction of teacher-centred learning. For example, PBL encourages students to work through authentic problems collaboratively and apply higher cognitive skills, and application of theories and principles in the problem solving process (Barrow, 1999; Hmelo, 1998). In CBL, students identify and analyse authentic, ill-structured problems in cases and engage in problem solving processes (Choi & Lee, 2009). Both approaches adopt the

constructivist theory (Savery & Duffy, 1995; Chen, Shang & Harris, 2006). Both approaches have the same foundation and goal of enhancing problem-solving skills.

In the case-based problem-solving module, a case scenario will be the main content from which the problem-solving processes will focus on. Ill-structured problems identified in the case will be analysed in the process of seeking solutions. Solutions presented will be supported by theories and principles of the subject-matter in which the module is prepared for. In this study, the second language writing instructional theories and principles will serve as support for the solutions presented. Other learning and cognitive theories that can provide significant support are considered. Students will have to synthesize relevant literature in the process of providing solutions with strong epistemological substances.

Merill's First Principles of Instruction. A model that is relevant to problem-solving instruction is Merill's First Principles of Instruction (Merill, 2002). M.D Merill (2002) reviewed various instructional design theories to identify prescriptive principles that are common in those theories. He developed the "First Principles of Instruction" in 2002 and compared the principles with the principles of other instructional design theories which are (1) Star Legacy by the Vanderbilt Learning Technology Center, (2) 4-Mat by McCarthy, (3) instructional episodes by Andre, (4) multiple approaches to understanding by Gardner, (5) collaborative problem solving by Nelson, (6) constructivist learning environments by Jonassen, and (7) learning by doing by Schank. He concluded that his principles is common and overlaps with the principles of other instructional design theories albeit the eclectic terminologies used. Merill's (2002) five first principles are:

1. Learning is promoted when learners are engaged in solving real-world problems.
2. Learning is promoted when existing knowledge is activated as a foundation for new

knowledge.

3. Learning is promoted when new knowledge is demonstrated to the learner.

4. Learning is promoted when new knowledge is applied by the learner.

5. Learning is promoted when new knowledge is integrated into the learner's world.

(p. 43)

These principles are problem-centered and stress on the importance of knowledge construction by the learner (Molenda & Boling, 2008). Advocating the constructivist perspective, Merill's (2002) theory involves the student in four distinct phases of learning: (a) activation of prior experience, (b) demonstration of skills, (c) application of skills, and (d) integration of these skills into real-world activities. His review found that most of the theories reviewed in his paper stress problem-centered instruction and include some (if not all) of these four phases of effective instruction. The figure below provides a conceptual framework for stating and relating the first principles of instruction.

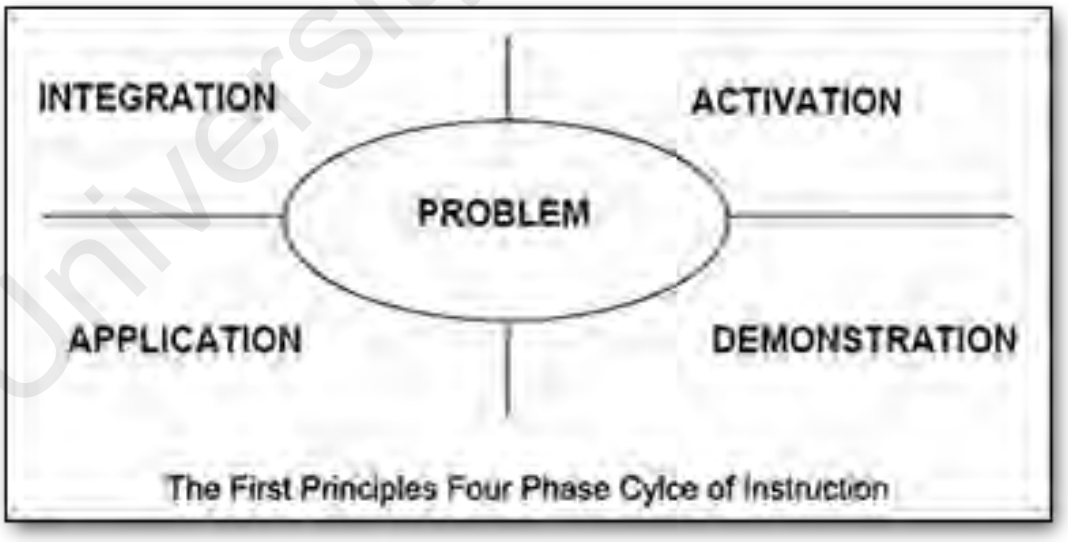


Figure 2.4. The First Principles Four Phases of Instruction (adapted from Merill, 2002)

Merill's First Principles of Instruction is developed with the notion that students learn more effectively when engaged in problem solving tasks. This is supported by a number of recent instructional models (Merill, 2002). Problem-solving through online case-based learning can adopt Merill's first principles because the main aim of the instruction is to engage learners in solving real-world problems. In doing so, mental activation of existing knowledge becomes the springboard for the construction of new knowledge, the constructivist approach to learning which promotes, student-centered, active, deep and collaborative learning strategies. Learners demonstrate new knowledge when they present their discovery of knowledge derived in their task of seeking solutions to the problems that exist. This new knowledge is applied by the learner in sharing and deliberating on the multiple perspectives shared and analysed. The new knowledge gained is integrated into the learner's world.

Models for Solving Ill-Structured Problems. There are several models that demonstrate the general processes and activities for solving ill-structured problems. Choi and Lee's (2009) model has five steps:

Table 2.1

Model for Solving Ill Structured Problems (adapted from Choi & Lee, 2009)

Steps	**Processes**
Step 1	Understanding situations and contexts where multiple problems may exist
Step 2	Identifying problems by considering the multiple perspectives held by different stakeholders
Step 3	Generating possible solutions

Step 4	Choosing appropriate solutions along with a rationale
Step 5	Implementing and evaluating the solutions

Jonassen's (1997) model presented seven stages in the process of solving ill-structured problems which are:

Table 2.2

Model for Solving Ill Structured Problems (adapted from Jonassen, 1997)

Stages	**Processes**
Stage 1	Articulate problem space and contextual constraints
Stage 2	Identify and clarify alternative opinions, positions, and perspectives of stakeholders
Stage 3	Generate possible problem solutions
Stage 4	Assess the viability of alternative solutions by constructing arguments and articulating personal beliefs
Stage 5	Monitor the problem space and solution options
Stage 6	Implement and monitor the solution
Stage 7	Adapt the solution

The problem-solving model in the Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction in this study covers seven stages which are as follows:

Table 2.3

Online Case-Based Problem-Solving (OCBPS) Model in this Study

Stages	Processes	Procedures	Context
1	Identification of problems	Viewing and understanding the case scenario and identifying problems	In and out of class
2	Analysis and brainstorming ideas for possible solutions	Interpreting and clarifying the problems by looking at possible causes and proposing solutions	In and out of class Self-directed or collaborative
3	Reviewing the literature for evidence-based support	Application of theories and approaches to support solutions generated	Out of class Self-directed or peer-collaboration
4	Deliberating on solution proposed and providing justification	Deliberating on possible solutions in groups	In class Peer collaboration
5	Presenting solutions	Presentation of solution	In class Peer collaboration
6	Feedback on solutions	Lecturer and students provide feedback	Whole class
7	Reflecting on solutions	Students write a reflection	In or out of class Individual reflection

The rationale for each step can be supported by Merill's first principles and four phases of instruction.

Table 2.4

Stages, Processes and Merill's First Principle of Instruction in the Online Case-Based Problem-Solving Model

Stages	OCBPS Processes	Merill's First Principles of Instruction (2002)	Merill's Four Phases of Instruction (2002)
1	Identification of problems	Learning is promoted when learners are engaged in solving real-world problems	The four phases in the instructional process revolves around a problem (Molenda and Boling, 2008)
2	Analysis and brainstorming ideas for possible solutions	Learning is promoted when existing knowledge is activated as a foundation for new knowledge	Activation of prior knowledge and experience
3	Reviewing the literature for evidence-based support	Learning is promoted when new knowledge is demonstrated to the learner.	Activation of prior knowledge, construction of new knowledge and application
4	Deliberating on solution proposed and providing justification	Learning is promoted when new knowledge is applied by the learner.	Activation, application and integration
5	Presenting solutions		Demonstration
6	Feedback on solutions	Learning is promoted when new knowledge is integrated into the learner's world.	Application
7	Reflecting on solutions		Application, Integration

The following diagram illustrates the model used in this study supported by Merill's First Principles of Instruction:-

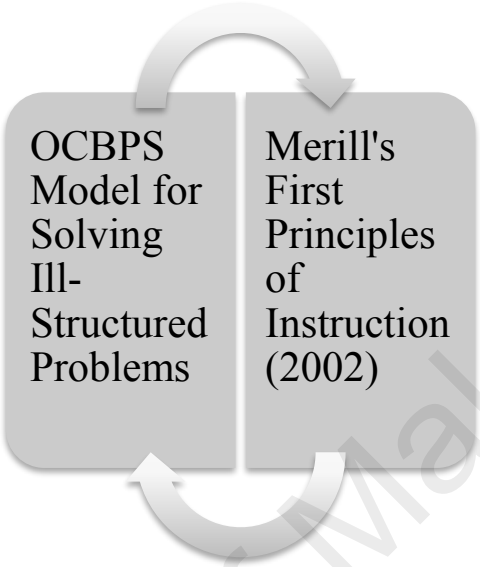


Figure 2.5: Instructional Model for Online Case-based Problem-Solving Module for the Current Study

Instructional Approaches in the Online Case-Based Problem-Solving Module In the Current Study

There are several instructional approaches in the online case-based problem-solving module in the current study.

Authentic Problems in the Online Case-Based Learning. Jonassen, Howland, Marra and Crismond (2008) state that the five characteristics of meaningful learning with technology are authentic, constructive, active, intentional, and cooperative (in Chai, Woo & Wang, 2010). A case that is to be presented as an electronic tool to be viewed by prospective teachers should be authentic in that it has to be grounded in the learners' own world and with reference to the subject-matter. A case has to present a real-world scenario with authentic problems for learning to be

more meaningful (Chai et al, 2010). In case-based learning, students are presented with authentic scenario for their constructive and collaborative analysis. They engage in active learning processes of finding workable solutions through synthesizing resources, and discussing for the most acceptable solution. Chai et al (2010) believe that the affordances of Web 2.0 technologies employing a constructivist framework can make e-learning more meaningful.

Question Prompts. Kale and Whitehouse's (2012) literature review found that it is important to provide question prompts in the analysis of video cases as it guides pre-service teachers towards interpretations of cases (Rich & Hannifin, 2009). Cognitive and metacognitive demands are required in developing problem-solving skills (Ge & Land, 2004). Analyzing video cases requires teaching knowledge components, which activates cognitive processes of using content-specific knowledge, organized knowledge, and a mental scheme to interpret certain pedagogical situations in the case (Ge & Land, 2004). Pre-service teachers use metacognitive processes when they verbalize their thinking in collaborative discussions about the cases (Kale & Whitehouse, 2012). Question prompts can help to activate cognitive and metacognitive processes when prior content knowledge is activated in the analysis of problems and generation of solutions, and then through deliberating on the effectiveness of the solutions. Question prompts can also be useful for self-regulated learning process to scaffold students towards a more organized analysis of video cases.

Collaborative Learning. Collaboration in an online CBL environment helps learners in that it encourages them to interact and support their friends' learning especially if the selection of team members is not determined by the instructor. Students leverage on each other's strengths to help each other and overcome problems

with every member playing an important role in completing the tasks (Meksophawannagul & Hiranburana, 2013).

Collaborative learning derives from constructivist principles employing engaged learning activities in groups working on authentically based inquiries to improve communication skills, problem solving and creative thinking skills, as well as cooperation in students (Robinson, Molenda & Rezabek, 2008). Most real world problems require analysis from multiple viewpoints and opportunity to consider more than one solution. Collaboration and combinations of viewpoints provide the creation of different perspectives and solution (Glasgow, 1997).

Rationale for Developing a Case-Based Problem-Solving Module in a TESL Writing Methodology Course

There are several reasons for developing the OCBPS module. Case-based learning has been implemented in many disciplines like social studies (Kale & Whitehouse, 2012), information security (He, Yuan & Yang, 2013), childhood education (Koc, 2012), classroom management (Choi & Lee, 2012), marketing (Henson et al, 2003), special education (Choi & Yang, 2011), and others (Kocyigit & Zembat, 2013). However, the use of this pedagogy has not been employed in the writing methodology courses in a Teaching English as a Second Language (TESL) teacher education program.

The rationale for developing a case-based problem-solving module in a TESL writing methodology course stems from the importance placed in the mastery of English amongst Malaysian students, yet there are problems faced in terms of English instruction and the lack of students' proficiency in English which require the effective

preparation of ESL teachers who are able to face the problems and challenges faced in ESL instruction specifically ESL writing skills.

The Importance of English in Malaysian Education System. In Malaysia, English is learnt as a second language and is taught from pre-school right through tertiary education. In primary school, English is a compulsory subject and students are required to sit for a centralized assessment called Ujian Penilaian Sekolah Rendah (UPSR) at year 6. English is also a compulsory subject in secondary school and is one of the main subjects evaluated in the national centralized assessments, namely, Penilaian Tingkatan Tiga (PT3) in Form 3, and Sijil Pelajaran Malaysia (SPM) in Form 5, which is the equivalent of the O levels. SPM is the examination that determines entry to higher education and doing well in this major examination is very much expected not only by students and parents, but also by many sectors with the hope of increasing the education levels amongst Malaysian students as part of the country's agenda of increasing human capital for achieving a developed nation status by 2020.

In the 'O' levels equivalent of the SPM examination, English is tested in two papers. While the components in Paper 2 are comprehension, literature and summary writing, Paper 1 examines students essay writing skills in which there are two sections. Section A requires students to write a directed writing essay using the points given in 200 words within 45 minutes. In section B, students write a continuous writing essay without any stimulus given in about 350 words within one hour. Five essay topics are given for section B and students are to write on one topic of their choice. 35 marks is given for section A and 50 marks for section B. Section A carries weightage in the SPM English paper and for that, English teachers are often concerned if they cannot prepare students for essay writing. This is because Form Five students sitting for the SPM examination has to pass the English paper to pass and obtain the SPM certificate.

English subject has become a compulsory pass paper since 2016 (Yesuiah, 2015, The Star Malaysia). Research done by the English Language Teaching Centre (ELTC) found that writing is the main reason most students do not excel in the English Language paper (Yesuiah, 2015). Perhaps, the ability to write well goes a long way in helping students do well in examinations since writing has always been a major form of assessment in schools and higher learning institutions.

Furthermore, in Malaysian public and private higher learning institutions (HEI), the medium of instruction is mostly English across most disciplines (Clark, 2014). Hence, the demand on the proficiency of English for skills such as reading, speaking, listening, writing and use of English for various purposes mainly for education amongst tertiary students is highly expected. Students are required to perform many tasks and the language required for assessments is English. Assignments and examinations, the major forms of assessments at tertiary level are in English in which students writing abilities are tested in the process of responding to the requirement of the assessments.

The ability to write well will help students earn better grades. However, only a fraction of students, those mainly with higher levels of proficiency are able to perform well in English while many Malaysian students fall in the lower proficiency category especially those from rural areas (Yesuiah, 2015) and the problems they face in all language skills especially writing cannot be ignored or overlooked or they pay the price of being left behind, which will eventually implicate the overall education system and the national education philosophy of producing citizens who are intellectual and knowledgeable.

In Malaysia, the process of enrolment and attaining a degree in local public and private universities involves the undergraduates and pre-university students to sit for

the Malaysian University English Test (MUET) (Malaysian Examinations Council, 2017). Students are given scores based on band, 6 the highest and 1, the lowest and a certain minimum band is required to pursue certain courses (Malaysian Examinations Council, 2017). For example, to pursue a course in law, candidates need at least band 4. It is also a prerequisite for certain degree programs that a certain minimum band is obtained in order to graduate. MUET tests candidates in four components that are, reading, speaking, listening and writing skills. The highest weightage is the reading component which is 120 marks followed by 90 marks for the writing paper (Malaysian Examinations Council, 2017). This shows the importance placed for literacy skills in acquiring English proficiency for educational purpose. There must be constant measures to improve the teaching of English nationwide for the betterment of the society at large.

With the demand in English language proficiency amongst Malaysian students especially for academic purposes which influences the capacity to use the language for work, social, and economic reasons in the future, English educators are placed with a responsibility to ensure that students achieve a level of proficiency to enable them to use the language effectively for various purposes and to function and progress in this era of technology and globalization when multilingualism is very much needed to be a global citizen.

Hence, producing English teachers who can help students attain the needed proficiency in English is important. However, the pre-service teachers who mostly have no teaching experience have no prior knowledge and experience to provide them with the schemata to apply problem-solving strategies because they have not yet experienced the problems. The problems they experienced in learning English may be unique to their own personal, social, and situational contexts, and may not be similar

to current problems. One way of exploring new problems and challenges is to seek the help of practitioners who can share their experience and the problems they have encountered throughout the years they have taught English.

Experienced teachers can provide help in providing information on the constraints faced in teaching writing. Practitioners who are English teachers can provide the framework for how the curriculum can be revised to cater to problem-solving strategies based on authentic problems. The problem-solving approach can be integrated into the existing curriculum or may be revised based on current problems and issues faced in the English instruction. Inspirations for teaching involves readiness to search for whatever resources that may help and one of the ways is through networking with other practitioners who can share their experience (Kahn & Walsh, 2006). Networking provides opportunities for the development of ideas, through learning from others' successes and failures in teaching, and how practitioners deal and solve issues in teaching and learning (Kahn & Walsh, 2006).

Writing Problems Faced by ESL Students. English as a Second language (ESL) writing instruction and pedagogy have undergone multi-faceted evolution in terms of approaches and methodologies employed in diverse learning environments. Approaches like product and process writing orientations, metacognition, think-aloud protocols, genre-based approach, content-based approach and many others are used and explored within certain learning goals and the outcomes seem to be varied. Despite, the numerous approaches available, writing instruction is still considered to be a problematic endeavour for many instructors due to various challenges faced in the writing class and with learners coming from diverse needs, proficiency and expectations.

The problem of students' low proficiency and the decline in the standard of English has been raised by many parties. The decline in the English language proficiency is reflected in the English language newspapers (New Straits Times, September, 2; September 7, 2011). Several concerned Malaysians have written to New Straits Times to highlight this; "Surely it is no big revelation as to the low standard in English proficiency of our generation in Malaysia today. It is no surprise to the private sector that a simple job application letter is full of grammatical errors. Nor is it unexpected that a job interview ends disastrously when the applicant cannot speak fluently and convincingly as to why he should be employed" (New Straits Times, September 7, 2011).

There is a view highlighted that "Employers face difficulties finding local graduates with an adequate standard of English proficiency to write and discuss work matters, especially technical issues" (New Straits Times, September 2, 2011). Efforts must be taken by the relevant authorities to address the issues and problems relating to the lack of proficiency amongst students especially in the rural areas and to find effective measures to remedy them.

Malaysian students, especially those from the rural areas, face challenges writing in English. Malaysian Ministry of Education announced that the challenges are first, students are unable to elicit the information needed to answer the question, resulting in the inability to recall and elaborate on anything that they have learned about the topic. The second is the inability to develop interesting and thoughtful ideas, resulting in monotonous compositions. The third weakness is the inability to present ideas clearly and coherently, resulting in confusion about the ideas presented. The fourth is the inability to plan paragraphs or essay cohesively, often resulting in repetitious and irrelevant ideas and a lack of direction in their writing.

English has always been a barrier for students in the rural contexts due to lack of exposure in the language. Students in rural schools do not have the language advantage to write well in English. Writing in English is a struggle for them because they do not have a good foundation in English. How will teachers handle students who cannot even construct correct sentences in English or on many occasion students who will not even attempt to start writing because they do not have the language to start with? Many of them are in secondary level and still cannot write. This has implication for their future and their journey to tertiary education which require English proficiency for academic purposes.

Writing involves the ability to use relevant content and ideas. This is one of the constraints for students with low proficiency. They may not be able to come up with points and ideas to develop significant contents for their essays. Teachers often assess students' selection of contents and how ideas are elaborated with valid support. Many students with limited proficiency in English have difficulties in coming up with content for their essays. This is due to limited mental schemata. Many students do not read English materials enough to support their academic requirements. As a result, they have inadequate content knowledge to write. Ruddel (2001) stress the importance of reading to serve as mental schemata for retrieval when writing. Writing involves tapping the schemata for prior knowledge for selective use of ideas for writing or other modes of expression. The consequence of insufficient knowledge in the schemata due to lack of reading is students' inability to write with adequate content to complete a writing task.

In addition, students are not familiar with the genre of their writing tasks. As required by the education system in assessing upper secondary essay writing skills, different genres are required to be mastered by the students. Due to the different genres

given, the students find it difficult to grasp the format or the style of writing. According to Harmer (2003), students who are writing within a certain genre need to consider a number of different factors. They need to have the knowledge of the topic, the conventions and style of the genre. Thus, students get confused with different types of genres which eventually leads to lack of interest in writing.

Many students obviously do not have good control over their speech and language. They make lot of errors in grammar, usage, punctuations and spelling (Hedge, 2005). They may not have developed a good understanding about variety of sentences ranging from simple to compound to complex and may not be able to use accurate words and appropriate synonyms. Such students tend to present ineffective essays which the teachers do not like to read. Such essays receive less scoring and thus decrease the confidence and the interest of the students and later lead to too much of anxiety. Anxiety and a person's perception of language competence will affect the willingness to express oneself in the target language (Mac Intyre, Baker, Clement & Donovan, 2003; Mason, 2006).

Students lack of motivation to learn English poses a threat to the learning of effective writing skills. According to an English Language lecturer and has been in the teaching profession for more than 22 years, "...The problems with learning the language could be linked to traditionally, uninspiring teaching materials or conventional styles which did not endear the teachers to their students. The teaching of English in schools and institutions of higher learning have been based on a grammar-structured approach, which usually leads to boredom, lack of interest and limited motivation. Once learners stop enjoying their lessons, there is a tendency for them to learn less" (New Straits Times, September 2, 2011).

Other issues found to be the contributing factors to students' low proficiency level in English are limited opportunity to use English outside the classroom, negative attitude toward English, lack of confidence, lack of motivation, insufficient exposure to English, imbalanced focus of language skills, ineffective syllabus, inadequate teaching material, ineffective teaching methodology, and lack of time to study (Fauziah Hassan and Nita Fauzee Selamat, 2002).

Teacher education has to prepare pre-service teachers who can attend to students learning problems through application of pedagogical and content knowledge (Shulman, 1987). They will be faced with problems that need to be attended to and exposing them to problem-solving practices will give them the skills and experience to apply strategies for solving real classroom problems. Part of the process is thinking strategically and critically about ways to solve the problems using and applying tacit knowledge of theories and approaches learnt to test what works and what does not. Sharing with others and leveraging on other professionals' expertise help in exploring multiple perspectives in solving issues.

Reflective practices through documentation of experiences, analysis of events, and exploring research and literature in the fields contribute to constant improvement and professional development. Experience is also needed to tackle instructional problems because problems are evolving. New trends are developing, new ways of doing things emerge, changes are inevitable, hence educators have to keep up with the change and be creative and innovative in solving problems. Instruction should include activities that prepare students best for their profession (Glasgow, 1997).

Problems and Challenges Faced by TESL Pre-service and Novice Teachers. Many pre-service teachers and novice teachers face challenges in teaching during practical and the early years of teaching. Farrell (2006) face complications

using appropriate teaching approaches and course contents in his first year of teaching TESOL (Teaching English to Speakers of Other Language). A study conducted by Norshiha and Norsiah (2011) on 104 pre-service teachers who at the time of study had just ended their practicum on whether their B. Ed TESL teacher education program had prepared them for the practicum found that the lowest score received was for the category of working with parents and peers to solve problems, resolve conflicts, and assume leadership. This shows that the TESL pre-service teachers had difficulties working with parents and peers to solve problems. These skills are crucial for teachers to develop their professionalism because part of their job involves working with parents and their fellow colleagues.

Another aspect the ESL pre-service teachers were not adequately prepared for is teaching long classes (Norshiha and Norsiah, 2011, p. 82). They faced difficulties planning instruction for 90-minute class not fully utilizing classroom time and finishing too early. These were the common complaints received from the supervisors.

TESL pre-service teachers in Malaysia reported that that they had problems applying theory to practice, and pedagogical challenges relating to methodology, curriculum, teaching approaches, materials class size, mixed ability students and using mother-tongue to teach English (Kabilan & Raja Izzaham, 2008; Brinton & Holten, 1989 in Ishihara, 2005). In Yunus, Hashim, Ishak and Mahmod's (2010) study, it was found that TESL pre-service teachers faced difficulty with applying teaching methodology into real context and according to their students' level and proficiency. Teaching students with low proficiency especially those who are not interested to learn English pose a serious problem for pre-service teachers (Yunus et al, 2014). ESL novice teachers face problems such as pedagogical and content knowledge (Ong et al., 2004).

In Nahal's (2010) study, 90% of the participants wished that curricular content in preparation programs provided pre-service teachers with practical activities relevant to classroom teaching. The participants had wished that they had learnt activities related to ready-to-use strategies, real-world applications, and classroom management. "Pre-service teachers need role-paying scenarios to provide an idea and help to practice what they had learned so that they become familiar with the types of situations they may encounter upon entering the classroom. While it is not possible for preparation programs to discuss all aspects of the teaching, the theory that relates to practice will help novice teachers develop intuitive skills in dealing with classroom-related issues" (Nahal, 2010, p. 10). According to one participant in Nahal's study, practical skills are easy to pick up and seem easy, however, they take time to learn and the participant had wished that he was given the strategies beforehand. He believes that it would reduce the number of mistakes a new teacher makes in addition to the problems encountered (Nahal, 2010, p. 10).

In investigating how pre-service teachers' beliefs about teaching affects their decision-making process, Stuart and Thurlow (2000) found that pre-service teachers who were engaged in reading, writing and discussing their experiences and beliefs and the impact of their beliefs on classroom practice, began to rethink some of their original simplistic beliefs about teaching and learning. Sharing of perspectives, observation of real classroom teaching and openness to reflection and decision making can help pre-service teachers to re-evaluate and change their beliefs about teaching and become agents of change in their schools (Stuart & Thurlow, 2000).

The pre-service teachers should be trained to cope with these challenges through problem-solving practices in their teacher education methodology courses. Schools of education must offer a solid, comprehensive teacher education grounded in

professional practice (Norshiha & Norsiah, 2011). It should provide the experience of understanding issues and challenges, as well as the strategies to solve them.

Problems in Teaching English Writing Skills. Pre-service teachers face problems in teaching English writing skills. Nguyen and Hudson (2010) investigated English as Foreign Language (EFL) pre-service teachers' perceived difficulties in teaching writing during their practicum and a majority revealed that they lacked confidence and knowledge for teaching writing at secondary schools. The pre-service teachers also indicated that they would have difficulties in learning to teach writing due to the mix-ability proficiency of students, uninteresting writing topics at secondary schools, and different writing styles (Nguyen & Hudson, 2010). The respondents also said that they would face difficulties of not having enough opportunities and time to practice the teaching of writing, and difficulty in making English writing lessons interesting and meaningful. In addition, they believed writing was a difficult skill for secondary students and writing lessons seem very boring to them (Nguyen & Hudson, 2010).

Teachers are also grappling with their own writing skills. A study by Kwan and Yunus (2014) found that Malaysian ESL pre-service teachers' mastery of cohesive writing is insufficient. This is one of the problems faced relating to content knowledge which can have negative pedagogical implications on ESL writing instruction'. Pre-service teachers need to be equipped with pedagogical and content knowledge of ESL writing for the instruction to be more effective.

Teachers face problems in teaching students how to write. It may involve many factors like lack of interest and low proficiency in English. It is important to investigate the problems teachers face and to see how these problems can be made aware in teacher education courses with the aim of preparing pre-service teachers to

be better prepared to face problems in writing instruction. There is a tendency to blame teachers for students' lack of proficiency or their declining standard of English.

The OCBPS module in this study aims to help pre-service teachers identify problems faced in ESL writing instruction and how these problems can be attended to through multiple perspectives shared during the implementation of the module. It is hoped that through training for problem-solving, prospective teachers can develop critical problem-solving skills that they can apply in their profession.

Conceptual Framework

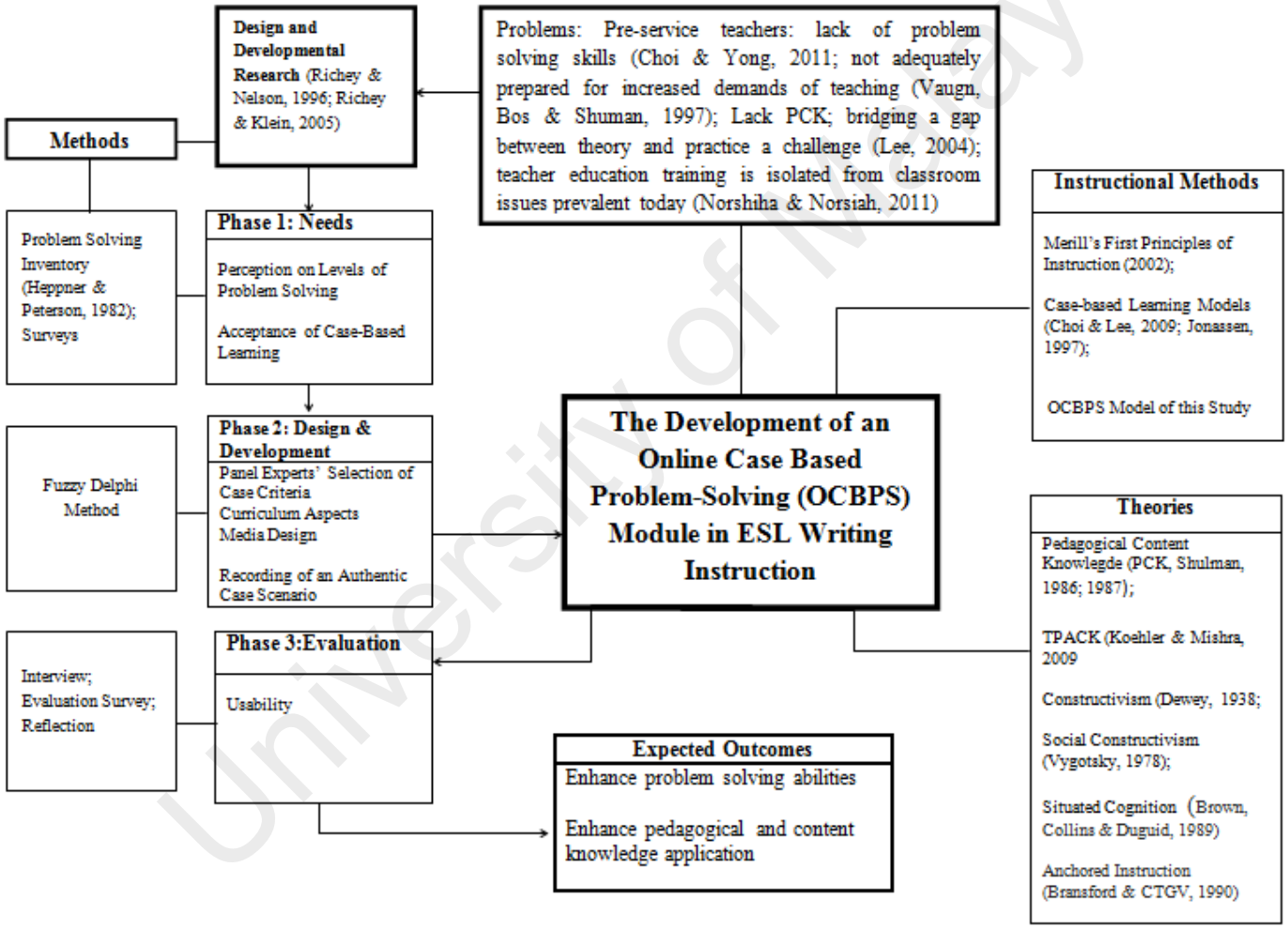


Figure 2.6 Conceptual Framework for the Current Study

Conceptual Framework for the Study

The conceptual framework of this study is framed by the problem statement that shows several issues in teacher education. Research indicates that pre-service teachers lack problem solving skills (Choi and Yong, 2011). In addition, pre-service teachers are not adequately prepared for the increased demands of teaching (Vaugn, Bos and Shuman, 1997), and find it a challenge to bridge theory to practice (Lee, 2004). Also, it is found that teacher education training is isolated from classroom issues prevalent today (Norshiha and Norsiah, 2011).

These problems have implications on teacher training in that the problems must be addressed. The solution that this study proposes is the development of an online case-based problem-solving module to address the issues of enhancing problem solving skills, bridging theory and practice, application of pedagogical and content knowledge, and for pre-service teachers to be adequately prepared for their teaching job. Case-based learning has been found to be effective in developing problem solving skills (Choi and Lee, 2009), bridging the gap in theory and practice (Koc, 2012), and applying pedagogical and content knowledge (Shulman, 1986; 1987).

The subject-matter in which the case-based problem-solving module focuses on is English as a Second Language Writing Methodology. ESL writing is a difficult skill to master for ESL students. Hence, the pre-service teachers need to be prepared to teach writing effectively. Part of the training is to prepare pre-service teachers for problem-solving practices related to ESL writing instruction. In addition, they need training on effective application of pedagogical and ESL writing methodology content knowledge. The development of the module takes into consideration the training afore mentioned.

The development of the module in this study undergoes a Design and Developmental Research Procedure (DDR) proposed by Richey and Klein (2005). The DDR instructional design model is used to guide the process of development (Saedah Siraj, Norlidah Alias, Mohd Nazri Abdul Rahman, Dewitt, 2013). The phases that the development of the module goes through are: Phase 1- Needs analysis; Phase 2- Design and Development; Phase 3- Implementation and Evaluation.

In Phase 1, the needs analysis is to (1) determine the perception of pre-service teachers on their level of problem solving skills, and (2) find out the perspectives of pre-service teachers on their acceptance of using an online case-based problem-solving module. Data is collected through surveys.

In Phase 2, the objective is to ascertain the design of the online case-based problem-solving module based on the views of panel experts, after which the development of the module is done. In this phase, experts' opinion will be gathered using the Fuzzy Delphi technique to determine the design of the module.

In Phase 3, the module is implemented and evaluated for usability. This is done through an interview with the lecturer and a few pre-service teachers. Survey is distributed to gauge the perception of the participants on the usability of the module. A pre-and post-test reflection written by the participants determines if the module is able to enhance problem-solving skills in a critical and analytical way.

The development of the case-based problem-solving module adopts the First Principles of Instruction proposed by Merril (2002). Merrill's (2002) instructional principles are used because they support the goal of developing the case-based problem-solving module. According to the principles, (1) learning is promoted when learners are engaged in solving real-world problems; (2) Learning is promoted when existing knowledge is activated as a foundation for new knowledge; (3) Learning is

promoted when new knowledge is demonstrated to the learner; (4) Learning is promoted when new knowledge is applied by the learner; (5) Learning is promoted when new knowledge is integrated into the learner's world. Problem solving through online case-based learning can adopt Merill's first principles because the main aim of the instruction is to engage learners in solving real-world problems. The OCBPS model in this study comprises seven stages in the instructional process, which are: (1) Identification of problems; (2) Analysis and brainstorming ideas for possible solutions; (3) Reviewing the literature for evidence-based support; (4) Deliberating on solution proposed and providing justification; (5) Presenting solutions; (6) Feedback on solutions (7) Reflecting on solutions. The implementation of the module is guided by the stages adapted from Choi and Lee's (2009) and Jonassen's (1997) case-based learning models with additional stages included that are: . Presenting solutions; Feedback on solutions; and Reflecting on solutions.

The theories that underpin this study are pedagogical content knowledge (Shulman, 1986; 1987), technological pedagogical content knowledge (Koehler and Mishra, 2009), Constructivism (Dewey, 1938; Driscoll, 1999), Social Constructivism (Vygotsky, 1978), Situated Cognition (Brown, Collins & Duguid, 1989) and Anchored Instruction (Bransford & CTGV, 1990). The training of technological, pedagogical, content knowledge (TPACK) is important in teacher education programs and this chapter provides the rationale for including this theory as a foundation for the development of the module. The next main theory that frames this study is constructivism which the case-based learning module firmly holds on to with integration of social constructivism, situated cognition and anchored instruction. It falls back on the philosophy of progressivism that believes learning should be

meaningful and relevant to the learners. The theoretical framework of this study has been explained in the beginning of this chapter.

Conclusion

The literature review provides a synthesis of the main aspects of case-based learning for problem-solving in teacher education. The case method had gained popularity with its roots in the University of Harvard with law, business and medicine as the main disciplines using the method. Now the case method has become eclectic with the case based learning having spread to other domains like education and teacher education. Previous studies have shown how this method has been used and to what outcomes. The theories reviewed provide a framework to the instructional principles and philosophical dimensions that guide this study.

The literature provides information on how online case-based learning has been used in teacher education in various programs and courses. It provides knowledge on how others have used this method in various ways, for multiple purposes, and in different education programs. The findings give some perspectives on how online case-based learning has served to enhance problems-solving skills and other higher-order thinking skills. This study further explores its potential in an area that has not fully utilised this method which is ESL writing methodology.

The principles and models for online case-based learning are important to serve as a backbone for the development of the module using the same method and principles. It supports the instructional processes because of the shared goals that the module aims to achieve which is to enhance problem-solving skills among pre-service teachers. It is to acknowledge the use of models and principles that have been tested and used in other studies, and with the rationale that these models and principles

support problem-solving practices and constructivism with approaches such as the use of online authentic case scenario that promotes self-directed and meaningful learning with the focus on student-centred learning instead of the traditional method of instruction.

The importance of technology for instruction cannot be taken for granted as the literature has indicated, and the development of case-based learning videos on online platforms show how this approach is gaining recognition. This approach has been researched in other areas and contexts but not for ESL writing methodology in the Malaysian contexts. The development of the module in this study aims to explore the potential of technology as a tool to enhance learning in the 21st century and to add to the repertoire of knowledge on using an online case-based learning module in the TESL writing methodology teacher education program. The rationale for using this approach in the TESL writing methodology course show the importance of preparing future English teachers who are able to face problems with critical and creative efforts of seeking solutions to address the multi-faceted situations in ESL writing instruction.

Chapter 3 Methodology

Introduction

This chapter describes the methodology of the study. It begins with a description of the Design and Developmental Research (DDR) adopted in this study. Then, it explains the methodology that covers three phases: *needs analysis; design and development; and implementation and evaluation* for the development of an Online Case-Based Problem-Solving Module For ESL Writing Instruction (OCBPS). The context, objectives and methodology of each phase such as, sampling, data collection methods, procedures, instruments used, and the data analysis is explained. It attempts to provide a comprehensive documentation of every step taken in the collection and analysis of data to provide the findings for the research questions and objectives of the study.

Design and Developmental Research

This study adopts the Design and Developmental Research (DDR) procedures. DDR is a useful research approach for practitioners interested in the domains of instructional technology and curriculum development because DDR procedures provide empirical data that assist in developing new theories and knowledge that contribute to a more informed practice in designing instruction (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013). The DDR approach has been used in the development of products, such as a module or a training programme, and involves several phases: a needs analysis, design and development; and evaluation phase (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013).

Seels and Richey (1994) defines developmental research as "the systematic study of designing, developing and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness" (p. 127). Richey and Klein (2007) define DDR as "the systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that govern their development" (p. 1). The two categories of DDR are Type 1 and Type 2 studies (Richey, Klein & Nelson, 2004). Type 1 studies focus on the design, development, and evaluation of a product or tool, whilst Type 2 studies focus on the design, development and evaluation of a model (Richey & Klein, 2005).

This study employs the Type 1 category because it aims to develop a product, which is a case-based problem-solving module. It goes through an analysis phase, design and development phase and implementation and evaluation phase as suggested by Richey and Klein (2005). Type 1 DDR for product development is based on Instructional Design Models such as ADDIE, Gagne and ASSURE (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman, Dewitt, 2013). In this study, however, Merril's First Principles is used as the design of instruction (Merril, 2002).

This study utilizes the DDR because it is a scientific research method that seeks to create knowledge based on data that are systematically derived from practice (Richey & Klein, 2005). This study employs the DDR to develop a module because the procedure goes through the process of methodical analysis, in several phases, such as, needs analysis, design, development, and evaluation, based on a specific case that produces context-specific knowledge that serves a problem-solving function (Richey & Klein, 2005).

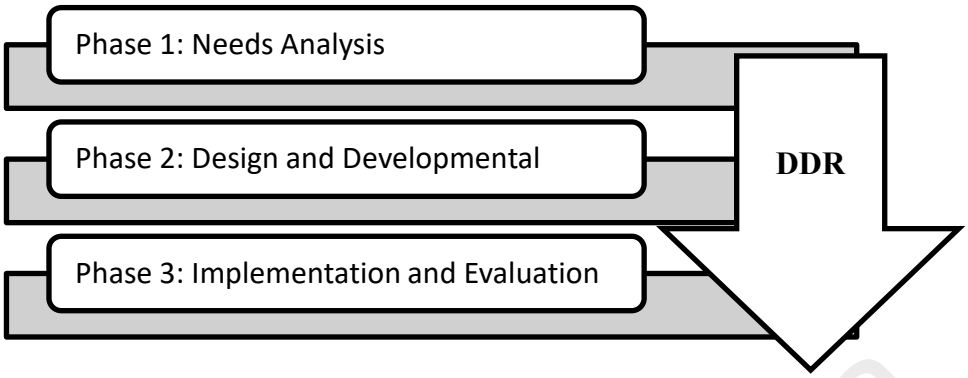


Figure 3.1. Phases of Design and Developmental Research

In the analysis phase, the researcher identifies the need for the module. In the design phase, the design and content of the module is determined using empirical data. In the developmental phase, the module was developed using appropriate approaches determined by empirical data. In the implementation phase, the module is implemented in a real situation, and subsequently, the module is assessed for usability in the evaluation phase. These are the procedures of DDR (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman and Dewitt, 2013).

The participants of a DDR may vary according to each phase ((Richey & Klein, 2005). Typically, Type 1 DDR for product design and development may consist of designers, developers, and clients as participants in the design and development phase. In the product evaluation phase, the participants may be evaluators, clients, learners, instructors, and organizations (Richey & Klein, 2005). In this study, the participants are learners, instructors, and panel experts. The researcher is the designer and developer of the module who seek the input and guidance of instructional design experts, and subject matter experts in the process of designing and developing the module. The rationale for using DDR in this study is that the data collected is a

consolidation of rich experiences from multiple perspectives (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013).

It is common for a DDR study to utilize multiple research methodologies and designs for the different phases of the study (Richey & Klein, 2005). In the needs analysis phase, data is collected through surveys. In the design phase, the researcher used the Fuzzy Delphi Method (FDM) to generate opinions from a panel of experts on the design of the module. As for the evaluation phase, the exploratory implementation study using surveys, interviews, and evaluation of pre-service teachers' reflective essays is utilized (DeWitt, Alias & Siraj, 2013). DDR is selected because it guides this study to create practical form of knowledge that is context-specific and practical, grounded in data collected through the systematic process of design and development (Richey & Klein, 2005; Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013).

An Online Case-Based Problem-Solving Module for ESL Writing Instruction is developed to enhance problem-solving skills among pre-service teachers. An online case in a video format is used as a problem-solving module in a teacher education TESL writing methodology course. The rationale for selecting DDR for this study is because of its strengths and applications. DDR can be used to address multiple problems faced by learners, educators and administrators. DDR is a form of rigorous scientific research or inquiry that is flexible and adaptable, yet reliable in developing theories (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman and Dewitt, 2013), and reliable for creating practical, context-specific knowledge and solutions (Richey & Klein, 2005).

DDR has been applied in several studies in Malaysia for material and module development. It has been used to develop the following: a learning portal for Form 2

Bahasa Melayu grammar (Chin, 2009); a pedagogical module based on technology and Felder-Silverman's learning style for Malaysian secondary school Physics curriculum (Norlidah Alias, 2010); a collaborative mobile learning module for Malaysian secondary school students on the topic 'Nutrition' for Form 2 students (DeWitt, 2010); a digital story pedagogical module to facilitate reading among indigenous primary school students of the Temuan tribe in Malaysia (Thanabalan, 2011); an online Arabic vocabulary learning games prototype (Muhammad Sabri Shahir, Nor Aziah Alias, Zawawi Ismail & Nurulhuda Osman, 2012) and; a culturally responsive pedagogical module for multi-cultural awareness in art education among Malaysian secondary school students (Zuraidah Maarof, 2014). DDR becomes relevant to address the many problems unique to different educational contexts as it guides in the scientific procedure of development of educational products, modules and training programmes that are practical and context-specific grounded in sound theory (Norlidah Alias, Saedah Siraj, Mohd Nazri Abdul Rahman & Dewitt, 2013).

Phase 1: Needs Analysis

Objectives. The needs analysis phase is carried out to analyse the Teaching English as a Second Language (TESL) pre-service teachers' perception of the following:

1. Problem solving skills,
2. Importance of Problem-Solving
3. Acceptance of using an online case-based problem-solving module in a TESL writing methodology course, and
4. Interests in viewing videos online.

Context

The specific context where data collection is done is in two Faculties of Education in two public universities in Malaysia.

Rationale for Selecting Public Universities

There are twenty public universities in Malaysia (MOE, 2014). The public universities in Malaysia are categorized into three main groups: *Research Universities, Focussed Universities,* and *Comprehensive Universities (*MOE, 2014). Currently, there are 20 public universities comprising 5 research universities, 4 comprehensive universities, and 11 focussed universities (MOE, 2014). The researcher selected one Research University and one Comprehensive University for the purpose of collecting data. Implementation of the module is done in one of the universities. Research universities focus on research (MOE, 2014), and the lecturers are expected to conduct research, which is vital for the selection of experts in this study. Comprehensive universities offer a variety of courses and fields of study and focus on teaching and learning (MOE, 2014).

The rationale for choosing samples from two public universities is due to geographical reasons. Most public universities are located in Selangor and the Klang Valley, not distant from Kuala Lumpur, the capital city of Malaysia. The two universities selected for this study are located in the Klang Valley, which provides accessibility and convenience in data collection. In addition, both universities have a Faculty of Education each and offer the same program, the Bachelor in TESL program. The two universities also offer the TESL writing methodology course, and this makes the sample population homogeneous.

Furthermore, public universities are selected because the entries are competitive (MOE, 2014), and students go through stringent selection process due to limited space (Wan, 2007; Teh, 2014). Public universities have at least 80% of the teaching staff who are PhD holders compared to less than 20% of those in private universities (Teh, 2014). Selection criteria of teacher educators and panel experts for the design and developmental phase must at least adhere to those who already have master's degree and PhD, hence the rationale for selecting public universities for wider options of experts.

In terms of characteristics of programmes offered, it is found that public universities cover all areas of Sciences and Humanities (MQA, 2007; MOHE, 2008, in Wan, 2007). Social sciences and humanities programmes are well established in public universities, especially in the four major research universities: University of Malaya (UM), Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM), and Universiti Putra Malaysia (UPM) (Wan, 2007). Public universities are listed as the top ten universities in Malaysia based on the QS World University Ranking (MOE, 2016). UM, UPM, UKM and UiTM are amongst the top 100 for the field of education (MOE, 2016).

The ESL Writing Methodology is the subject-matter for which the online case-based problem-solving process is focussed on. The methodology of teaching writing in the English as a Second Language (ESL) is usually taught in the Teaching English as a Second Language (TESL) teacher education program in the Faculty of Education of various higher learning institutions for the purpose of preparing prospective teachers to teach English writing skills. Students registered for the TESL programme are trained in the Faculty of Education to teach English. The duration of the whole TESL programme is four years. The writing methodology course for ESL instruction is a

required course for TESL programme undergraduates to prepare them to become English teachers who are trained to teach ESL writing skills.

The course information of the writing course in TESL from two Education Faculties of Malaysian public universities show that this course is offered in the second year in one university and in the third year in the other for the duration of fourteen weeks or one semester. One faculty adopts the name 'Methodology in Teaching Writing' (Faculty of Education, University A, 2016) and the other faculty names the course 'Writing in the ESL Classroom' (Faculty of Education, University B, 2014). The context of the study is the faculties of education teaching the writing methodology course for which the module is intended for.

Population. To meet the objectives of the needs analysis phase for the development of an OCBPS module for ESL writing instruction, the researcher has selected TESL undergraduates who are referred to as TESL pre-service teachers. Their perception on their problem solving abilities, the importance of problem-solving, and acceptance of case-based learning is sought for needs analysis. The researcher obtained permission from the Deans of the faculties to carry out the data collection procedures.

Sampling. The sample of the study is TESL pre-service teachers from the Faculty of Education of one comprehensive university (University A) and one research university (University B) in the Klang Valley, Malaysia. A total of 121 participants participated in the survey. The TESL undergraduates are of various ages and semesters. The courses *Methodology in Teaching Writing* and *Writing in the ESL Classroom* are compulsory in the TESL education program in University A and University B to learn about the methodological aspects and approaches to teaching writing in ESL.

The samples are selected through purposive sampling. Purposive sampling is useful when the researcher needs to intentionally select participants who have experience with the central phenomenon or the key issues being explored (Creswell & Clark, 2007). It is also applicable for small number of participants in selected sites to provide in-depth information about the problems under investigation (Creswell & Clark, 2007). Maximal variation sampling (MVS) is used because it is a purposive sampling strategy that aims for heterogeneity to generate perspectives from students of differing sites (Cohen & Crabtree, 2006). In this case, two different universities were selected for MVS. The students are from semester two to six in both universities since the purpose of the needs analysis is to find out the perceptions of TESL undergraduates on their problem-solving abilities. Perspectives of different cohorts of students provide heterogeneity of the samples. Moreover, the courses *Methodology in Teaching Writing* and *Writing in the ESL Classroom* are offered in different semesters in each of the selected faculties of education.

The use of sample participants from two different universities is for the purpose of MVS. When researchers triangulate, they collect information from several sources about the same event or behaviour to increase the likelihood that the phenomenon under study is understood from various points of view (Ary, Jacobs, Sorensen & Walker, 2013).

Before the samples and sites are used, field and ethical issues are considered. The researcher got the permission from the Deans of the respective faculties involved (Refer Appendix 1). Participants above 18-years old participate on a voluntary basis and their rights and privacy are guaranteed.

Table 3.1

Samples and Sites

Sample/Sites	University A	University B	Total
TESL pre-service teachers	58	63	121

Data Collection Methods. The data collection for the needs analysis phase is carried out using the quantitative method. For the first objective of Phase 1, the analysis is carried out to find out the pre-service teachers' perception of their levels of problem solving skills using a Problem Solving Inventory (PSI).

As for the second objective, the needs analysis investigates the pre-service teachers' perspectives through a survey on the importance of problem-solving, and their acceptance of using a case-based problem-solving module in their TESL writing course. Their interest in viewing videos online is also investigated in the same survey.

Before the participants respond to the questionnaire they are briefed on the purpose of the study. The researcher inquired if the participants have prior knowledge of case-based learning. They said they have learnt it before in their first year of the TESL program. The researcher asked the participants to explain what case-based learning is to test if they have knowledge of it. They conceptually know what case-based learning is. They are then given some explanation on case-based learning to refresh their knowledge and understanding about this approach. The researcher explained how the approach is used in instruction. The researcher was careful not to create biasness towards this approach and remained neutral in her explanation so as not to influence the TESL undergraduates' responses.

Instruments

The instruments used for the needs analysis phase are the PSI, and the Importance of Problem-Solving Skills, Acceptance of Case-based Learning and Interests in Viewing Videos Online Questionnaire.

Instrument 1 (Problem-solving Inventory). To assess pre-service teachers' perceptions of their levels of problem solving skills, the Problem Solving Inventory (PSI) developed by Heppner and Peterson (1982) is used (refer to Appendix 2). Heppner and Peterson (1982) developed the Problem-Solving Inventory (PSI) consisting of 35 items to capture an individual's perception of his or her problem-solving behaviours. Research has indicated that an individual's perception and beliefs about his or her problem solving skills somewhat influences how a person deals with a problem (Heppner & Krauskopf, 1987), and his or her ability to solve problems (Heppner, Witty & Dixon, 2004).

The inventory presents 6-point Likert-scale type items indicating 1=strongly agree to 6=strongly disagree. Lower scores indicate higher perception of problem-solving abilities whilst higher scores reflect lower self-perception. In this study, the Likert-scale is reversed to 1=strongly disagree to 6=strongly agree, which means that higher scores indicate higher perception and lower scores indicate lower perception.

Heppner and Peterson (1982) derived three distinct constructs from factor-analysis results relating to problem-solving perception; Problem-Solving Confidence (PSC: 11 items:- 5, 10, 11, 12, 19, 23, 24, 27, 33, 34, 35), Approach-Avoidance Style (AAS: 16 items:- 1, 2, 4, 6, 7, 8, 13, 15, 16, 17, 18, 20, 21, 28, 30, 31), and Personal Control (PC: 5 items:-3, 14, 25, 26, 32). Only 32 items are used based on Heppner and Petersen's (1982) rationale in their study that "on the basis of factor analysis, the 35-item questionnaire was reduced to 32-items"…applying the rule of retaining only those

factor loadings above .3 (p. 68). The reliability estimates show that the total inventory has internal consistency (α = .90) and is stable over a two-week period (α = .89). In Heppner and Peterson (1982), the reliability estimates for the three factors are: PSC, α = .85; AAS, α = .84; PC, α = .72. In this study, the Cronbach's alpha reliability coefficient of the overall inventory (PSI) shows an internal consistency of .870. As for each factor in the inventory, PSC, α = .827; AAS, α = .781, and PC, α = .745. These show that the 32-items in the PSI are reliable.

The PSI has been used in other studies for measuring perceptions of problem solving ability (Temel, 2014; Good, Heppner, DeBord & Fisher, 2004). It has been used to investigate problem-solving perceptions of psychology students (Sahin, Sahin & Heppner, 1993), nursing students (Basak, Kok, Unver, & Cervimez, 2014), special event managers (Ross, 2006), physical education and sports students (Tasgin, 2011), pre-service teachers (Seyhan, 2014; Yenice, 2011), and in many published investigations in the psychology and counselling fields (Sahin, Sahin & Heppner, 1993). This study investigates TESL pre-service teachers' perception of their problem-solving abilities.

Instrument 2 (Questionnaire: Importance of Problem-solving Skills, Acceptance of Case-based Learning and Interests in Viewing Videos Online). As for the second, third and fourth objectives, the needs analysis investigates pre-service teachers' perspectives through a questionnaire on the importance of problem-solving skills, acceptance in using case-based learning, and interests in viewing videos online (refer to Appendix 3). Part A consists of demographic profile items. Part B consists of items that investigate their level of agreement using 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) on whether the participants perceive problem-solving skills as important. Part C comprises items that seek to find out the participants'

acceptance of using case-based learning, and whether they would consider looking at cases online for training in problem-solving skills. The 5-point Likert scale items aim to generate their level of agreement on their acceptance of using case-based learning module, and their interest to view a video online for problem-solving purposes (1 = strongly disagree to 5 = strongly agree).

The survey provides information on whether TESL undergraduates perceive problem-solving as important and their acceptance in exploring case-based learning module in an ESL writing methodology course to enhance their problem-solving skills, for example, whether they are interested in watching a video online for learning purposes.

Procedure for Data Collection. The procedure for data collection began with the pilot test. After the pilot test is done, a survey is carried out to generate the TESL pre-service teachers' perspectives on their problem-solving abilities, the importance of problem-solving skills, acceptance in using case-based learning, and interests in viewing videos online for the needs analysis phase.

Before the participants respond to the questionnaire they are briefed on the purpose of the study. The pre-service teachers conceptually know what case-based learning is. The researcher refreshed their knowledge and understanding about this approach by providing some explanation on case-based learning without influencing the TESL undergraduates' responses.

Pilot Test. A pilot test is done to ensure the reliability of the questionnaire for needs analysis.

Sample. Thirty TESL pre-service teachers participated in the pilot study. They are selected through purposive sampling. The samples for the pilot study are not the same as samples for the needs analysis phase.

Data Analysis. The data from the pilot test is analysed using the Statistical Package for Social Sciences (SPSS) software to determine the Cronbach Alpha reliability coefficients and findings. The internal consistency estimate of the instrument is generated. Improvements are made to the questionnaires after pilot test. The minor amendments are typo errors and do not affect the original items. The Cronbach Alpha scores for all Likert-scale items show that the items in the questionnaire are internally consistent.

Table 3.2

Overall Internal Consistency Estimates of Instrument 2

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.786	.948	48

The tables above show that all items have Cronbach Alpha that is more than .70. Hence, no items were removed since the internal consistency is high.

Data Analysis. The data from the survey is analysed using the Statistical Package for Social Sciences (SPSS) software to determine the Cronbach Alpha reliability coefficients and findings. The quantitative measures like frequencies, descriptive scores, mean and standard deviation serve to provide findings for the needs analysis phase. Findings for needs analysis is presented in Chapter 4.

The summary of data collection methods for needs analysis is shown in Table 3.3.

Table 3.3

Summary of Data Collection for Needs Analysis Phase

Research Questions	Method	Sample (N) and Sampling	Site
1. What is the perception of pre-service teachers on their level of problem solving skills?	Survey 1 Problem-solving Inventory (PSI)	121 TESL undergraduates selected through purposive sampling	University A and B
2. What is the pre-service teachers' perception of the importance of problem-solving skills?	Survey 2 Importance of Problem-Solving Skills		
3. What are the perspectives of pre-service teachers on their acceptance of using an online case-based problem-solving module?	Acceptance of Case-Based Learning		
4. What are pre-service teachers' views on their interests in viewing online case-based videos?	Interests in Viewing a Video Online for Learning Purposes		

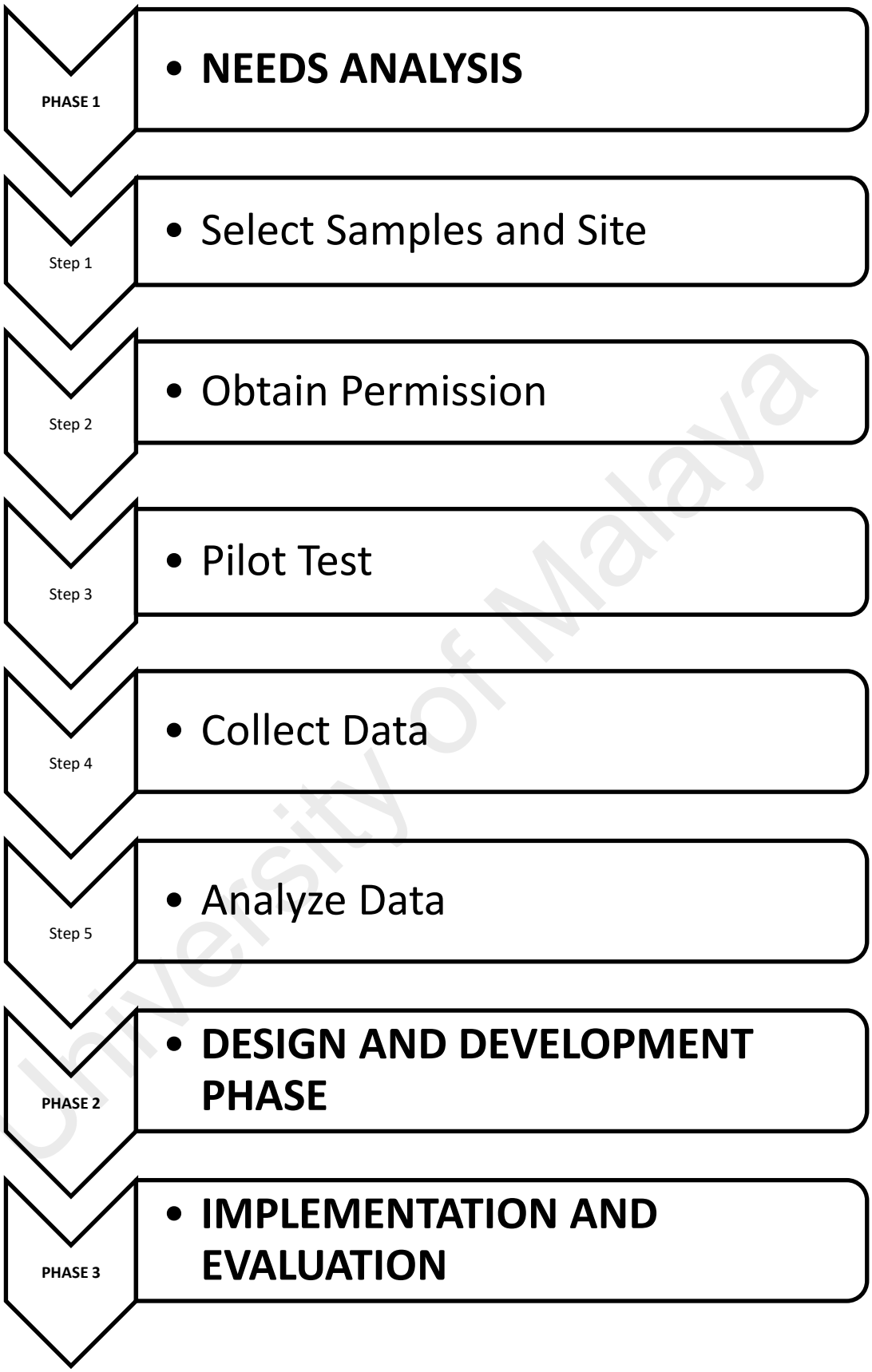


Figure 3.2. Operational Framework of the Needs Analysis Phase

Phase 2: Design and Development of the Module

Objectives. In this phase, the objective is to design and develop an Online Case-Based Problem-Solving Module for ESL Writing Instruction based on the views of a panel of experts for enhancing pre-service teachers' problem-solving skills. A consensus among a panel of experts was obtained to determine the design of the module.

Data Collection Procedure. The design and developmental phase adopts the Fuzzy Delphi Method (FDM). It is done in three parts. Firstly, interviews are conducted to generate opinions from six (6) experts. This interview is intended to generate the views of panel experts on the aspects that are to be considered for the selection of a significant teaching case scenario, specifically, the context, genre, level, proficiency of the students, teacher's teaching experience, and the duration of the class. Panel experts also give their input on the curriculum aspects such as learning outcomes, evaluation, resources and duration for implementation. In addition, they provide input on the technological aspects and design of the online case-based problem-solving module. The interviews are transcribed and the themes that emerge from the interviews are used to design the FDM items. According to Creswell and Clark (2007), interviews can be carried out and from the data, variables, and constructs can be identified to develop an instrument. From the interview data, variables are generated to develop the FDM instrument.

Secondly, the Fuzzy Delphi Method (FDM) is used to obtain the consensus of panel experts, and the selection of the most preferred case criteria, curriculum aspects of the module, and the media design for the development of the Online Case-Based Problem-Solving Module for ESL Writing Instruction.

The final part is the development of the module based on the data and findings gathered from the FDM. The module's main component is a teaching scenario of an actual ESL writing class in a secondary school based on the FDM results provided by panel experts.

Part 1: The Interview

Panel of Experts. In the first phase of FDM, interviews are conducted with six (6) experts in the field of TESL, Curriculum and Instruction, and Education and Instructional Technology to get their views on the selection of criteria for the case, and the curriculum aspects for the OCBPS module. The key idea to conducting an interview is to provide detailed views of individuals and the specific contexts in which they hold these views (Creswell and Clark, 2007).

Experts for FDM panel are selected based on several criteria. Experts should have experience in teaching the TESL program specifically the writing methodology course. They should also have experience as coordinators of the writing course who are in charge of the construction and reviewing process of the curriculum. TESL teacher educators with more than 20 years' experience teaching the program are prioritized. They should have experience in constructing and evaluating the writing curriculum. In addition, a TESL expert lecturer selected by the Ministry of Education, and a curriculum expert from the teacher education curriculum division of the Ministry of Education serve as subject-matter panel experts. They are selected to provide in depth views about the case selection of the online case-based module.

The instructional technology experts provide recommendations on the multimedia design and technological aspects of the module. Their advice is also sought for the most effective online platform and media elements for the OCBPS module. The

education and instructional technology lecturers whose experience is more than 15 years provide input on the most suitable design of the online case-based module.

The experts in this study are highly competent in the area of TESL, ESL writing instruction, curriculum and instruction, and education and instructional technology. Their suggestions are listed as the constructs in the Fuzzy Delphi Method questionnaire for selection by all other panel experts. Description of panel experts is reported in Chapter 5. The summary of experts is in the table below:

Table 3.4

Sample and Aspects for Case Criteria, Curriculum Aspects and Multimedia Design

Sample for Interview	**Method**	**Aspects**
6 Subject Matter (TESL), Curriculum and Instruction, Education and Instructional Technology Experts	Interview	Case criteria:- 1. Context 2. Genre 3. Level and Proficiency 4. Teacher's teaching experience 5. The duration of the class Curriculum Aspects:- 1. Learning Outcomes 2. Evaluation 3. Resources 4. Duration for Implementation Media Design:- 1. Online Platform 2. Media Elements 3. Instructional sequence 4. Presentation Structure

Procedure for Interview. The interview is done face-to-face, and one-on-one. The timing and setting of the interview is set and given due consideration. The interviews are conducted in a most conducive location convenient to both parties. It is preferable to conduct the interview in a setting where one's full attention can be devoted to the interview (Anderson & Arsenault, 2004). The interviews are conducted in the experts' office and one interview is a telephone interview due to geographical distance. Prior to the interview, the researcher got the experts' verbal agreement to participate in the study, and before an appointment is set, the researcher explains the purpose of the interview, address terms of confidentiality, explain the format of the interview, indicate how long the interview usually takes, exchange contact information, and allow interviewee to clarify any doubts about the interview. The experts are given a letter appointing them as panel experts (Refer Appendix 4).

The researcher uses audio or video recorders and later transcribes the dialogues for analysis. Before the device is used, permission from the subject is considered and a rationale is given as to the purpose of recording. All the experts are familiar with the procedure used in interviews and agreed that the interview is recorded. They were at ease and did not feel conscious with the recording process. Proper ethical procedures are adhered to in the process of collecting data.

Interview Protocol. The questions in the interview protocol are open-ended and are prepared before the interview is carried out (Refer Appendix 5). For interviews, researchers are encouraged to use open-ended, informal interview techniques (Hitteman and Simon, 2002). Closed–questions will only elicit narrowly defined answers or choices of responses (Chenail, 2011). The idea of conducting an interview is to encourage the subjects to talk and share their perspectives about the problem or issue being investigated and, what they think is happening and the reason for the arising conditions, what they believe about certain events, or even their feelings about particular situations under investigation. According to Chenail (2011), questions

should be open-ended in nature so the investigators provide openings through which interviewees can contribute their insiders' perspectives with little or no limitations imposed by more closed-ended questions (p. 255).

The researcher uses the main questions as a guide for the interview and also asks emerging questions as the interview progresses to generate the needed data. The interview is natural and uses emerging questions to clarify doubts and for further understanding of the input by the experts.

Data Analysis Procedure for Interview. The interview is transcribed and the data is sent to the interviewees for validation process to determine accuracy in the data. Members' check is carried out to cross-check the data with the original recording (McMillan, 2004; Ary et. al, 2006). Reliability is present in the accuracy of the data and the extent to which what is recorded as data is what actually occurred in the setting that was studied. A useful method for checking reliability is called member checking in which the researcher checks her notes with the subjects so that they can verify that the recording was accurate (McMillan, 2004; Ary et. al, 2006). Interview data is coded according to the case criteria, curriculum aspects and the media design categories for easy retrieval of variables and referral. From the interview data, variables are generated to develop the Fuzzy Delphi instrument.

Part 2: Fuzzy Delphi Method. The Fuzzy Delphi Method (FDM) is used to obtain the consensus of panel experts, and the selection of the most preferred case criteria, aspects of the module, and the media design for the development of the Online Case-Based Problem-Solving Module for ESL Writing Instruction. FDM was introduced in 1985 by Murray, Pipino and Gigch, and later reviewed by Kaufman and Gupta in 1988. The method has been used in various design and developmental research, and research in education, among others: Determining e-Portfolios Elements

in Learning Process Using Fuzzy Delphi Analysis (Syamsul Nor Azlan, Amin Embi & Norazah Nordin, 2015); Usage of Facebook: The Future Impact of Curriculum Implementation on Students in Malaysia (Nurrabihah Mat Noh, Siti Hajar Abd Razak, Norlidah Alias, Saedah Siraj, Mohd Ridhuan Mohd Jamil & zaharah Husin, 2013); and Fuzzy Delphi Method for Evaluating Effective Teaching Based on Students' Perspectives (Zamah Tarmudi, Fatihah Anas, Muhidin, Munirah Rossdy & Tamsin, 2016).

The rationale for using FDM is to compensate for the weaknesses arising from the traditional Delphi method. Researchers have identified several weaknesses in the Delphi Method (Siraj, 2008; Chang, Hsu & Chang, 2011; Ho & Chen,2007). The weaknesses are the validity of data is questionable if researchers fail to choose the real experts, boredom among the experts because of the iterative process of the method requiring recurring rounds of feedback (Siraj, 2008), the results generated has low convergence, time-consuming process of data collection, the loss of valuable information from experts' opinion (Chang, et al, 2011). Ho and Chen (2007) explained that the Delphi method incurs costs, is time consuming and researchers face difficulty in coordination and communication due to the multiple processes in surveying and analysing results. Experts' opinion is easily misinterpreted, weakened or suppressed during the long, iterative process, and when experts' consensus is achieved at a certain time of the analytical process, the fuzziness of it is not taken into consideration (Ho & Chen, 2007).

The FDM addresses the ambiguity and fuzziness of the panel experts' consensus in the Delphi Method by utilizing semantic variables (Murray, Pipino & Gigch, 1985) to determine the distance between the levels of consensus within the expert panel through the Fuzzy Set Theory (Ishikawa et al., 1993).

The FDM has advantages that can solve the drawbacks from the Delphi Method. Among the advantages of FDM are (Mohd Ridhuan Jamil, Zaharah Husin, Nurul Rabihah Mat Noh, Ahmad Arifin Sapar & Norlidah Alias, 2013; Ho & Wang, 2008):

i. Saves time in collecting data

ii. Saves costs

iii. Reduces the need for several rounds of data collection for experts' consensus

iv. Increases the recovery rate of questionnaires

v. Experts can fully express their opinions, ensuring the completeness and consistency of the group opinion.

vi. Takes into consideration the fuzziness that occurs during the iterative process. Does not misinterpret experts' original opinions and provides a true reflection of their response.

The Fuzzy Delphi Instrument. The FDM instrument is developed based on the input from the interview. A 5-point Likert scale questionnaire measuring preference is developed based on themes derived from the interview for case criteria selection, curriculum aspects, and multimedia design. There are three parts to the questionnaire (Refer Appendix 6). Part A of the instrument consists of six (6) items which aims to obtain panel experts' consensus and the most preferred criteria for the recording of an actual teaching scenario of a secondary school ESL writing instruction that will best serve as a case-based problem-solving module for pre-service teachers' viewing and analysis. It consists of items that require panel experts' to select the most preferred case criteria, such as, the context, form and proficiency of students, essay genre, the duration of the writing class, and teacher's teaching experience. The

consensus of panel experts and the most preferred case criteria selected serve as a sample case for the case-based problem-solving module for ESL writing instruction.

The panel experts views on the criteria of a case is important so that not any teaching situation is selected but the context, level, and genre that need attention and should be brought to the attention of the pre-service teachers. The criteria are selected by experts because they are experienced and credible enough to know the problematic areas that should be exposed to the future English teachers.

Part B comprises items on aspects of the module such as the learning outcomes, evaluation, resources to be included in the module, and the duration to implement the module.

Part C of the module comprises items on media design of the module, such as, the most suitable online platform, media elements, and structure of the module that can make the online module more effective (Refer Appendix 6).

Item listed in the survey instrument are for the panel experts' selection process. The FDM findings serve as the criteria for the selection of the case scenario that is to be recorded, the curriculum aspects and the online platform to be considered for the module development.

Procedure for Fuzzy Delphi Method. In the first step of the FDM procedure, six (6) experts are interviewed to obtain their views on the case criteria, curriculum aspects of the module, and media design. From their responses, the researcher generates the items and sub-items for the Fuzzy Delphi questionnaire. Then, the questionnaire is given to eighteen (18) experts who determine the most preferred case criteria, aspects of the module, and media design that are measured using the linguistic variables 1 = least preferred to 5 = most preferred.

Table 3.5

Panel Experts and Aspects for Case Criteria, Curriculum Aspects and Multimedia Design for Fuzzy Delphi Method

Panel Experts	**Method**	**Aspects**
18 Subject Matter, Curriculum and Instruction, Education and Instructional Technology Experts	Fuzzy Delphi Method	Case criteria:- 1. Context 2. Genre 3. Level 4. Proficiency 5. Teacher's teaching experience 6. The duration of the class Curriculum Aspects:- 1. Learning Outcomes 2. Evaluation 3. Resources 4. Duration for Implementation Media Design:- 1. Online Platform 2. Media Elements 3. Instructional sequence 4. Presentation Structure

Data Analysis. Data obtained from the experts' responses is analysed based on FDM using Microsoft Excel. There several steps in the FDM. The steps in this study adopt those suggested by Mohd. Ridhuan Mohd. Jamil et al. (2013).

Step 1: Selection of Linguistic Scales. All linguistic variables in the questionnaire are converted to fuzzy triangular fuzzy number. See Table 3.6 for the five-point scale linguistic variables.

Table 3.6

Five-Point Scale Linguistic Variables

Linguistic Variable	**Fuzzy Scale**		
Most preferred	0.6	0.8	1
Preferred	0.4	0.6	0.8
Not sure	0.2	0.4	0.6
Slightly preferred	0.1	0.2	0.4
Least Preferred	0.0	0.1	0.2

These linguistic variables are selected according to the needs of the design phase in which the recording of the authentic teaching is determined by the criteria most preferred by the members of panel experts. According to Mohd. Ridhuan Mohd. Jamil et al. (2013), researchers can use linguistic variables according to the needs of the research objectives.

Step 2: Obtaining the Average Value (a_1, a_m, a_2). Chen (2000) suggested using the vertex method to calculate the average distance between r_{ij} (in Mohd. Ridhuan Mohd. Jamil et al., 2013). This is to get the average value m_1, m_2, m_3. The average is then used to calculate the threshold value and obtain the a_1, a_m, a_2 value. The spacing between two fuzzy numbers $m = (m_1, m_2, m_3)$ and $n = (m_1, m_2, m_3)$ is calculated using the formula:

$$\mathbf{d(m\tilde{n})} = \sqrt{\frac{1}{3}\left[(m_1 - n_1) + (m_2 - n_2) + (m_3 - n_3) \right]}$$

Step 3: Determining the Threshold Value (d). For the expert consensus to be reached, the threshold value must be less than 0.2 (d< 0.2) or 75% and above (Cheng & Lin, 2002). When the percentage is more than 75%, it means that the threshold value is less than 0.2 d (d< 0.2). According to Mohd. Ridhuan Mohd. Jamil et al. (2013), there should be 75% group consensus achieved among experts to proceed to the next step. If the percentage is found otherwise, a second round of FDM is needed (Mohd. Ridhuan Mohd. Jamil et al., 2013).

In this study, part A achieved 77% consensus among experts. Part B achieved 79% and Part C achieved 80%. This shows that there are consensuses achieved among experts since the percentage of consensus is more than 75%.

Step 4: Defuzzication (Determining the scores/ranking). The defuzzification process is done to determine the scores or ranking of the sub-items. There are three formulas for the defuzzification process and any one can be used:

i. $A_{max} = 1/3 * (a_1 + a_m + a_2)$
ii. $A_{max} = 1/4 * (a_1 + 2a_m + a_2)$
iii. $A_{max} = 1/6 * (a_1 + 4a_m + a_2)$

The researcher has chosen formula 1 for the defuzzification process. The FDM findings are reported in Chapter 5: Design and Development Phase.

Part 3: Development of Module. The objective of the development phase is to develop a suitable online case-based problem-solving module for ESL writing instruction incorporating the case criteria, curriculum aspects, and media design selected by experts. Based on the findings from panel experts on all the aspects significant to the module, the researcher goes through the process of developing an Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS) to explore its potential for enhancing problem-solving skills among pre-service

teachers. The FDM findings were used as a guide for the development of the module. The following were done:

1. Recording of the main component of the module, which is a case of an authentic ESL writing lesson based on the case criteria selected by panel experts.
2. Module description: Describing the learning outcomes, lessons, activities, evaluation, resources, and duration for implementation based on the curriculum aspects selected by panel experts.
3. Module on the online platform: Presentation of the module on the online platform most preferred by the panel experts.

Recording of an Authentic Case Scenario. The researcher goes through the process of recording an actual teaching of ESL writing in a secondary school classroom based on the input derived from the FDM procedure. The video of the ESL writing lesson is the main media tool for the case-based learning module. Before the shooting is done, the researcher interviews an expert in film and video technology to get consultation on the aspects to consider before, during and after the procedure of capturing the actual teaching scenario on camera (Refer Appendix 7 for interview protocol). The procedure for recording the authentic ESL writing lesson is reported in Chapter 5.

The video of an actual ESL writing lesson gives a vivid idea of what happens in a writing class. It is a useful source of information and teaching module. It can be used to identify problems faced during instruction and can also help provide a perspective for students' problem-solution analysis when used in a teacher education writing methodology class.

Before the samples and sites are used, field and ethical issues are considered. A written agreement is required before any recording is done. The researcher got the permission from the Ministry of Education and the Selangor State Education Department (Refer Appendix 8) to record the teaching session and use the video for this research. Table 3.7 provides the aspects of the module in brief. Findings are reported in Chapter 5.

Table 3.7

The Module

Aspects of the Module	**Description**
Instructors' Instruction/ Module Description	Describes the module and provides guidelines on how to implement the module including the philosophy, rationale, target students, role of teacher and students, goals and learning outcomes, assessment, and other important information that help the instructors/lecturers carry out the module smoothly in the TESL writing methodology class.
Participants	Bachelor of TESL undergraduates referred to as pre-service teachers
Course	The module is to be infused in a TESL Writing Methodology Course
Duration	As determined by panel experts in FDM
Learning outcomes	Learning outcomes are determined by panel experts in FDM
Contents	A video case depicting an actual ESL writing instruction for critical analysis of instructional problems (content and pedagogy) by pre-service teachers. The case criteria, curriculum aspects and media design of the module are based on panel experts' consensus in FDM.

Table 3.8, continued

Aspects of the Module	Description
Case-Based Learning Model and Instructional Principles	Based on the Instructional Model of Case Based Learning adapted from Choi and Lee (2009) and Jonassen's (1997) model. The model in this study includes three additional stages with integration of Merrill's First Principles of Instruction (2002)
Resources	As determined by panel experts in FDM
Evaluation	As determined by panel experts in FDM

The models of case-based learning by Jonassen (1997) and Choi and Lee (2009) are adapted as the instructional model for the case-based learning. The model is this study included three additional stages: Presenting solutions; Feedback on Solutions; and Reflecting on solutions. The model is integrated with Merril's First Principles of Instruction (2002). Table 3.8 summarizes the stages and principles that the current OCBPS module adopts:

Table 3.9

Models and Principles of the Online Case-based Module

Stages	Processes	Merill's First Principles of Instruction (2002)
1	Identification of problems in the case	Learning is promoted when learners are engaged in solving real-world problems
2	Analysis and brainstorming ideas for possible solutions	Learning is promoted when existing knowledge is activated as a foundation for new knowledge
3	Reviewing the literature for evidence-based support	Learning is promoted when new knowledge is demonstrated to the learner.
4	Deliberating on solution proposed and providing justification	Learning is promoted when new knowledge is applied by the learner.
5	Presenting solutions	
6	Feedback on solutions	Learning is promoted when new knowledge is integrated into the learner's world.
7	Reflecting on solutions	

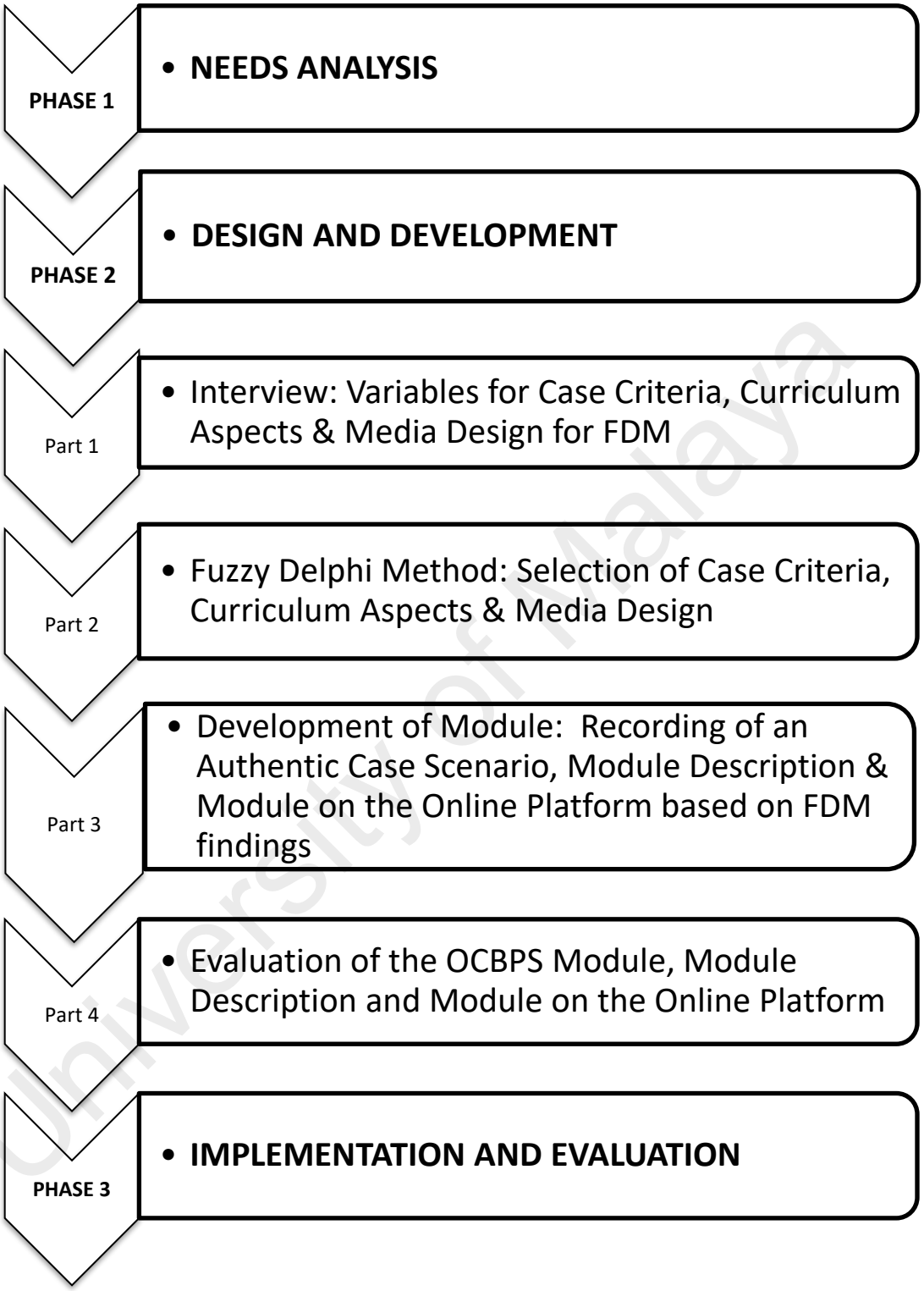


Figure 3.3. Operational Framework of Design and Development Phase

Phase 3: Evaluation

Objectives. The objective of this phase is to obtain the feedback from the pre-service teachers and lecturer on the usability of the OCBPS module after it has been implemented. The procedure for implementation and data collection are explained.

Implementation of the Online Case-Based Problem-Solving Module for ESL Writing Instruction in a Writing Methodology Course

The ESL Writing Methodology is the subject-matter for which the online case-based problem-solving process is focussed on. The methodology of teaching writing in the Teaching English as a Second Language (TESL) is usually taught in the TESL teacher education program in the Faculty of Education of various higher learning institutions for the purpose of preparing prospective teachers to teach English writing skills. Reviewing the course information of the Methodology in Teaching Writing in TESL in a Faculty of Education of a public university in Malaysia where the module is implemented, reveals that this course is taught in the second year for the duration of fourteen weeks or one semester (Faculty of Education, University A, 2013/2014).

The TESL program's 'Methodology in Teaching Writing' covers the principles and techniques in the teaching of writing with focus on the theories and pedagogical applications. Prospective English teachers are exposed to the methods, issues and challenges in teaching writing. Students are expected to apply relevant theories, methodology, strategies and approaches in micro teaching sessions especially suited for the Malaysian English Curriculum for writing skills. The assessments include quizzes, a report, micro teaching and test-construction. The course learning outcomes are to enable students to 1) describe the theoretical foundations of teaching writing, 2) select and apply suitable teaching methodology for writing class, 3) relate theories to

the practice of teaching writing, and 4) acquire and apply pedagogical knowledge in teaching writing. Students are taught the theories and approaches of teaching writing, text selection, material development and task construction, assessing written work and micro teaching in the Writing Methodology in TESL course (Faculty of Education, University A, 2013/2014).

The OCBPS Module is integrated in the Writing Methodology in TESL course to enhance pre-service teachers' problem solving skills. The researcher feels that it is suitable to implement the present case-based problem-solving module into the Writing Methodology in TESL course because part of the problem-solving process involves analytical thinking and synthesizing from the theories, principles and approaches of writing in the discussion and solution seeking process. The module encourages higher order thinking processes in the pre-service teachers' attempt at identifying the problems in the case and proposing solutions with evidence from the contents learnt in the course. The module encourages the application of content knowledge to pedagogical solutions with the hope of enhancing pre-service teachers' pedagogical content knowledge as recommended by Shulman (1987), and also to enhance their problem solving skills.

Samples. One lecturer and 22 pre-service teachers participated in this phase of the study. The rationale for using 22 pre-service teachers is that this number constitutes one intact group and cohort. Using one intact group in a class will not disrupt the original schedule and the pre-assigned grouping by the TESL department administration. Permission and written consent are obtained from the Dean of the faculty prior to implementing the module to fulfil the ethical procedure (refer Appendix 1).

Context. The module was designed for a specific context, which is TESL undergraduates in a local university. Richey and Klein in (2014) explained that "design and development research problems are typically contained in a specific context which includes distinct participants" (p. 148). In this phase, the researcher implements the module in a TESL education program's Writing Methodology in TESL course. It is carried out in the Faculty of Education of a local public university in the Klang Valley. The needs analysis was also done for the students in this context in the first phase.

Table 3.10

Samples and Site for Implementation and Evaluation of the Module

	Implementation and Evaluation
Samples	1 TESL lecturer 22 B. Ed TESL pre-service teachers
Site	Faculty of Education of a public university in the Klang Valley

Evaluation of the Module. The objective of this phase is to evaluate the module by discerning the perspectives of the lecturer and pre-service teachers on the usability of the OCBPS module. Survey and interviews determine the lecturer's and the pre-service teachers' perception of the online OCBPS module. The components are as follows:

1. Experience in Case-Based Problem-Solving in ESL Writing Instruction before and after the Implementation of the OCBPS Module

2. Evaluation of the Usability of the Module
    - Technical Aspects
    - Strengths of the Module
    - Level of Satisfaction of the Lesson
    - Students' Evaluation of the Problems
    - Opinion of the Module
        i. Strengths of the Module
        ii. The Limitations of the Module
        iii. The Problems Encountered during the Module Implementation
        iv. Suggestions and Comments for Improvements

3. Lecturer's Opinion of the Module from Interview
4. Students' Opinion of the Module from Interview
5. Comparison of Students' Pre and Post Reflection Scores
6. Pre-service Teachers' Reflection of the Module

Data Collection Methods. In the evaluation phase of this study, the evaluation is done using the exploratory implementation procedure through surveys, interviews and single-group pre-test-post-test. Explanation for each evaluation is given below:

Evaluation 1: Experience in Case-Based Problem-Solving in ESL Writing Instruction before and after the Implementation of the OCBPS Module. This evaluation is done to gauge the pre-service teachers' experience in case-based problem-solving in ESL writing instruction before and after the implementation of the OCBPS module. They respond to the entrance survey before the module is

implemented. After the implementation of the module, the pre-service teachers respond to the exit survey. Both entrance and exit surveys consist of the same 12 statements to gauge the pre-service teachers' level of agreement on a 5-point Likert-scale on the following aspects:

1. Ability to discuss concepts of pedagogical content knowledge, problems, contents in argumentative essays, pedagogy of teaching writing, and pedagogy in teaching argumentative writing.
2. Experience in observing a writing lesson online and engaging in problem-solution analysis, writing reflections on problem-solution analysis, and pedagogy and contents of ESL writing instruction.

It is to evaluate if the pre-service teachers perceive themselves to have gained from the OCBPS module after its implementation (Refer Appendix 9).

Evaluation 2: Usability of the Module. The pre-service teachers respond to a survey to evaluate the usability of the module. The items on usability of the module are categorized into the following themes:

- Technical Aspects
- Strengths of the Module
- Level of Satisfaction of the Lesson
- Students' Evaluation of the Problems
- Opinion of the Module
    - i. Strengths of the Module
    - ii. The Limitations of the Module
    - iii. The Problems Encountered during the Module Implementation
    - iv. Suggestions and Comments for Improvements

Instrument. A survey instrument is used to evaluate the usability of the OCBPS module. There are four parts in the instrument: Part A, B, C and D. Each part evaluates different aspects of usability of the OCBPS module. A detailed explanation of each part is presented in the following sub-sections.

Part A: Technical Aspects and Strengths of the Module. After the OCBPS Module for ESL Writing Instruction is implemented the pre-service teachers responded to a survey evaluating the usability of the module. There are 32 items in Part A of the survey (refer Appendix 10). Part A is to find out participants' level of agreement on a 4-point Likert scale: 1) Strongly Disagree; 2) Disagree; 3) Agree; and 4) Strongly Agree on the technical aspects and strengths of the module. The more detailed descriptive analysis of the items on Part A: Evaluation on Usability of the Module is reported under the themes Technical Aspects and Strengths of the Module.

Part B: Satisfaction of the Module. Part B of the survey evaluates the pre-service teachers' satisfaction of the OCBPS module. There are seven (7) items in Part B of the survey (refer Appendix 10). Part B is to find out participants' level of satisfaction on a 5-point Likert scale: 1) Very dissatisfied (VD); 2) Dissatisfied (D); 3) Moderately Satisfied (MS); 4) Satisfied (S); and 5) Very Satisfied (VS).

Part C: Problems Identified in the ESL Writing Lesson. Part C of the survey evaluates the pre-service teachers' perception on the quality of the problems identified. There are eleven (11) items in Part C of the survey (refer Appendix 10). Since it is a problem-solving module, the pre-service teachers provided their opinion on the nature and quality of the problems identified in the ESL writing lesson. They state their level of agreement on a 5-point Likert scale: 1) Strongly Disagree (SD); 2) Disagree (D); 3) Undecided (U); 4) Agree (A); and 5) Strongly Agree (SA).

Part D: Opinion of the Module. Part D of the survey contains open-ended questions (refer Appendix 10). The pre-service teachers have the option of providing their honest feedback on the OCBPS Module for ESL Writing Instruction after its implementation. They responded to open-ended questions on the strengths of the module, its limitations, and the problems faced in using the module. They also give comments and suggestions for improvements.

Data Analysis. After the pre-service teachers responded to the survey, the data was analysed using SPSS to derive descriptive statistics, mean, and standard deviation. The data from open-ended sections are reported in sub-headings based on the themes derived from the responses.

Lecturer's Evaluation of the Module. After the module was implemented, the lecturer who taught the module was interviewed to get her opinion on the Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS). Semi-structured interview was conducted to obtain the lecturer's perspective of the module to determine the usability of the OCBPS module in the writing methodology course, and whether it is able to achieve the intended learning outcomes. The interview protocol contains 29 questions to obtain the lecturer's opinion on her experience teaching the module, the contents and materials used, the technical aspects of the online platform, whether it is able to achieve the intended skills and outcomes, whether it is suitable for the writing methodology course, whether it is helpful for the pre-service teachers, her attitude towards the module, strengths, limitations, problems and challenges faced, and other questions related to the usability of the OCBPS module (Refer Appendix 11). The interview is audio-recorded and data is transcribed for coding based on themes. They are presented based on themes related to the usability of the module.

Pre-Service Teachers' Opinion of the Module. Four pre-service teachers who participated in the implementation of the module are interviewed. The pre-service teachers expressed their views and opinions in the interview sessions conducted by the researcher. The interview protocol contains 23 questions to obtain the pre-service teachers' opinion on their experience learning from the OCBPS module, whether it is helpful, useful and relevant, their attitude towards the module, technical aspects, strengths, problems encountered, and other questions on usability (Refer Appendix 12).

The interview sessions were conducted after the module was implemented. The one-on-one face-to-face interview sessions were held in a PhD. room of a library close to the classroom where the module was implemented. The atmosphere was silent and conducive for the interview sessions to proceed without distractions and interruptions. The pre-service teachers participated on a voluntary basis after the module implementation. The findings of the interview are presented in themes related to the usability of the module.

Pre-and Post-Reflection Essay. Before the OCBPS module is implemented, the pre-service teachers write a pre-reflection essay (Refer Appendix 13). They write a post reflection essay after the module is implemented (Refer Appendix 14). A Single-Group Pre-test-Post-test Design is adopted in which scores of pre-reflection essays written by the pre-service teachers at the beginning of the module implementation, and the scores of post reflective essays written at the end of the module implementation are compared. The scores of pre- and post-reflections are compared to determine if there are significant differences in the scores. If the scores have significant difference, it can be concluded that the module is able to improve the pre-service teachers' reflective abilities in the following aspects:

1. Pedagogical Content Knowledge
2. Problem-Solving Skills
3. Bridge Theory and Practice
4. Overall Score

Pre-service Teachers' Reflection. To determine the general attitude of pre-service teachers on the OCBPS module, their post reflective essays are analysed for reflections, opinion and thoughts about the whole learning experience. From the reflections, the lecturer can ascertain if the students have positive attitudes or otherwise from their learning experience of the OCBPS module. Nineteen (19) reflective essays written after the implementation of the module are analysed (Appendix 14 for sample post reflection essay). The reflections are analysed thematically to derive data for the findings on opinions on the usability of the module. The findings are presented in Chapter 6.

Table 3.11

Evaluation of the Module

Evaluation	**Method**			
	Exploratory Implementation Process	**Sample (N)**	**Sampling**	**Site**
Experience in Case-Based Problem-Solving in ESL Writing Instruction	Entrance and Exit Survey (Wilcoxon Signed Ranked Test)	22 TESL pre-service teachers	Purposive Sampling	Faculty of Education, University A
Evaluation of the Usability of the Module	Survey	22 TESL pre-service teachers		
Lecturer's Opinion of the Module	Semi-structured Interview	1 lecturer		
Students' Opinion of the Module	Interview	4 TESL pre-service teachers		
Comparison of Students' Pre-and Post-Reflection Scores	Pre- and Post-Reflective Essays (Single Group Pre-Test Post Test)	19 TESL pre-service teachers		
Pre-service Teachers' Reflection of the Module	Analysis of Post-Reflective Essays	19 TESL pre-service teachers		

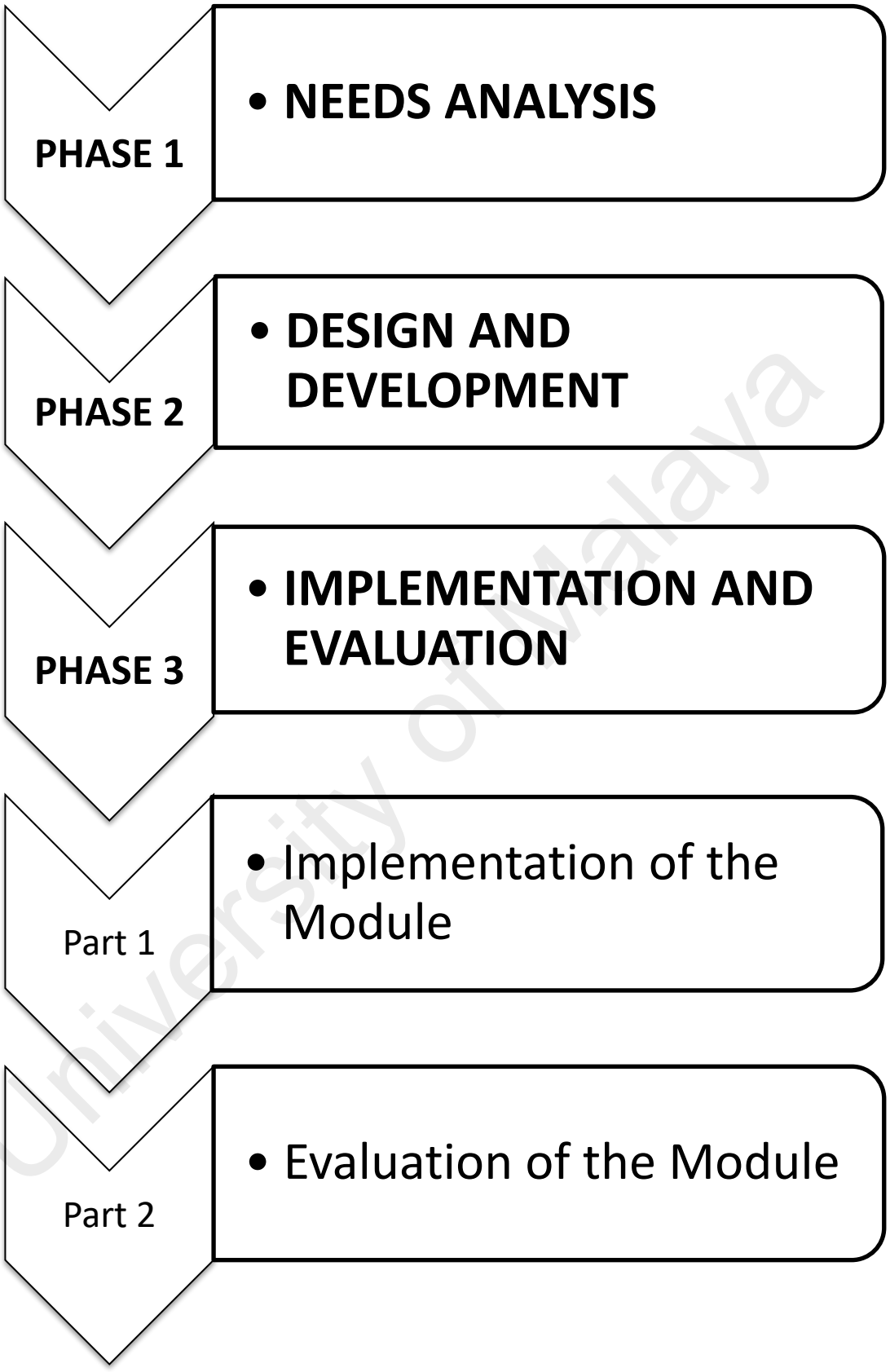


Figure 3.4. Operational Framework of Design and Development Phase

Conclusion

This study employs the design and developmental research (DDR) approach (Richey & Klein, 2005) for the design of an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. It is designed to enhance problem-solving skills, pedagogical content knowledge, and bridge theory and practice gap among pre-service teachers by integrating an online case in a video format to be used as a problem-solving module in a teacher education TESL writing methodology course. This study employs the DDR to develop a module because the procedure goes through the process of methodical analysis, in several phases, such as, needs analysis, design, development, and evaluation, based on a specific case that produces context-specific knowledge that serves a problem-solving function (Richey & Klein, 2005).

The OCBPS module is intended to serve as an agent that connects pre-service teachers to real world issues on writing instruction. The partnership between and amongst teacher educators and the teaching case are intended in this study to create a suitable module that brings real classroom issues to the attention of pre-service teachers with the aim of preparing them for teaching and improve their beliefs and attitudes on problem solving in ESL writing instruction. It is intended that as the pre-service teachers reflect on the issues, they co-construct their knowledge and views about the issues from their observation of a video-recording of a case, and discussion with lecturers and peers. It is hoped that they engage in collaborative discussion of exploring possible solutions to the issues raised in the problem-solving stages, providing scientific evidence and applying their tacit knowledge of pedagogical and education theories. The module hopes to encourage learning as a continual process and keeping abreast with current issues in education that can subsequently help them face challenges more readily and with more professionalism.

Chapter 4 Findings

Phase 1: Needs Analysis

Introduction

This chapter presents the findings of Phase 1, the Needs Analysis. The purpose of this phase is to investigate the needs for an OCBPS module for ESL writing instruction in the TESL program.

The data was collected using the Problem-Solving Inventory (PSI) (Heppner and Peterson, 1982) to investigate the perception of TESL pre-service teachers on their problem-solving abilities. In addition, a survey was carried out to find out their perception on the importance of problem-solving skills, their acceptance of case-based learning, and their interests in viewing videos online.

The findings are presented in four sections: pre-service teachers' perception of their problem-solving abilities, perception on the importance of problem-solving skills, acceptance of using an online case-based problem-solving module, and interests in viewing videos online.

Perception on Problem-Solving Abilities

A total of 121 TESL pre-service teachers from two universities: University A (n=58) and University B (n=63) took part in the needs analysis phase and responded to the Problem-Solving Inventory (PSI) by Heppner and Peterson (1982). Heppner and Peterson (1982, 1988) identified three factors in the Problem-Solving Inventory (PSI) through factor analysis: Problem-solving Confidence (PSC), Approach-Avoidant Style (AAS), and Personal Control (PC). The findings cover how samples appraise their problem-solving ability and skills with regards to these factors.

Reliability Test for the Problem-Solving Inventory for the Current Study

Table 4.1

Internal Consistency of the Problem-Solving Inventory

Domains of PS	Cronbach's Alpha	N of Items
PSC	.827	11
AAS	.781	16
PC	.745	5
Overall	.870	32

The Cronbach's alpha reliability coefficient of the overall inventory (PSI) shows an internal consistency of .870. As for each factor in the inventory, PSC has a Cronbach's alpha of .827; AAS has an internal consistency of .781, and PC with .745. These show that the 32-items in the PSI are reliable.

Table 4.2

Descriptive Statistics of the Problem-Solving Confidence (PSC) Items

Items	Strongly Disagree 1	Moderately Disagree 2	Disagree 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
I am usually able to think of creative and effective alternatives to my problems.	5 (4.1%)	6 (5.0%)	24 (19.8%)	43 (35.5%)	36 (29.8%)	7 (5.8%)	3.99	1.144	121
I have the ability to solve most problems even though initially no solution is immediately apparent.	3 (2.5%)	7 (5.8%)	37 (30.6%)	49 (40.5%)	21 (17.4%)	4 (3.3%)	3.74	1.004	121

Table 4.2, continued

Items	Strongly Disagree 1	Moderately Disagree 2	Disagree 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
Many of the problems I face are too complex for me to solve.	5 (4.1%)	10 (8.3%)	32 (26.4%)	53 (43.8%)	14 (11.6%)	7 (5.8%)	3.68	1.105	121
When solving a problem, I make decisions that I am happy with later.	4 (3.3%)	5 (4.1%)	24 (19.8%)	42 (34.7%)	32 (26.4%)	14 (11.6%)	4.12	1.177	121
When I make plans to solve a problem, I am almost certain that I can make them work.	2 (1.7%)	7 (5.8%)	22 (18.2%)	50 (41.3%)	31 (25.6%)	9 (7.4%)	4.06	1.059	121
Given enough time and effort, I believe I can solve most problems that confront me.	4 (3.3%)	7 (5.8%)	17 (14.0%)	49 (40.5%)	27 (22.3%)	17 (14.0%)	4.15	1.202	121
When faced with a novel situation, I have confidence that I can handle problems that may arise.	2 (1.7%)	7 (5.8%)	30 (24.8%)	49 (40.5%)	23 (19.0%)	10 (8.3%)	3.94	1.075	121
I trust my ability to solve new and difficult problems.	3 (2.50)	6 (5.0%)	30 (24.8%)	47 (38.8%)	26 (21.5%)	9 (7.4%)	3.94	1.090	121
After making a decision, the actual outcome is usually similar to what I had anticipated	2 (1.7%)	4 (3.3%)	37 (30.6%)	50 (41.3%)	23 (19.0%)	5 (4.1%)	3.85	0.963	121

Table 4.2, continued

Items	Strongly Disagree 1	Moderately Disagree 2	Disagree 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
When confronted with a problem, I am unsure of whether I can handle the situation.	4 (3.3%)	16 (13.2%)	35 (28.9%)	42 (34.7%)	17 (14.0%)	7 (5.8%)	3.60	1.158	121
When I become aware of a problem, one of the first things I do is try to find out exactly what the problem is.	2 (1.7%)	6 (5.0%)	23 (19.0%)	31 (25.6%)	31 (25.6%)	28 (23.1%)	4.38	1.260	121

Table 4.3

Distribution of responses, mean and standard deviation of the Approach-Avoidance Style (AAS) Items

Items	SD 1	MD 2	D 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
When a solution to a problem has failed, I do not examine why it didn't work	1 (0.8%)	8 (6.6%)	20 (16.5%)	17 (14.0%)	39 (32.2%)	36 (29.8%)	4.60	1.295	121
When I am confronted with a complex problem, I don't take the time to develop a strategy for collecting information that will help define the nature of the problem.	1 (0.8%)	11 (9.1%)	18 (14.9%)	28 (23.1%)	39 (32.2%)	24 (19.8%)	4.36	1.258	121
After I solve a problem, I do not analyse what went right and what went wrong.	2 (1.7%)	7 (5.8%)	23 (19.0%)	35 (28.9%)	35 (28.5%)	19 (15.7%)	4.25	1.199	121

Table 4.3, continued

Items	SD 1	MD 2	D 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
After following a course of action to solve a problem, I compare the actual outcome with the one I had anticipated	5 (4.1%)	9 (7.4%)	17 (14.0%)	45 (37.2%)	37 (30.6%)	8 (6.6%)	4.02	1.179	121
When I have a problem, I think of as many possible ways to handle it as I can until I can't come up with any more ideas	2 (1.7%)	8 (6.6%)	27 (22.3%)	37 (30.6%)	31 (25.6%)	16 (13.2%)	4.12	1.192	121
When confronted with a problem, I consistently examine my feelings to find out what is going on in a problem situation.	1 (0.8%)	7 (5.8%)	16 (13.2%)	42 (34.7%)	40 (33.1%)	15 (12.4%)	4.31	1.087	121
When confronted with a problem, I tend to do the first thing that I can think of to solve it.	4 (3.3%)	6 (5.0%)	30 (24.8%)	38 (31.4%)	32 (26.4%)	11 (9.1%)	4.00	1.176	121
When considering solutions to a problem, I do not take the time to assess the potential success of each alternative	4 (3.3%)	13 (0.7%)	34 (28.1%)	34 (28.1%)	28 (23.1%)	8 (6.6%)	3.77	1.209	121
When confronted with a problem, I stop and think about it before deciding on a next step	5 (4.1%)	5 (4.1%)	22 (18.2%)	43 (35.5%)	32 (26.4%)	14 (11.6%)	4.11	1.203	121
I generally act on the first idea that comes to mind in solving a problem.	8 (6.6%)	6 (5.0%)	38 (31.4%)	41 (33.9%)	21 (17.4%)	7 (5.8%)	3.68	1.192	121

Table 4.3, continued

Items	SD 1	MD 2	D 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
When making a decision, I compare alternatives and weigh the consequences of one against the other.	3 (2.5%)	6 (5.0%)	22 (18.2%)	36 (29.8%)	36 (29.8%)	18 (14.9%)	4.24	1.204	121
I try to predict the result of a particular course of action.	3 (2.5%)	2 (1.7%)	16 (13.2%)	46 (38.0%)	36 (29.8%)	18 (14.9%)	4.36	1.094	121
When I try to think of possible solutions to a problem, I do not come up with very many alternatives	6 (5.0%)	10 (8.3%)	31 (25.6%)	51 (42.1%)	16 (13.2%)	7 (5.8%)	3.68	1.142	121
I use a systematic method to compare alternatives and make decisions.	2 (1.7%)	11 (9.1%)	29 (24.0%)	48 (39.7%)	25 (20.7%)	6 (5.0%)	3.83	1.067	121
When faced with a problem, I seldom assess the external forces that may be contributing to the problem.	2 (1.7%)	8 (6.6%)	40 (33.1%)	44 (36.4%)	21 (17.4%)	6 (5.0%)	3.76	1.033	121
When confronted with a problem, I usually first survey the situation to determine the relevant information.	1 (0.8%)	8 (6.6%)	18 (14.9%)	48 (39.7%)	38 (31.4%)	8 (6.6%)	4.14	1.027	121

Table 4.4

Descriptive Statistics of the Personal Control (PC) Items

Items	SD 1	MD 2	D 3	Slightly Agree 4	Moderately Agree 5	Strongly Agree 6	Mean	Std. Dev	N
When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation	5 (4.1%)	22 (18.2%)	39 (32.2%)	23 (19.0%)	19 (15.7%)	13 (10.7%)	3.56	1.353	121
Sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead.	7 (5.8%)	19 (15.7%)	36 (29.8%)	34 (28.1%)	18 (14.9%)	7 (5.8%)	3.48	1.252	121
Even though I work on a problem, sometimes I feel like I'm groping or wandering and not getting down to the real issue.	9 (7.4%)	17 (14.0%)	46 (38.0%)	34 (28.1%)	6 (5.0%)	9 (7.4%)	3.31	1.225	121
I make snap judgments and later regret them.	5 (4.1%)	11 (9.1%)	35 (18.9%)	42 (34.7%)	17 (14.0%)	11 (9.1%)	3.73	1.211	121
There are times when I become so emotionally charged that I can no longer see the alternatives for solving a particular problem.	13 (10.7%)	21 (17.4%)	47 (38.8%)	21 (17.4%)	13 (10.7%)	6 (5.0%)	3.15	1.282	121

Analysis of Pre-Service Teachers' Perception of Their Problem-Solving Skills

Table 4.5

Mean according to Problem-Solving Confidence; Acceptance-Avoidant Style; and Personal Control

Statistics				
Factors	**PSC**	**AAS**	**PC**	**TOTAL**
N	121	121	121	121
Mean	3.9504	4.0759	3.4463	3.9344
Variance	.456	.315	.794	0.269
Std. Dev.	.6753	.5621	.0891	.0164
Minimum	2.18	2.50	1.40	2.69
Maximum	5.91	5.44	6.00	5.47

The table above shows the overall mean of pre-service teachers' perception of their problem-solving abilities. It also shows the mean for each factor. Results show that pre-service teachers mostly slightly agree to the items relating to Problem-Solving Confidence (PSC) (mean=3.9504, SD=.6753). This shows that most participants have a satisfactory PSC. The pre-service teachers reported having a moderate perception of Approach-Avoidance Style (AAS) in relation to their problem-solving ability (mean=4.0759, SD=.5621). On their perception of Personal Control (PC), the pre-service teachers have a low to moderate perception for this factor (mean=3.4463, SD=.0891). Overall, the pre-service teachers have a moderate perception of their problem-solving abilities (mean=3.9344, SD=.0164).

Analysis of Pre-Service Teachers' Perception of Their Problem-Solving Skills According to University. Before a statistical analysis is done to compare if there are any significant differences in the perception of problem-solving skills between pre-service teachers in University A and University B for all the three factors, several normality tests are conducted to analyse whether the differences are to be determined through a parametric test or a non-parametric one. The results of the normality tests are shown in the tables and diagrams below.

Normality Test for Problem-solving Confidence (PSC)

Table 4.6

Kolmogorov-Smirnov[a] Normality Test for Problem-solving Confidence (PSC)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PSC	.057	121	**.200***	.991	121	.582

The Kolmogorov-Smirnov[a] normality test shows a normal distribution since the p-value of Kolmogorov is > 0.05 (See Table 4.6).

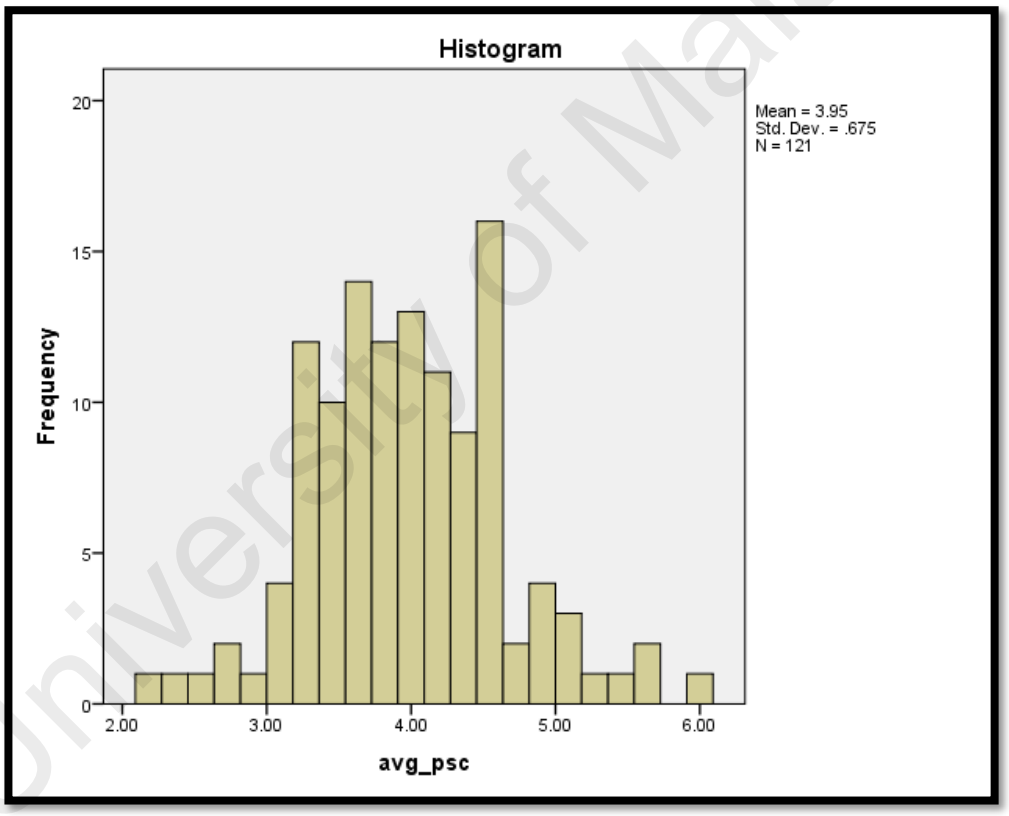


Figure 4.1. Histogram for Problem-solving Confidence (PSC)

The histogram shows a curve which approximates a normal curve for items on Problem-solving Confidence (PSC) (See Figure 4.1).

Normality Test for Approach-Avoidant Style

Table 4.7

Kolmogorov-Smirnov[a] Normality Test for Approach-Avoidant Style (AAS)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AAS	.078	121	**.069**	.971	121	.010

The Kolmogorov-Smirnov[a] normality test for AAS shows a normal distribution since p-value of Kolmogorov > 0.05 (See Table 4.7).

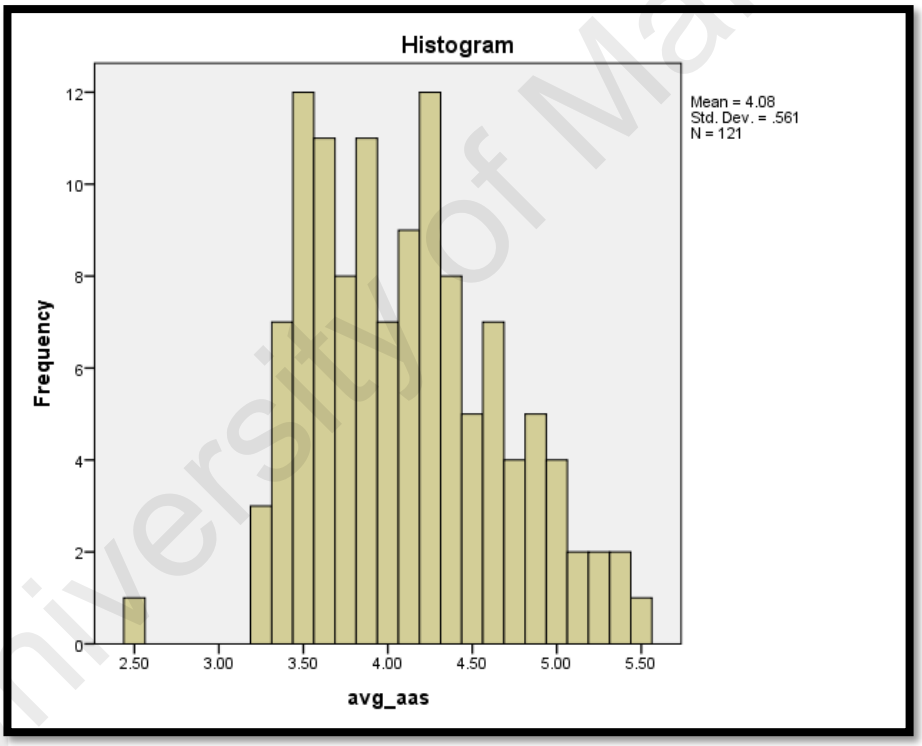


Figure 4.2 Histogram for Approach-Avoidant Style (AAS)

The histogram shows a curve which approximates a normal curve for items on Approach-Avoidant Style (AAS) (See Figure 4.2).

Normality Test for Personal Control (PC)

Table 4.8

Kolmogorov-Smirnov[a] Normality Test for Personal Control (PC)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PC	.101	121	**.004**	.971	121	.011

The Kolmogorov-Smirnov[a] normality test for PC shows a distribution that is not normal since p-value of Kolmogorov < 0.05 (See Table 4.8).

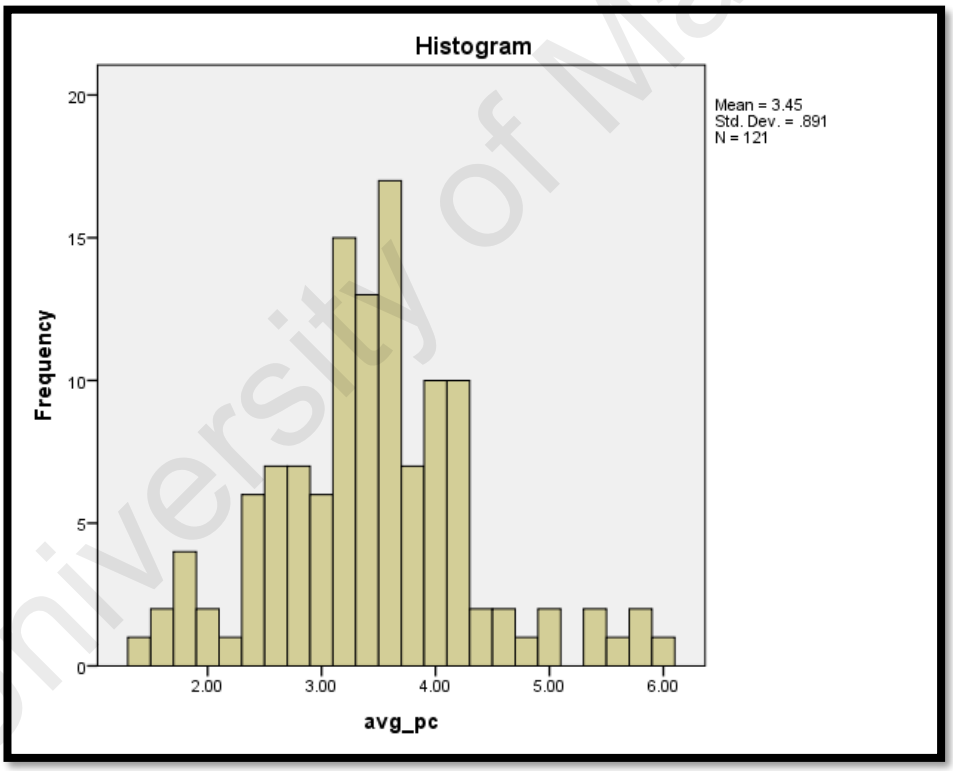


Figure 4.3. Histogram for *Personal Control (PC)*

The histogram shows a curve which approximates a normal curve for items on PC (See Figure 4.3). Since the Kolmogorov-Smirnov[a] normality test for PC and the histogram show inconsistencies in the distribution of normality, other normality tests are done to determine the normality of PC.

Normality Test Using Stem-and-Leaf and Q-Q Plot for Personal Control (PC)

Frequency Stem & Leaf

1.00 Extremes (=<1.4)
6.00 1 . 668888
9.00 2 . 002444444
14.00 2 . 66666668888888
34.00 3 . 00000022222222222222444444444444
24.00 3 . 666666666666666668888888
22.00 4 . 0000000000222222222244
3.00 4 . 668
4.00 5 . 0044
4.00 Extremes (>=5.6)

Stem width: 1.00
Each leaf: 1 case(s)

Figure 4.4. Stem-and-Leaf Plot for Personal Control (PC)

Stem & leaf plot for PC shows normal curve (See Figure 4.4)**.**

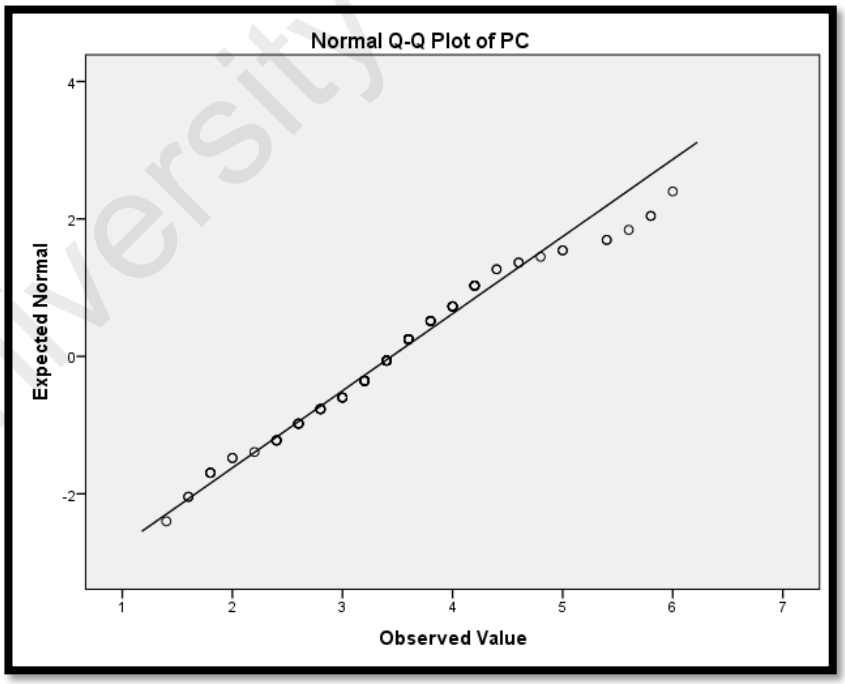


Figure 4.5. Q-Q Plot of Personal Control (PC)

The Q-Q Plot of PC is normal. Almost all the points lines on the straight line (See Figure 4.5). Based on the histogram, Stem-and-Leaf Plot and Q-Q Plot, the distribution for PC is normally distributed.

Normality Test for Overall Factors

Table 4.9

Kolmogorov-Smirnov[a] Normality Test for Overall Factors

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Overall	.098	121	**.006**	.963	121	**.002**

The Kolmogorov-Smirnov[a] normality test for overall factors shows a distribution that is not normal since p-value of Kolmogorov < 0.05 (See Table 4.9).

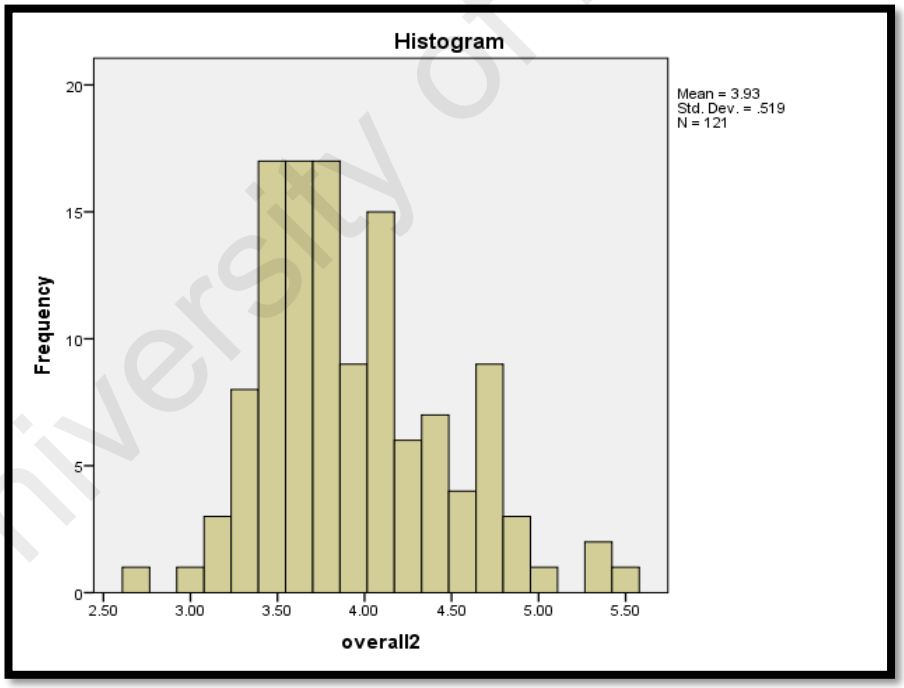


Figure 4.6 Histogram for Overall Factors

The histogram shows a normal curve for the overall factors (See Figure 4.6). Since the Kolmogorov-Smirnov[a] normality test for PC and the histogram show

inconsistencies in the distribution of normality, other normality tests are done to determine the normality of the overall scores.

```
Frequency    Stem & Leaf
     1.00       2 .  6
     1.00       2 .  9
     2.00       3 .  11
     9.00       3 .  223333333
    23.00       3 .  44444444444555555555555
    22.00       3 .  6666666666777777777777
    12.00       3 .  888888889999
    19.00       4 .  0000000000000000111
     8.00       4 .  22223333
     7.00       4 .  4444555
    10.00       4 .  6666666777
     3.00       4 .  888
     1.00       5 .  0
     3.00 Extremes    (>=5.3)
 Stem width:      1.00
 Each leaf:       1 case(s)
```

Figure 4.7 Stem-and-Leaf Plot for Overall Factors

The stem & leaf plot shows a normal curve for the overall factors (See Figure 4.7).

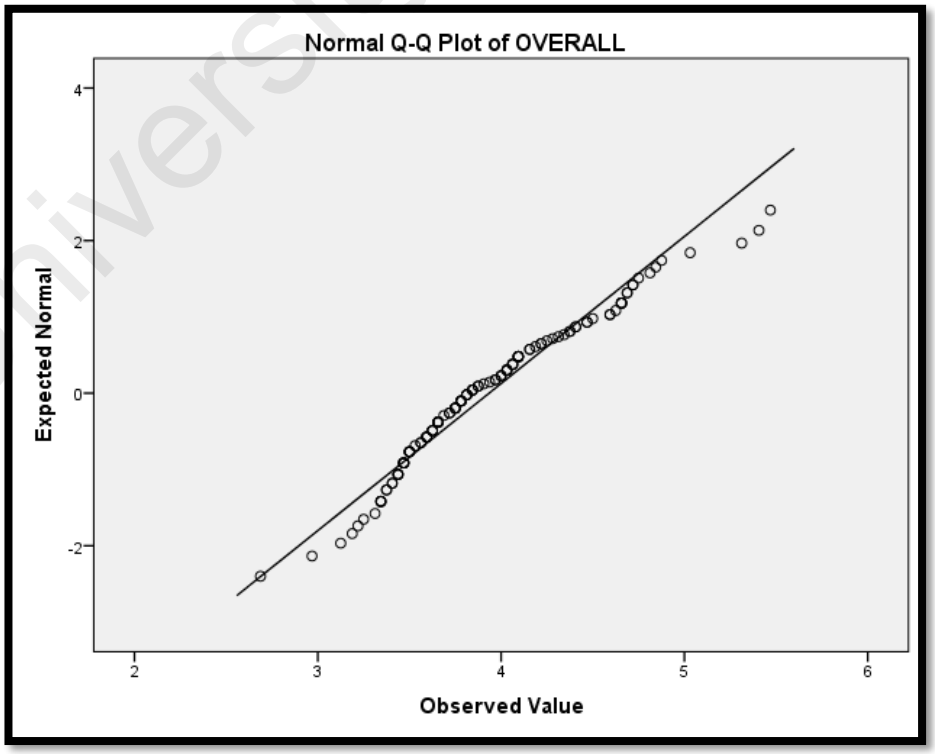


Figure 4.8. Q-Q Plot for Overall Factors

The Q-Q plot is normal (See Figure 4.8). Almost all the points line on the straight line. Out of four normality test, 3 shows the overall factors to be normally distributed, hence a parametric test is used to compare mean between two universities.

Perception of Pre-Service Teachers' Problem-Solving Skills According to University. Since all the factors in the Problem-Solving Inventory show normal distribution, a t-test is used to determine if there is any significant difference in pre-service teachers' perception of their problem-solving skills according to university.

Table 4.10.

Mean for Each Factor According to University

	Group Statistics				**Independent Samples t-test**	
Factors	University	N	Mean	Std. Deviation	t-value	p-value
PSC	A	58	3.9530	.73050	.040	.968
	B	63	3.9481	.62532		
AAS	A	58	4.1369	.59286	1.147	.254
	B	63	4.0198	.52936		
PC	A	58	3.5690	.87844	1.460	.147
	B	63	3.3333	.89443		
OVERALL	A	58	3.9849	.58002	1.028	.306
	B	63	3.8879	.45468		

Table 4.10 shows the mean score for each factor according to university. Independent sample t-tests are conducted to determine if there is any significant difference amongst the pre-service teachers of University A and University B on their perception of problem-solving abilities for each factor. The significant level for all analysis was determined at 0.05. The p-value score for PSC ($p=.968>0.05$) indicates that there is no significant difference in the mean scores of PSC between pre-service teachers from the two universities. The p-value for AAS ($p=.254>0.05$) indicates there

is no significant difference in the mean scores of AAS between the two universities' pre-service teachers. Similarly for PC, the p-value is .147> 0.05. This means that there is no significant difference in the mean scores of PC between samples from the two universities.

For overall PSI, the p-value is more than the significance level ($p=0.306 > \alpha=0.05$). This concludes that there is no significant difference between the pre-service teachers from the two universities for overall perception of problem-solving abilities. This indicates that although the participants are heterogeneous, the perception on problem-solving abilities shows no difference.

Perception on the Importance of Problem Solving Skills (IPSS)

Data from 121 pre-service teachers from two universities on the Importance of Problem-Solving Skills (IPSS) was analysed to determine their perception on the importance of problem-solving skills. The findings are important to establish a need to develop an online case-based problem-solving module. If they perceive problem-solving skills as important, it will be more likely to implement a problem-solving module as they show positive inclination towards enhancing this skill. The results are presented below:

Estimates of Reliability of Items on the Importance of Problem-Solving Skills

Table 4.11

Importance of Problem-Solving Skills

	Cronbach's Alpha	N of Items
Importance of Problem-Solving Skills	.937	13

The Cronbach's alpha reliability coefficient for the thirteen items on the importance of problem-solving skills is .937. These show that the items for IPSS has high reliability estimate.

Descriptive Statistics for Perception on the Importance of Problem-Solving Skills (IPSS)

Table 4.12

Descriptive Statistics for Importance of Problem-Solving Skills

Items	SD	D	U	A	SA	Mean	Std. Dev	N
It is important for everyone to learn problem-solving skills.	0	0	3 (2.5%)	51 (42.1%)	67 (55.4%)	4.53	0.549	121
Problem-solving is an important skill for everyone.	0	0	1 (0.8%)	44 (36.4%)	76 (62.8%)	4.62	0.504	121
It is important for me to learn and aquire problem-solving skills.	0	1 (O.8%)	4 (3.3%)	54 (44.6%)	62 (51.2%)	4.46	0.606	121
It is important for teachers to have problem-solving skills to solve problems related to their profession.	0	1 (0.8%)	2 (1.7%)	45 (37.2%)	73 (60.3%)	4.57	0.575	121
Higher education should help students develop problem-solving skills.	0	1 (0.8%)	3 (2.5%)	47 (38.8%)	70 (57.9%)	4.54	0.592	121
Problem-solving is an important skill to have to face the challenges of life	0	1 (0.8%)	1 (0.8%)	46 (38.0%)	73 (60.3%)	4.58	0.559	121
Courses in universities should help students solve problems related to the course.	1 (0.8%)	1 (0.8%)	4 (3.3%)	50 (41.3%)	65 (53.7%)	4.46	0.684	121
I will be a better English teacher if I have learnt how to solve problems related to teaching specific skill, such as writing skill.	0	2 (1.7%)	5 (4.1%)	51 (42.1%)	63 (52.1%)	4.45	0.658	121
Future teachers should be exposed to problem-solving practices related to the contents and pedagogies	0	1 (0.8%)	3 (2.5%)	57 (47.1%)	60 (49.6%)	4.45	0.592	121
I think having problem-solving skills help a person be better at is/her job.	1 (0.8%)	1 (0.8%)	5 (4.1%)	59 (48.8%)	55 (45.5%)	4.37	0.685	121
Problem-solving is an important skill to have in any profession.	0	4 (3.3%)	1 (0.8%)	43 (35.5%)	73 (60.3%)	4.53	0.684	121

It is important for the TESL programme to prepare students to solve problems related to teaching English.	1 (0.8%)	0	0	56 (46.3%)	64 (52.9%)	4.50	0.593	121
Future English teachers should be trained to solve authentic problems related to teaching	1 (0.8%)	0	3 (2.5%)	60 (49.6%)	57 (47.1%)	4.42	0.629	121

The mean for perception of IPSS for pre-service teachers are shown in Table 4.12. Pre-service teachers percieve problem-solving to be important. The findings show that pre-service teachers agree that problem-solving is an important skill for everyone (mean= 4.62, SD=0.504). They percieve problem-solving as an important skill to have to face the challenges of life (mean=4.58, SD=0.559). They agree that it is important for everyone to learn problem-solving skills (mean=4.53, SD=0.55), and that it is important for each one of them to acquire problem-solving skills (mean=4.46, SD=0.61).

Pre-service teachers perceive problem-solving as important in higher education, in the TESL programme, and in academic courses.The findings show that pre-service teachers perceive that it is important for higher education to help students develop problem-solving skills (mean=4.54, SD=0.59). It is important for the TESL programme to prepare students to solve problems related to teaching English (mean=4.50, SD=0.59). In addition, pre-service teachers agree that courses in universities should help students solve problems related to the course (mean=4.46, SD=0.68).

Pre-service teachers view problem-solving as important for work. They perceive problem-solving as an important skill to have in any profession (mean=4.53, SD=0.68). They agree that it is important for teachers to have problem-solving skills to solve problems related to their profession (mean=4.57, SD=0.58). They also think

that having problem-solving skills help a person be better at his/her job (mean=4.37, SD=0.69).

Pre-service teachers view problem-solving as important for teachers. Each percieve he/she will be a better English teacher if he/she has learnt how to solve problems related to teaching specific skill, such as writing skill (mean=4.45, SD=0.59). They agree that future teachers should be exposed to problem-solving practices related to contents and pedagogies (mean=4.45, SD=0.59), and that future English teachers should be trained to solve authentic problems related to teaching (mean=4.42, SD=0.63).

Most of the samples indicate positive perception on the importance of problem-solving skills. The statement that is rated most important is 'Problem-solving is an important skill for everyone' (mean = 4.62, S.D. =0.504) followed by 'Problem-solving is an important skill to have to face the challenges of life' (mean=4.58, SD=0.559). The third highest rated statement is 'It is important for teachers to have problem-solving skills to solve problems related to their profession' (mean=4.57, SD=0.575). We can conclude that there is a high perception on the importance of problem-solving skills.

Analysis of Pre-Service Teachers' Perception on the Importance of Problem-Solving Skills.

Table 4.13

Overall Mean of the Perceptions on the Importance of Problem-Solving Skills

	Mean	Std. Dev	Minimum	Maximum	N
Importance of Problem-Solving Skills	4.499	0.46166	2.15	5.00	121

Table 4.13 shows the overall mean of pre-service teachers' (N=121) perception on the importance of problem-solving skills. Results show that pre-service teachers mostly agree to the items relating to importance of problem-solving skills (mean=4.499, SD=0.46166). Overall, pre-service teachers perceive problem-solving skills to be important.

Analysis of Pre-Service Teachers' Perception of the Importance of Problem-Solving Skills (IPSS) According to University. Before a statistical analysis is done to compare if there are any significant differences in the perception of the importance of problem-solving skills between pre-service teachers in University A and University B, a normality test is conducted to analyse whether the differences are to be determined through a parametric test or a non-parametric one. The results of the normality tests are shown below.

Table 4.14

Kolmogorov-Smirnov[a] Normality Test for Pre-Service Teachers' Perception of the Importance of Problem-Solving Skills (IPSS) According to University

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
IPSS	.139	121	**.000**	.870	121	**.000**

Table 4.14 shows the normality test of the distribution of scores. A non-significant result (Sig. value of more than 0.05) indicates normality. In this case, the Sig. value is 0.000, suggesting violation of the assumption of normality. Thus, this data is not normally distributed.

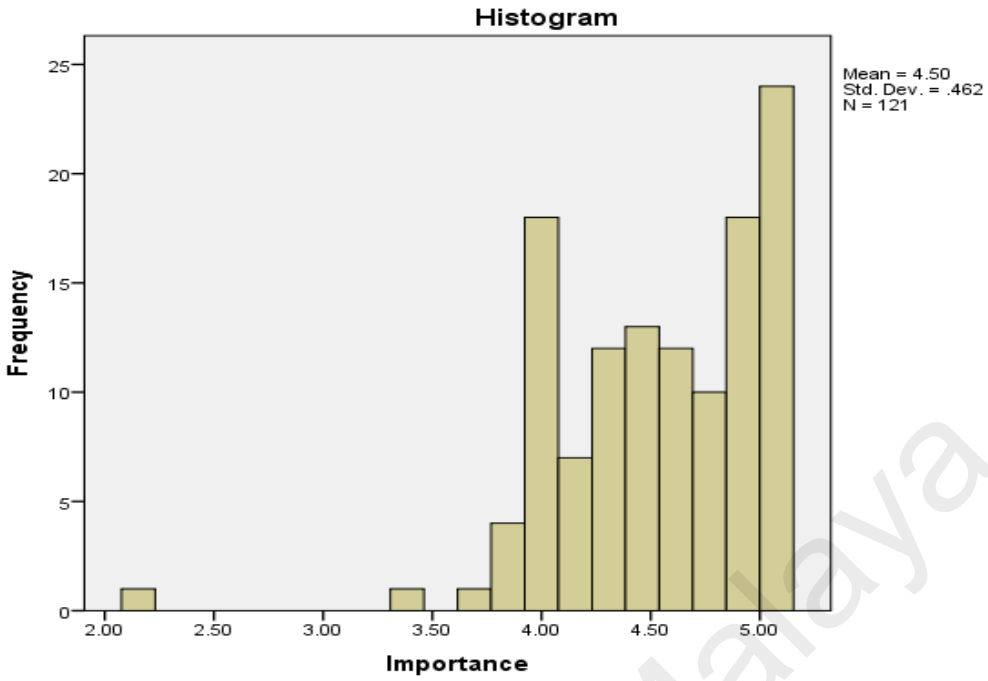


Figure 4.9. Histogram for Pre-Service Teachers' Perception of the Importance of Problem-Solving Skills (IPSS) According to University

The histogram shows that the data is not normally distributed

The result of the analysis on normality for pre-service teachers' perception of the importance of problem-solving skills according to university is not normal. Hence, the non-parametric Mann Whitney Test is used to determine if there is any significant difference for IPSS between University A and University B.

Table 4.15

Mann-Whitney Test on Pre-Service Teachers' Perception of the Importance of Problem-Solving Skills According to University

Test Statistics[a]	
IPSS	
Mann-Whitney U	1686.000
Z	**-.736**
Asymp. Sig. (2-tailed)	**.462**
a. Grouping Variable: University	

From the output, the z-value is -0.736 with a significance level (p) of p=0.462, thus the p-value is not less or equal to α = 0.05, so the result is not significant (See Table 4.15). There is no statistically significant difference in the pre-service teachers' perception of the importance of problem-solving skills between University A and University B.

Table 4.16

Median for Pre-Service Teachers' Perception of the Importance of Problem-Solving Skills (IPSS) According to University

	IPSS	
University	N	Median
Univ. A	58	4.7692
Univ. B	63	4.4615
Total	121	4.5385

Table 4.16 shows the median score for perception on importance of problem-solving skills according to university. A Mann-Whitney Test was conducted to determine if there is any difference in the perception of pre-service teachers from University A and University B on the importance of problem-solving skills. Significance level for all analysis was determined at 0.05. The median score for University A (*M*= 4.7692, *n*= 58) is higher than University B (*M*= 4.4615, *n*= 63). However, since the p-value=0.462 is greater than α= 0.05, we can conclude that there is no significant difference in the perception on the importance of problem-solving skills between University A and University B (*U*= 1686.000, *Z*=-0.736, *p*=0.462).

Acceptance of Case-Based Learning

The results of the survey with 121 TESL pre-service teachers from two universities on their acceptance of case-based learning are reported in this section.

Estimates of Reliability of Items on Acceptance of Case-Based Learning (ACBL)

Table 4.17

Cronbach's Alpha: Acceptance of Case-Based Learning

Factors	Cronbach's Alpha	N of Items
ACBL	.933	12

The Cronbach's alpha reliability coefficient for the twelve items on the acceptance of case-based learning is .933 (See Table 4.17). These show that the 12-items analysing the acceptance of case-based learning have high reliability estimates.

Descriptive Statistics for Acceptance of Case-Based Learning (ACBL)

Table 4.18

Descriptive Statistics for Acceptance of Case-Based Learning

Items	SD	D	U	A	SA	Mean	Std. Dev	N
Case-based learning is an effective approach to develop problem-solving skills	1 (0.8%)	1 (0.8%)	12 (9.9%)	60 (49.6%)	47 (38.8%)	**4.25**	**0.733**	121
Case-based learning should be infused in the ESL writing methodology course to expose future English teachers to the actual teaching scenario of ESL writing in the Malaysian contexts	1 (0.8%)	1 (0.8%)	10 (8.3%)	60 (49.6%)	49 (40.5%)	**4.28**	**0.721**	121
Case-based learning is a way for future teachers to develop problem-solving skills through exposure to actual teaching scenario showing authentic problems	0	1 (0.8%)	12 (9.9%)	57 (47.1%)	51 (42.1%)	**4.31**	**0.681**	121

Table 4.18, continued

Items	SD	D	U	A	SA	Mean	Std. Dev	N
related to teaching in actual education contexts								121
Future English teachers can be trained to solve authentic problems related to teaching through case-based learning	0	3 (2.5%)	11 (9.1%)	64 (52.9%)	43 (35.5%)	**4.21**	**0.710**	
I think all TESL students should know the problems qualified teachers face in teaching ESL writing	1 (0.8%)	1 (0.8%)	9 (7.4%)	71 (58.7%)	39 (32.2%)	**4.21**	**0.682**	121
I am interested in learning through case-based learning to view actual scenarios of teaching to solve authentic problems	0	1 (0.8%)	13 (10.7%)	77 (63.6%)	30 (24.8%)	**4.12**	**0.613**	121
I am interested to view an actual teaching scenario showing a teacher teaching writing to ESL students to analyze the issues in a writing class with my lecturer and course-mates	1 (0.8%)	0	9 (7.4%)	77 (63.6%)	34 (28.1%)	**4.18**	**0.632**	121
Watching a qualified teacher teaching ESL writing will help me view actual problems related to contents and pedagogy	0	3 (2.5%)	11 (9.1%)	79 (65.3%)	28 (23.1%)	**4.09**	**0.645**	121
I think it will help me be more prepared for teaching ESL writing skills if I view how professional teachers teach ESL writing and discuss the method and approach used	0	1 (0.8%)	9 (7.4%)	78 (64.5%)	33 (27.3%)	**4.18**	**0.592**	121
I am interested to know the problems teachers face in teaching ESL writing	0	2 (1.7%)	7 (5.8%)	85 (70.2%)	27 (22.3%)	**4.13**	**0.577**	121
I am interested to view a teacher teaching ESL writing skills to see his/her experience in teaching writing	0	2 (1.7%)	9 (7.4%)	81 (66.9%)	29 (24.0%)	**4.13**	**0.605**	121
I am willing to collaborate with lecturers and course-mates in viewing actual teaching scenarios to identify, analyze and solve problems through case-based learning	0	2 (1.7%)	15 (12.4%)	76 (62.8%)	28 (23.1%)	**4.07**	**0.648**	121

Table 4.18 shows the mean scores for items on acceptance of case-based learning. Pre-service teachers mostly agree that case-based learning is an effective approach to develop problem-solving skills (Mean=4.25, SD=0.733). They agree that future English teachers can be trained to solve authentic problems related to teaching through case-based learning (Mean=4.21, SD=0.710). Most of them agreed that case-based learning is a way for future teachers to develop problem-solving skills through exposure to actual teaching scenario showing authentic problems related to teaching in an actual education contexts (Mean=4.31, SD=0.681).

The pre-service teachers mostly are interested to know the problems teachers face in ESL writing (Mean=4.13, SD=0.577). They agree that watching a qualified teacher teaching ESL writing will help them view actual problems related to contents and pedagogy (Mean=4.09, SD=0.645), and they can see a teacher's experience in teaching writing (Mean=4.13, SD=0.605).

Most of the pre-service teachers are interested in learning through case-based learning to view actual scenario of teaching of writing to ESL students to analyse the issues in a writing class with their lecturer and course-mates (Mean=4.18, SD=0.632). They are willing to collaborate with lecturers and course-mates in viewing actual teaching scenario to identify, analyse and solve problems through case-based learning (Mean=4.07, SD=0.648).

Most of the pre-service teachers agree that all TESL students should know the problems qualified teachers face in teaching ESL writing (Mean=4.21, SD=0.682). They agree that it will help them be more prepared to teach ESL writing skills if they view how professional teachers teach ESL writing and discuss the methods and approaches used (Mean=4.18, SD=0.592). They agree that case-based learning should be infused in the ESL writing methodology course to expose future English teachers

to the actual teaching scenario of ESL writing in the Malaysian context (Mean=4.28, SD=0.721).

Most of the pre-service teachers agree to all the statements above, indicating a positive perception on acceptance of case-based learning. The highest rated statement is 'Case-based learning is a way for future teachers to develop problem-solving skills through exposure to actual teaching scenario showing authentic problems related to teaching in actual education contexts' (mean=4.31, SD=0.681). The next highest rated satement is 'Case-based learning should be infused in the ESL writing methodology course to expose future English teachers to the actual teaching scenario of ESL writing in the Malaysian contexts' (mean=4.28, SD=0.721). The third highest rated statement is, 'Case-based learning is an effective approach to develop problem-solving skills' (mean=4.25, SD=0.733). We can conclude that most of the pre-service teachers either agree or strongly agree to the statements above indicating a high acceptance of case-based learning. This shows that the TESL undergraduates are open to the idea of learning through case-based learning, hence, the need to develop a case-based learning module for problem-solving purpose for ESL writing instruction.

Analysis of Pre-Service Teachers' Acceptance of Case-Based Learning

Table 4.19

Overall Mean of Acceptance of Case-Based Learning

	Mean	Std. Dev	Minimum	Maximum	N
Acceptance of Case-Based Learning	4.1811	0.49694	1.67	5.00	121

Table 4.19 shows the overall mean of pre-service teachers' (N=121) perception on acceptance of case-based learning. Results show that pre-service teachers mostly agree to the items relating to acceptance of case-based learning (mean=4.18,

SD=0.496). Overall, pre-service teachers have a generally high acceptance of case-based learning.

Analysis of Pre-service Teachers' Acceptance of Case-Based Learning (ACBL) According to University

Before a statistical analysis is done to compare if there are any significant differences in the acceptance of case-based learning between pre-service teachers in University A and University B, a normality test is conducted to analyse whether the differences are to be determined through a parametric test or a non-parametric one. The results of the normality test are shown below.

Table 4.20

Kolmogorov-Smirnov[a] Normality Test for Pre-Service Teachers' Acceptance of Case-Based Learning (ACBL) According to University

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ACBL	.126	121	**.000**	.910	121	**.000**

Table 4.20 shows the normality test of the distribution of scores. A non-significant result (Sig. value of more than 0.05) indicates normality. In this case, the Sig. value is 0.000, suggesting violation of the assumption of normality. Thus, this data is not normally distributed.

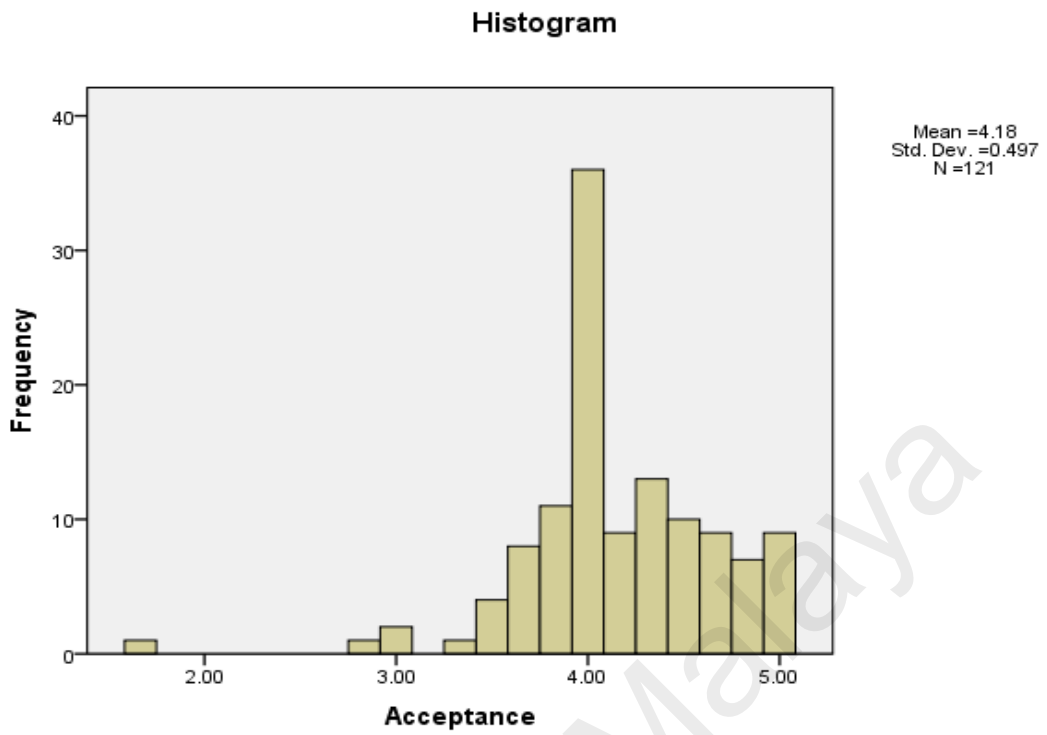


Figure 4.10. Histogram for *Pre-Service Teachers' Acceptance of Case-Based Learning (ACBL) According to University*

The histogram shows that the data is not normally distributed.

The result of the analysis on normality for pre-service teachers' acceptance of case-based learning according to university is not normal. Hence, the non-parametric Mann-Whitney Test is used to determine if there is any significant difference between University A and University B for pre-service teachers' acceptance of case-based learning. Mann-Whitney Test is used to compare two independent group for non-parametric test.

Table 4.21

Mann-Whitney Test on Acceptance of Case-Based Learning (ACBL) According to University

Test Statistics[a]	
Acceptance of Case-Based Learning	
Mann-Whitney U	1.5743
Z	-1.319
Asymp. Sig. (2-tailed)	**.187**
a. Grouping Variable: University	

From the output, the z-value is -1.319 with a significance level (p) of p=0.187, thus the p value is greater than α = 0.05, so the result is not significant (See Table 4.21). There is no statistically significant difference in the acceptance of case-based learning scores of University A and University B.

Table 4.22

Median for Acceptance of Case-Based Learning (ACBL) According to University

Acceptance of Case-Based Learning		
University	N	Median
University A	58	4.1667
University B	63	4.0833
Total	121	4.0833

Table 4.22 shows the median score for ACBL according to university. The median score of University A (*M*= 4.1667, *n*= 58) is higher than University B (*M*= 4.0833, *n*= 63). However, since the p-value=0.187 in the Mann-Whitney Test is greater than α= 0.05, we can conclude that there is no significant difference in the perception on the acceptance of case-based learning of University A and University B (*U*= 1.574, *Z*=-1.319, *p*=0.187).

Analysis on Interests in Viewing Online Videos

It is important to find out if pre-service teachers are interested in viewing online videos as a needs analysis for the development of an online case-based problem-solving module. Constructs related to interests in viewing online videos are included in the survey to gauge the TESL undergraduates' opinion and find out their level of interests in watching videos online. The findings also reveal if the pre-service teachers are open to the idea of viewing a video online out of class time.

Estimates of Reliability of Items on Interests in Viewing Online Videos

Table 4.23

Cronbach's Alpha: Interests in Viewing Online Videos

Factors	Cronbach's Alpha	N of Items
Interests in Viewing Online Videos	.824	5

The Cronbach's alpha reliability coefficient for the five items on interests in viewing online videos is .824. These show that the 5-items analysing interests in viewing online videos have high reliability estimates.

Descriptive Statistics for Interests in Viewing Online Videos

Table 4.24

Descriptive Statistics for Interests in Viewing Online Videos

Items	SD	D	U	A	SA	Mean	Std. Dev	N
I like watching videos for learning purposes	1 (0.8%)	4 (3.3%)	14 (11.6%)	69 (57.0%)	33 (27.3%)	**4.07**	0.772	121
I would like to see more videos online to see actual teaching scenarios	1 (0.8%)	6 (5.0%)	13 (10.7%)	78 (64.5%)	23 (19.0%)	**3.96**	0.757	121
I am interested to learn through online video viewing of actual teaching of writing to know the practical problems related to contents and pedagogy of ESL writing instruction	2 (1.7%)	7 (5.8%)	14 (11.6%)	69 (57.0%)	29 (24.0%)	**3.96**	0.860	121
I am interested to view videos online for the purpose of learning	1 (0.8%)	4 (3.3%)	19 (15.7%)	74 (61.2%)	23 (19.0%)	3.94	0.745	121

I dont mind given a video to watch out of class time and given tasks related to the video during lectures	3 (2.5%)	6 (5.0%)	16 (13.2%)	69 (57.0%)	27 (22.3%)	3.92	0.881	121

Table 4.24 shows the mean scores for items on interests in viewing online videos. Results show that most of the samples agree to all the statements above, indicating a positive perception on interests in viewing online videos. The statement with the highest level of agreement is 'I like watching videos for learning purposes' (mean=4.07, SD=0.772). Two statements with the second highest rating on level of agreement are 'I would like to see more videos online to see actual teaching scenarios' (mean=3.96, SD=0.757), and 'I am interested to learn through online video viewing of actual teaching of writing to know the practical problems related to contents and pedagogy of ESL writing instruction (mean=3.96, SD=0.860). The samples also agree to the statement 'I dont mind given a video to watch out of class time and given tasks related to the video during lectures' (mean=3.92, SD=0.881) implying acceptance towards the flipped classroom method . They indicated interest in viewing videos online for the purpose of learning (mean=3.94, SD=0.75). We can conclude that most of the samples either agree or strongly agree to the statements above indicating a generally high interests in viewing online videos.

Analysis of Pre-Service Teachers' Interests in Viewing Online Videos

Table 4.25

Overall Mean of Interests in Viewing Online Videos

	Mean	**Std. Dev**	**Minimum**	**Maximum**	**N**
Interests in Viewing Online Videos	3.9686	0.61699	1.40	5.00	121

The table above shows the overall mean of pre-service teachers' (N=121) interests in viewing online videos. Results show that pre-service teachers mostly agree to the items relating to interests in viewing online videos (mean=3.97, SD=0.62). Overall, the pre-service teachers have interests in viewing online videos.

Analysis of Pre-service Teachers' Interests in Viewing Online Videos According to University. Before a statistical analysis is done to compare if there are any significant differences in the interests in viewing online videos between pre-service teachers in University A and University B, a normality test is conducted to analyse whether the differences are to be determined through a parametric test or a non-parametric one. This section reports the results of the normality tests.

Table 4.26

Kolmogorov-Smirnov[a] Normality Test for Interests in Viewing Online Videos According to University

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Interests	.165	121	**.000**	.912	121	**.000**

Table 4.26 show the test of normality to assess the normality of the distribution of scores. A non-significant result (Sig. value of more than 0.05) indicates normality. In this case, the Sig. value is 0.000, suggesting violation of the assumption of normality. Thus, this data is not normally distributed.

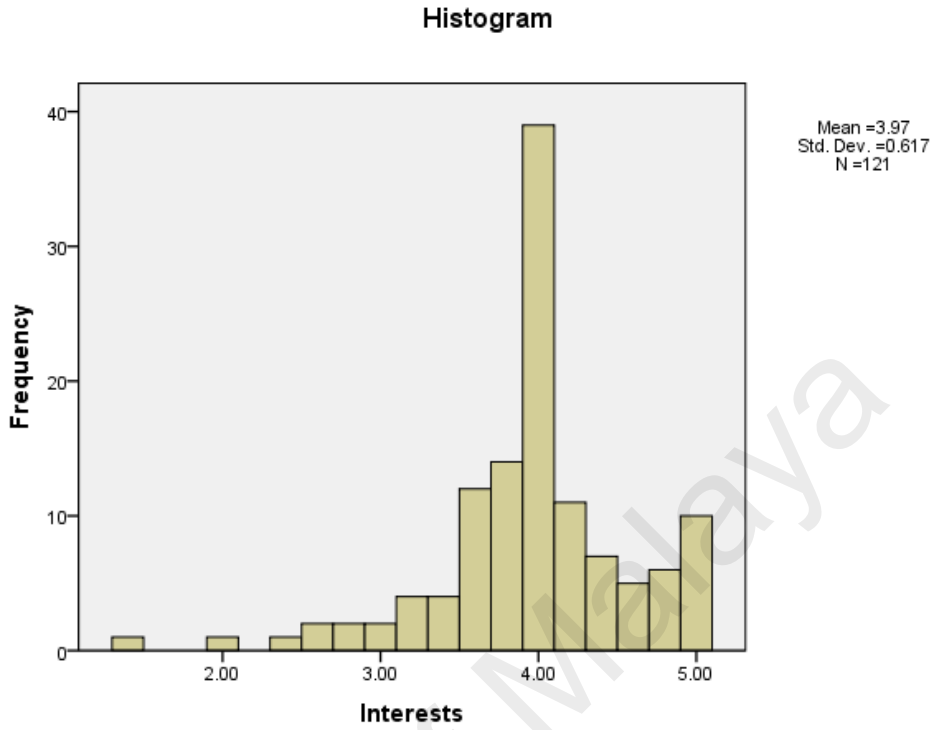


Figure 4.11 Histogram for *Pre-Service Teachers' Interests in Viewing Online Videos According to University*

The histogram shows that the data is not normally distributed.

The result of the analysis on normality for interests in viewing online videos according to university is not normal. Hence, the non-parametric Mann-Whitney Test is used to determine if there is any significant difference for the above factor between University A and University B.

Table 4.27

Mann-Whitney Test on Interests in Viewing Online Videos According to University

Test Statistics[a]	
Interests In Viewing Online Videos	
Mann-Whitney U	1.5583
Z	-1.423
Asymp. Sig. (2-tailed)	**.155**
a. Grouping Variable: University	

From the output, the z-value is -1.423 with a significance level (p) of p=0.155, thus the p value is greater than α = 0.05, so the result is not significant. There is no statistically significant difference in the interests in viewing online videos scores of University A and University B.

Table 4.28

Median for Interests in Viewing Online Videos According to University

Interests In Viewing Online Videos		
University	N	Median
University A	58	4.0000
University B	63	4.0000
Total	121	4.0000

Table 4.28 shows the median score for interests in viewing online videos according to university. A Mann-Whitney Test was conducted to find out if there is any difference in interests in viewing online videos between University A and University B. The median score for University A (*M*= 4.000, *n*= 58) is the same as University B (*M*= 4.000, *n*= 63). The Mann-Whitney Test, however, revealed no significant difference in the interests in viewing online videos between University A and University B (*U*= 1.5583, *Z*=-1.423, *p*=0.155).

Discussion of Findings

Perception on Problem-Solving Abilities

- Results show that pre-service teachers mostly slightly agree to the items relating to Problem-Solving Confidence (PSC) (mean=3.9504). This shows that most participants have a satisfactory perception of PSC.

- The pre-service teachers reported having a moderate perception of Approach-Avoidance Style (AAS) in relation to their problem-solving ability (mean=4.0759).
- On their perception of Personal Control (PC), the pre-service teachers have a moderate perception for this factor (mean=3.4463).

The findings show that the pre-service teachers have a satisfactory perception of their problem-solving abilities (mean=3.9344). Yet, there is a need to improve pre-service teachers' perception of their problem-solving abilities. They need to have high perception of problem-solving abilities to approach and solve problems with confidence. In terms of factors relating to PSC, AAS and PC, there is a need to improve these skills so that pre-service teachers have a higher perception in terms of their abilities to solve problems. According to Zimmerman and Campillo (2003, pp. 241-22), "having knowledge and skill does not produce high-quality problem solving if people lack the self-assurance to use these personal resources." More practice is needed in their course because more practice leads to improvements in problem-solving skills, hence a higher perception of problem-solving abilities. When there is confidence and self-efficacy in problem-solving skills, there is indeed persistence and effort to solve problems (Zimmerman & Campillo, 2003). Research has indicated that an individual's perception and beliefs about his or her problem solving skills somewhat influences how a person deals with a problem (Heppner & Krauskopf, 1987), and his or her ability to solve problems (Heppner, Witty & Dixon, 2004).

Perception on the Importance of Problem Solving Skills

- Pre-service teachers percieve problem-solving to be important for everyone.

- Pre-service teachers perceive problem-solving as important in higher education, in the TESL programme, and in academic courses.
- Pre-service teachers view problem-solving as important for work.
- Pre-service teachers view problem-solving as important for teachers.

Overall, the pre-service teachers have a positive perception on the importance of problem-solving. Problem solving is generally regarded as the most important cognitive activity in everyday and professional contexts (Jonassen, 2000). If they perceive problem-solving skills as important, they will be more positive towards enhancing this skill. The findings indicate that there is a need to develop an online case-based problem-solving module to enhance problem-solving practices and skills for teacher training programs.

Acceptance of Case-Based Learning

- The pre-service teachers have high acceptance for using case-based learning (mean=4.18, SD=0.496).

This shows that the TESL pre-service teachers are open to the idea of learning through case-based learning, hence, the need to develop a case-based learning module for problem-solving purpose for ESL writing instruction. This findings share similar results on the rather high acceptance of case-based learning with examples of actual teaching with videos by pre-service teachers and their facilitators in a Swiss teacher education program (Krammer, Hugener, Frommelt, Auf der Mau, & Biaggi, 2015). Wismath, Orr, and Zhong (2014) suggest that students in their course believe that problem-solving skills can be learned and developed, but not in a traditional lecture-format class. The skill can best be accomplished in a "carefully structured active

learning environment which facilitates the introduction, practice, and eventual deep understanding of problem solving as a process" (p.14).

Interest in Viewing Online Videos

- The pre-service indicate interests in viewing online videos (mean=3.97, SD=0.62).
- The pre-service teachers also agree to the statement 'I dont mind given a video to watch out of class time and given tasks related to the video during lectures,' (mean=3.92, SD=0.881).

The findings indicate that most of the pre-service teachers show interests in viewing online videos. Online learning platforms that support problem-solving need to engage learners in solving problems and to support the necessary attributed intellectual and collaborative activities (Jonassen, 2002). The findings show that there is a need to develop an online case-based problem-solving module to enhance problem-solving skills through a more dynamic approach without relying solely on the traditional lecture-format.

Conclusion

A needs analysis is conducted to investigate the need for developing an online case-based problem-solving module for ESL writing instruction in the TESL program. Data from 121 TESL undergraduates from Year 1 to Year 4 from two universities provide findings for pre-service teachers' perception of their problem-solving abilities, importance of problem-solving, acceptance of using an online case-based problem-solving module, and interests in viewing online videos. Results show a satisfactory perception of problem-solving abilities. Pre-service teachers regard problem-solving as important in life, for learning purposes, for work, and for teachers. In addition, the

pre-service teachers have a generally high acceptance of case-based learning, and reported interests in viewing videos online for learning purposes. The results indicate that pre-service teachers perceive their abilities to solve-problems as satisfactory, problem-solving is an important skill for them, and they are open to learn through case-based learning. From the findings of the needs analysis phase, it can be concluded that there is a need to develop an online case-based problem-solving module for ESL writing instruction.

Chapter 5 – Findings of Design Phase

Phase 2: Design and Development

Introduction

This chapter elaborates the findings of the processes undertaken in the design and development phase of the Online Case-based Problem-Solving (OCBPS) Module in ESL Writing Instruction. In Phase Two of this DDR, the focus is on two parts. The first part of this chapter focuses on the design aspects of the module. The second part is on the development of the module. The design and development phase focus on the following:

1. Design: Fuzzy Delphi Method (FDM)
2. Development

In the design stage, the researcher obtains the views and consensus of a panel of experts through FDM using interviews and the FDM Questionnaire. From the perspectives gathered from the interview, the researcher designed a questionnaire for the Fuzzy Delphi Method (FDM). Members of panel experts responded to the questionnaires to provide their views and consensus.

The use of Fuzzy Delphi Method is to determine the design of the module, namely, the case-criteria, the curriculum aspects, and the media elements of the OCBPS Module for ESL Writing Instruction. This chapter reports the FDM findings, which is then used in the development of the OCBPS module. It attempts to provide the findings for the research question for the second phase of this research which is:

> What are the panel experts' views on the design of the Online Case-Based Problem-Solving Module for ESL Writing Instruction in enhancing pre-service teachers' problem-solving skills?

This chapter reports the following:

1. The description of panel experts.
2. Design of the OCBPS Module
    i. Interview findings to develop the FDM Questionnaire (Refer Appendix 15)
    ii. FDM findings for the design of the module
3. Development of the OCBPS Module:
    I. Recording of the ESL Writing Instruction based on Case Criteria
        i. Procedure for selecting the case based on the case criteria
        ii. Film expert's interview findings on the technical aspects for recording an authentic ESL writing lesson
        iii. Recording of the ESL writing lesson that serves as the case for the OCBPS Module
        iv. Multiple Cameras for Live Capture
        v. Editing based on Experts' Feedback

    II. Experts' Feedback of the OCBPS Module
    III. The OCBPS Module on the Online Platform

Description of Panel Experts

The researcher interviewed six (6) subject-matter, curriculum, and instructional technology experts to generate their in-depth perspective on the case criteria, curriculum aspects, and the media design of the module. They are selected through purposive sampling because according to Wiersma and Jurs (2009), the selection of panel experts must be based on the expertise that could best serve the

purpose of the study. In this case, the development of the OCBPS Module for ESL Writing Instruction needs the views and consensus of subject-matter, curriculum, and instructional technology experts in the fields of Teaching English as a Second Language (TESL), Curriculum and Instruction, Education and Instructional Technology. The following are the description of the panel experts who were interviewed:

- Expert 1: G (E1): One (1) Professor with Ph.D in the field of TESL, Instructional Leadership and Management, and Curriculum and Instruction. Curriculum Expert of the Ministry of Education in the field of TESL, over 30 years teaching experience in school, and public higher learning institutions. Served 5 years in the Ministry of Education. Member of TESL expert for English Language Quality and Standards Council.
- Expert 2: N (E2): One (1) Professor with PhD in the field of Science, Education and Instructional Design and Online Technology, and Curriculum and Instruction. Director of Academic Development in a public university, over 30 years teaching experience in public higher learning institutions.
- Expert 3: J (E3): One (1) senior lecturer with PhD in Instructional Technology, the Head of Research, Innovation and Commercialization in the Education Technology Department, with more than 15 years experience as a lecturer in a public university.
- Expert 4: P (E4): One (1) TESL, ESL Writing, and Curriculum and Instruction teacher educator with PhD with more than 20 years as lecturer in public universities.
- Expert 5: SB (E5): One (1) TESL, and Literature teacher educator with PhD with more than 20 years as lecturer in public universities. She has held the

Deputy Dean of Academics post before and has experience in Curriculum and Instruction.

- Expert 6: SG (E6): One (1) Education and Instructional Technology lecturer with PhD, with more than 15 years experience teaching in public universities

After the analysis of the interview data, a questionnaire is constructed for the Fuzzy Delphi procedure. In this procedure, eighteen (18) experts selected responded to the questionnaire to provide their consensus and the most preferred case criteria, curriculum aspects and media design for the module. The eighteen (18) experts are chosen based on their expertise in the fields of Teaching English as a Second Language (TESL), Curriculum and Instruction, and Education and Instructional Technology. The description of the members of the panel of experts are:

- One (1) Associate Professor with PhD in the fields of TESL, Curriculum and Instruction and Instructional Technology with more than 25 years experience as teacher educator in a public university
- One (1) Associate Professor with PhD in the field of TESL and ESL Writing with more than 25 years experience teaching in schools and public universities.
- One (1) Associate Professor with PhD in the field of TESL and Teacher Education with more than 20 years experience teaching in a public university.
- Four (4) TESL, and Curriculum and Instruction senior lecturers with PhD with more than 25 years as lecturers in public universities.
- Three (3) Education and Instructional Technology senior lecturers with Phd., with more than 20 years experience teaching in public universities.

- Eight (8) TESL and ESL writing senior lecturers that have Masters degree and are pursuing their PhD, and have more than 20 years as teacher educators and TESL lecturers in higher learning institutions.

Fuzzy Delphi Findings

This section reports the findings obtained from the Fuzzy Delphi Method (FDM). There are three parts to the FDM findings:

1. Part A: Case Criteria
2. Part B: Curriculum Aspects
3. Part C: Media Design

Findings for Part A: Case Criteria. This section reports the findings for case criteria of the OCBPS Module for ESL Writing Instruction namely the context, level of instruction, proficiency level, essay genre, duration of the writing class, and teacher's teaching experience. These aspects are considered in the design of the OCBPS module to determine the case criteria before recording an authentic ESL writing lesson that serves as the case for case-based problem-solving.

Context. The FDM seeks the panel experts most preferred context to record an authentic ESL writing lesson for the OCBPS Module. The contexts are rural, suburban and urban. Based on FDM, the defuzzification value obtained for each of the items for context is between 0.622 (minimum value) to 0.711 (maximum value). The defuzzification values show the preference of the panel experts for each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts is chosen as the context to record an authentic ESL writing lesson for the module.

Table 5.1

Panel Experts' Consensus on the Most Preferred Context

Sub-Item	Context	Fuzzy Evaluation			Defuzzification	Score
1	Rural	9.2	12.8	16.4	0.711	1
2	Suburban	8.2	11.8	15.4	0.656	2
3	Urban	7.6	11.2	14.8	0.622	3

Based on Table 5.1, the panel experts' most preferred context is rural (df=0.711). Hence, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a rural context. This means that most of the students in the school are from rural areas and the location of the school caters to students from rural areas.

Level of Instruction. The FDM seeks the panel experts most preferred level of education to record an authentic ESL writing lesson for the OCBPS Module. The levels are Form One, Two, Four and Six. Based on FDM, the defuzzification value obtained for each of the items for level for instruction is between 0.622 (minimum value) to 0.778 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts is chosen as the level to record an authentic ESL writing lesson for the module.

Table 5.2

Panel Experts Consensus on the Most Preferred Form

Sub-Item	Level for Instruction (Form)	Fuzzy Evaluation			Defuzzification	Score
1	One	7.6	11.2	14.8	0.622	4
2	Two	9	12.6	16.2	0.7	3
3	Four	9.8	13.4	17	0.744	2
4	Six	8	11.6	22.4	0.778	1

Based on Table 5.2, the panel experts' most preferred sub-item is Form Six (df=0.778). Hence, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a Form Six class. Lower Six class is chosen because the students have no major examination. The STPM examination is done at the Upper Six level. The research does not intent to disrupt students sitting for major examination.

Proficiency Level. The FDM seeks the panel experts most preferred proficiency level of the students for the recording of an authentic ESL writing lesson for the OCBPS Module. The proficiency levels are low, lower intermediate, intermediate and advance. Based on FDM, the defuzzification value obtained for each of the items for proficiency level is between 0.633 (minimum value) to 0.711 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts is chosen as the proficiency level of the students in the recording of an authentic ESL writing lesson for the module.

Table 5.3

Panel Experts Consensus on the Most Preferred Proficiency Level

Sub-Item	Proficiency Level	Fuzzy Evaluation			Defuzzification	Score
1	Low	9.2	12.8	16.4	0.711	1
2	Lower Intermediate	8	11.6	15.2	0.644	3
3	Intermediate	8.6	12.2	15.8	0.678	2
4	Advance	7.8	11.4	15	0.633	4

Table 5.3 indicates that the panel experts' most preferred sub-item is low proficiency level (df=0.711). Hence, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done with the low proficiency students.

Essay Genre. The FDM seeks the panel experts most preferred essay genre for the recording of an authentic ESL writing lesson for the OCBPS Module. The essay genres as selected by panel experts are argumentative, descriptive, and persuasive. Based on FDM, the defuzzification value obtained for each of the items for essay genre is between 0.67 (minimum value) to 0.722 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts is chosen as the essay genre to be taught in the recording of an authentic ESL writing lesson for the module.

Table 5.4

Panel Experts Consensus on the Most Preferred Essay Genre

Sub-Item	Essay Genre	Fuzzy Evaluation			Defuzzification	Score
1	Argumentative	8.6	12.2	15.8	0.678	2
2	Descriptive	9.4	13	16.6	0.722	1
3	Persuasive	8.4	12	15.6	0.670	3

The panel experts prefer the descriptive essay genre with a defuzzification value of 0.722 (See Table 5.4). This is followed by argumentative genre as the next preferred essay genre (df=0.678). Since the descriptive genre is not in the Lower Six syllabus, and is usually taught in the lower forms, the researcher decided to select the argumentative genre because this genre is taught at Form Six level to prepare students for the Malaysian University English Test (MUET) which is compulsory for all Form Six students as a requirement to enter public universities in Malaysia. Moreover, the researcher and the Form Six English teacher thought that it is best to teach according to the Form Six syllabus which is more relevant and useful for the students. Hence, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is based on an argumentative genre.

Duration of the Writing Class. The FDM seeks the panel experts most preferred duration of the writing lesson for the recording of an authentic ESL writing lesson for the OCBPS Module. The duration is 35-40 minutes (single period) and 70-80 minutes (double period). Based on FDM, the defuzzification value obtained for each of the items for duration is 0.64 (minimum value) to 0.73 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel

experts is chosen as the duration of the writing class for the recording of an authentic ESL writing lesson for the module.

Table 5.5

Panel Experts Consensus on the Most Preferred Duration of the Writing Class

Sub-Item	Duration of the Writing Class	Fuzzy Evaluation			Defuzzification	Score
1	35-40 minutes (Single period)	8	11.6	15.2	0.64	2
2	70-80 minutes (Double period	9.6	13.2	16.8	0.73	1

Table 5.5 shows that the panel experts' most preferred duration is double period (70-80 minutes) with a defuzzification value of (0.73). The result indicates that he recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a double period lesson. In the case of a Form Six class, each period is 60 minutes; hence the double period lesson is 120 minutes (1 hour).

Teacher's Teaching Experience. The FDM seeks the panel experts most preferred teacher's teaching experience for the recording of an authentic ESL writing lesson for the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items for teacher's teaching experience is between 0.644 (minimum value) to 0.74 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The items that obtained the two highest defuzzification values as agreed by the panel experts are chosen as the teacher's teaching experience in the recording of an authentic ESL writing lesson for the module.

Table 5.6

Panel Experts Consensus on the Most Preferred Teacher's Teaching Experience

Sub-Item	Teacher's Teaching Experience	Fuzzy Evaluation			Defuzzification	Score
1	Novice (Less than 5 years)	8	11.6	15.2	0.644	2
2	Experienced (5-10 years	8	11.6	15.2	0.644	2
3	Experienced (10 years and above)	9.8	13.4	17	0.74	1
4	Experience in grading centralized examination (PMR, PT3, SPM, MUET, etc)	9	12.6	16.2	0.74	1

Based on Table 5.6, the panel experts' prefer teachers with ten (10) years and above teaching experience (df=0.74). In addition, the same defuzzification value (0.74) is obtained for experience in grading centralized examination (PMR, PT3, SPM, MUET, etc. Hence, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is taught by and experienced teacher who has more than ten (10) years teaching experience and has experience examining centralized examination such as PMR, PT3, SPM and or MUET. The teacher who taught in this module has 14 years teaching experience at the time of the recording and has experience marking SPM and MUET examination papers.

Findings for Part B: Curriculum Aspects. This section reports the findings for the curriculum aspects of the OCBPS Module for ESL Writing Instruction namely the learning outcomes, evaluation, resources, and duration of implementation.

Learning Outcomes. The FDM seeks the panel experts most preferred learning outcomes for the OCBPS Module. The activities of the module are stages based on the OCBPS instructional model of case-based learning as listed below:

Stage 1: Viewing a video and Identification of Problems

Stage 2: Analysis and brainstorming ideas for possible solutions

Stage 3: Reviewing literature for evidence-based support

Stage 4: Deliberating on solution and providing justification

Stage 5: Presenting solutions

Stage 6: Feedback on solutions

Stage 7: Reflection

Based on FDM, the defuzzification value obtained for each of the items for learning outcomes is between 0.622 (minimum value) to 0.744 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The items that obtained the four highest defuzzification values as agreed by the panel experts are chosen as the learning outcomes of the module.

Table 5.7

Panel Experts Consensus on the Most Preferred Learning Outcomes

Sub-Item	Learning Outcomes	Fuzzy Evaluation			Defuzzifi-cation	Score
1	enhance pre-service teachers' capacity in identifying problems and recommending solutions in a particular teaching method.	7.4	11.4	15	0.633	5
2	help students pick out issues or problems in the lesson viewed, and suggest ways to overcome the problems	7.8	11.4	15	0.633	5
3	identify the strong points and the weak points in an actual teaching of ESL writing instruction, and to suggest ways to overcome the problems, with support from literature, and what they have learnt in their writing methodology course.	9.2	12.8	16.4	0.711	2
4	identify good practices, and provide justifications.	7.6	11.2	14.8	0.622	8

5	identify the problems and come up with possible solutions, and then make a decision on the best solution.	7.6	11.2	14.8	0.622	8
6	identify the problems, come up with possible solutions, decide on how you come to a solution, and then write a convincing conclusion at the end.	7.8	11.4	15	0.633	5
7	identify and analyse problems, propose and justify solutions, provide and receive feedback on solutions proposed, and reflect on the problem-solution process of ESL writing instruction	9.8	13.4	17	0.744	1
8	attain analytical problem-solving skills related to ESL writing instruction	8.2	11.8	15.4	0.655	4
9	apply content and pedagogical knowledge and principles to concrete situations through the problem-solution analysis of ESL writing instruction	9	12.6	16.2	0.7	3

Based on Table 5.7, the panel experts' most preferred learning outcomes in order of preference are sub-item 7 with a defuzzification value of (0.744), sub-item 3 (df= 0.711), sub-item 10 (df=0.7), and sub-item 8 (df= 0.655). Hence, the learning outcomes for the OCBPS Module for ESL Writing Instruction are to enable pre-service teachers to:

i. identify and analyse problems, propose and justify solutions, provide and receive feedback on solutions proposed, and reflect on the problem-solution process of ESL writing instruction.
ii. identify the strong points and the weak points in an actual teaching of ESL writing instruction, and to suggest ways to overcome the problems, with support from literature, and what they have learnt in their writing methodology course.

iii. apply content and pedagogical knowledge and principles to concrete situations through the problem-solution analysis of ESL writing instruction.

iv. attain analytical problem-solving skills related to ESL writing instruction.

Evaluation. The FDM seeks the panel experts most preferred evaluation to meet the learning outcomes of the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items for evaluation is between 0.567 (minimum value) to 0.744 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the two highest defuzzification values as agreed by the panel experts are chosen as the evaluation of the module.

Table 5.8

Panel Experts Consensus on the Most Preferred Evaluation

Sub-Item	Evaluation	Fuzzy Evaluation			Defuzzification	Score
1	Writing a reflective essay	9.8	13.4	17	0.744	1
2	Writing a report	8.4	12	15.6	0.667	3
3	Quiz/Test	6.6	10.2	13.8	0.567	5
4	Presentation	9.2	12.8	16.4	0.711	2
5	Online discussion	7.2	11	14.6	0.607	4

Based on Table 5.8, the panel experts' most preferred sub-item is writing a reflective essay with a defuzzification value of (0.744). This is followed by presentation as the second most preferred evaluation (df= 0.711). Hence, the evaluation methods for the OCBPS Module for ESL Writing Instruction are writing a reflective essay, and presentation.

Resources. The FDM seeks the panel experts most preferred resources for the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items on resources is between 0.6 (minimum value) to 0.7 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The items that obtained the three highest defuzzification values as agreed by the panel experts are chosen as the resources of the module.

Table 5.9

Panel Experts Consensus on the Most Preferred Resources

Sub-Item	Resources	Fuzzy Evaluation			Defuzzification	Score
1	Books on ESL writing instruction and methodology	8.4	12	15.6	0.667	3
2	Articles on ESL writing instruction and methodology	9	12.6	16.2	0.7	1
3	Video clips on ESL writing instruction and methodology	7.4	11	14.6	0.611	6
4	Research articles on ESL writing instruction and methodology	97.8	11.4	15	0.633	5
5	Textbook used in the writing methodology course	8.4	12	15.6	0.667	3
6	YouTube videos on ESL writing instruction and methodology	7.2	10.8	14.4	0.6	7
7	Bibliography and/or links to Web resources to find out more information about ESL writing instruction and methodology	8.8	12.4	16	0.689	2

Based on Table 5.9, the panel experts' most preferred resources are articles on ESL writing instruction and methodology with a defuzzification value of (0.7). This is followed by bibliography and/or links to Web resources to find out more information about ESL writing instruction and methodology as the second most preferred resources (df= 0.689). Books on ESL writing instruction and methodology (df= 0.667), and textbook used in the writing methodology course (df= 0.667) are the next most preferred resources. Hence, these resources are shared in the OCBPS Module for ESL Writing Instruction.

Duration of Implementation. The FDM seeks the panel experts most preferred duration for the implementation of the OCBPS Module in an undergraduate TESL writing methodology class. Based on FDM, the defuzzification value obtained for each of the items on duration is between 0.6 (minimum value) to 0.744 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts is chosen as the duration for the implementation of the module.

Table 5.10

Panel Experts Consensus on the Most Preferred Duration

Sub-Item	Duration	Fuzzy Evaluation			Defuzzification	Score
1	One week (3 hours/ two classes)	7.2	10.8	14.4	0.6	3
2	Two weeks (6 hours/ four classes)	8.6	12.2	15.8	0.678	2
3	Three weeks (9 hours/ six classes)	9.8	13.4	17	0.744	1

Based on Table 5.10, the panel experts' most preferred duration for implementation is three weeks (9 hours/ six classes) with a defuzzification value of (0.744). Hence, the duration is three weeks (9 hours/ six classes) for the

implementation of the OCBPS Module for ESL Writing Instruction are. Nine hours is allocated for the implementation of the module regardless of the weeks or the frequency of the class.

Findings for Part C: Media Design. This section reports the findings for media design of the OCBPS module namely the online platform, media elements, the instructional events, and effective video presentation.

Online Platform. The FDM seeks the panel of experts most preferred online platform for the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items for evaluation is between 0.611 (minimum value) to 0.744 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel of experts is chosen as the best online platform to showcase the module.

Table 5.11

Panel Experts Consensus on the Most Preferred Online Platform

Sub-Item	Online Platform	Fuzzy Evaluation			Defuzzification	Score
1	Website	8	11.6	15.2	0.644	3
2	Blog	7.4	11	14.6	0.611	6
3	Facebook	7.8	11.4	15	0.633	4
4	YouTube	7.6	11.2	14.8	0.622	5
5	Learning Management System (LMS)	8.4	12.1	15.6	0.669	2
6	Massive Online Open Course (MOOCs)	9.8	13.4	17	0.744	1

Based on Table 5.11, the panel experts' most preferred online platform is Massive Online Open Course (MOOCs) with a defuzzification value of (0.744). Hence, the most preferred online platform to showcase the OCBPS Module for ESL

Writing Instruction is the Massive Online Open Course (MOOCs) or the *openlearning* platform.

Media Elements. The FDM seeks the panel experts' most preferred media elements that should be integrated with the video sequence of the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items for evaluation is between 0.622 (minimum value) to 0.722 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The items that obtained the two highest defuzzification values as agreed by the panel experts are chosen as the media elements of the module.

Table 5.12

Panel Experts Consensus on the Most Preferred Media Elements

Sub-Item	Media Elements	Fuzzy Evaluation			Defuzzification	Score
1	Text	8.6	12.2	15.8	0.678	2
2	Graphics and Images	9.4	13	16.6	0.722	1
3	Montage	8	11.6	15.2	0.644	4
4	Animation	7.6	11.2	14.8	0.622	6
5	Audio narration	8.6	12.2	15.8	0.678	2
6	Music	7.8	11.4	15	0.633	5

Based on Table 5.12, the panel experts' most preferred media elements are Graphics and Images with a defuzzification value of (0.722). This is followed by Text, and Audio narration with defuzzification value of (d= 0.678) Hence, the most preferred media elements of the OCBPS Module for ESL Writing Instruction are Graphics and Images; Text and Audio narration. The video contains these media elements.

Instructional Events. The FDM seeks the panel experts' most preferred Gagne's Nine Events of Instruction as the systematic approach to the development and presentation sequence of the OCBPS Module. Based on FDM, the defuzzification

value obtained for each of the items for Gagne's Events of Instruction is between 0.674 (minimum value) to 0.767 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The items that obtained the higher defuzzification values as agreed by the panel experts are chosen as the systematic approach to the development and presentation sequence of the module.

Table 5.13

Panel Experts Consensus on the Most Preferred Instructional Events

Sub-Item	Instructional Events	Fuzzy Evaluation			Defuzzification	Score
1	Gain attention	10.2	13.8	17.4	0.767	1
2	Inform the learner of the objectives	9.6	13.2	16.8	0.733	4
3	Stimulate the recall of prior knowledge	8.6	12.2	15.8	0.678	8
4	Present the content	9.2	12.8	16.4	0.711	6
5	Provide learning guidance	9.2	12.8	16.4	0.711	6
6	Elicit performance (practice)	9.4	13	16.6	0.722	5
7	Provide feedback	9.8	13.4	17	0.744	2
8	Assess performance	9.8	13.4	17	0.744	2
9	Enhance retention and transfer to the job/ new situations	8.4	12	16	0.674	9

Based on Table 5.13, the panel experts' have given defuzzification values of more than (d= 6.50) for all Gagne's Nine Events of Instruction between 0.674 (minimum value) for Enhance retention and transfer to the job/ new situations to 0.767 (maximum value) for Gain attention. Since all nine events of instructions are relevant and suitable for the OCBPS Module, they are used in the implementation process

together with the Problem-Solving Stages of the OCBPS Module, and Merril's First Principles of Instruction (Merril, 2002).

Effective Video Presentation. The FDM seeks the panel experts' most preferred way to present the video for pre-service teachers' viewing and problem-solving practices in the OCBPS Module. Based on FDM, the defuzzification value obtained for each of the items for evaluation is between 0.622 (minimum value) to 0.711 (maximum value). The defuzzification values show the preference level of the panel experts on each of the items. The item that obtained the highest defuzzification value as agreed by the panel experts are chosen as the most effective way to present the video for pre-service teachers' viewing and problem-solving practices.

Table 5.14

Panel Experts Consensus on the Most Preferred Video Presentation

Sub-Item	Structure of the module	Fuzzy Evaluation			Defuzzification	Score
1	Present the video in a few segments within one complete sequence integrating media elements and practice questions in each segment	8	11.6	15.2	0.644	2
2	Break the video into several short clips/videos integrating media elements and practice questions for each clip/video	9.2	12.8	16.4	0.711	1
3	Present the video as one full sequence integrating media elements and practice questions that can appear anywhere in the video	7.6	11.2	14.8	0.622	3

Based on Table 5.14, the panel experts' most preferred way to present the video for pre-service teachers' viewing and problem-solving practices is by breaking the video into several short clips/videos integrating media elements and practice questions for each clip/video with a defuzzification value of (0.711). Hence, the video is presented in three short clips under the headings:

i. Introduction

ii. Mechanics of Writing

iii. Conclusion

The students may watch the video in one full sequence or watch it in three short clips. The structure of the video in both formats is provided. Media elements of the video are based on the findings generated through FDM which are graphics and images; text; and audio narration. Practice questions are based on the OCBPS Module's problem-solving stages. The recommended time of the whole video and the length of each video clip depend on the duration of the writing lesson and the time taken to teach each of the section above.

Summary of Fuzzy Delphi Findings. The table below presents the summary of the Fuzzy Delphi findings:

Table 5.15
Summary of Case Criteria

Items	**Sub-items**
Case Criteria	**Findings**
Context	Rural (df=0.711)
Level for Instruction (Form)	Form Six (df=0.778)
Proficiency Level	Low (df=0.711)
Essay Genre	Argumentative (df=0.678)
Duration of the Writing Class	70-80 minutes: Double period (df=0.73)
Teacher's Teaching Experience	Experienced : 10 years and above(df=0.74). Experience in grading centralized examination: PMR, PT3, SPM, MUET, etc. (df=0.74)

From the table above, the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a rural context. This means that most of the students in the school are from rural areas and the location of the school caters to students from rural areas. It is to be done in a Form Six class. A Lower Six class is chosen because the students have no major examination. The STPM examination is done at the Upper Six Form. The research does not intent to disrupt students sitting for major examination as suggested by experts in this study. The recording is to be done in a class with low proficiency students. The genre selected for the ESL writing instruction is argumentative essay based on experts' second preferred choice since the first choice descriptive genre is not in the Form Six syllabus. The instruction needs to be relevant to the learners' immediate and long term needs of preparation for their Malaysian University English Test (MUET) which requires students to write an argumentative type essay in the writing component. The result indicates that the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a double period lesson. In the case of a Form Six class, each period is 60 minutes; hence the double period lesson is 120 minutes (2 hours). The teacher teaching the ESL writing lesson should be an experienced teacher who has more than ten (10) years teaching experience and has experience examining centralized examination such as PMR, PT3, SPM and or MUET. The teacher who taught in this module has 14 years teaching experience at the time of the recording and has experience marking SPM and MUET examination papers.

Table 5.16

Summary of Curriculum Aspects

Items	**Sub-items**
Curriculum Aspects	**Findings**
Learning Outcomes	identify and analyse problems, propose and justify solutions, provide and receive feedback on solutions proposed, and reflect on the problem-solution process of ESL writing instruction (df=0.744)
	identify the strong points and the weak points in an actual teaching of ESL writing instruction, and to suggest ways to overcome the problems, with support from literature, and what they have learnt in their writing methodology course (df=0.711).
	apply content and pedagogical knowledge and principles to concrete situations through the problem-solution analysis of ESL writing instruction (df=0.7).
	attain analytical problem-solving skills related to ESL writing instruction (df=0.655).
Evaluation	Writing a reflective essay (df=0.744)
	Presentation (df=0.711)
Resources	Articles on ESL writing instruction and methodology (df=0.7)
	Bibliography and/or links to Web resources to find out more information about ESL writing instruction and methodology (df=0.689)
	Textbook used in the writing methodology course (df=0.667)
	Books on ESL writing instruction and methodology (df=0.667)
Duration of Implementation	9 hours/ six classes (df=0.744)

Based on the table above, the learning outcomes for the OCBPS Module for ESL Writing Instruction are to enable pre-service teachers to:

i. identify and analyse problems, propose and justify solutions, provide and receive feedback on solutions proposed, and reflect on the problem-solution process of ESL writing instruction.

ii. identify the strong points and the weak points in an actual teaching of ESL writing instruction, and to suggest ways to overcome the problems, with support from literature, and what they have learnt in their writing methodology course.

iii. apply content and pedagogical knowledge and principles to concrete situations through the problem-solution analysis of ESL writing instruction.

iv. attain analytical problem-solving skills related to ESL writing instruction.

Additional learning outcomes are included to meet the objectives of the problem-solving module, and the Problem-Solving Stages of the OCBPS Module. The other learning outcomes are constructed to enhance skills that pre-service teachers need pertinent to the statement of the problem of this research which are to develop pre-service teachers' problem-solving skills, enhance pedagogical content knowledge, and bridge theory and practice.

The evaluation methods for the OCBPS Module for ESL Writing Instruction are writing a reflective essay, and presentation. The resources shared in the module are articles on ESL writing instruction and methodology, bibliography and/or links to Web resources to find out more information about ESL writing instruction and methodology, books on ESL writing instruction and methodology, and textbook used

in the writing methodology. Approximately, nine hours is allocated for the implementation of the module regardless of the weeks or the frequency of the class. However, the duration depends on the availability of students, slots and venue at the time of implementation. Time constraint is addressed as one of the limitations of the study.

Table 5.17

Summary of Media Design

Items	**Sub-items**
Curriculum Aspects	**Findings**
Online Platform	Massive Online Open Course (MOOCs) (df=0.744)
Media Elements	Graphics and Images (df=0.722)
	Text (df=0.678)
	Audio narration (df=0.678)
Instructional Events	Gain attention (df=0.767)
	Inform the learner of the objectives (df=0.733)
	Stimulate the recall of prior knowledge (df=0.678)
	Present the content (df=0.711)
	Provide learning guidance (df=0.711)
	Elicit performance (practice) (df=0.722)
	Provide feedback (df=0.744)
	Assess performance (df=0.744)
	Enhance retention and transfer to the job/ new situations (df=0.674)
Effective Video Presentation	Break the video into several short clips/videos integrating media elements and practice questions for each clip/video (df=0.711)

Based on the table above, the most preferred online platform chosen by experts to showcase the OCBPS Module for ESL Writing Instruction is the Massive Online Open Course (MOOCs) or the *openlearning* platform. The most preferred media

elements of the OCBPS Module for ESL Writing Instruction are graphics and images; text and audio narration. Since all nine events of instructions are relevant and suitable for the OCBPS Module and are given defuzzification value of above 0.650, they are used in the implementation process with no specific order, together with the Problem-Solving Stages of the OCBPS Module, and Merril's First Principles of Instruction (Merril, 2002).

The majority of the experts' most preferred way to present the video for pre-service teachers' viewing and problem-solving practices is by breaking the video into several short clips/videos integrating media elements and practice questions for each clip/video. Hence, the video is presented in three short clips under the headings:

i. Introduction
ii. Mechanics of Writing
iii. Conclusion

The students may watch the video in one full sequence or watch it in three short clips. The structure of the video in both formats is provided. Media elements of the video are based on the findings generated through FDM which are graphics and images; text; and audio narration. Practice questions are based on the OCBPS Module's problem-solving stages. The recommended time of the whole video and the length of each video clip depend on the duration of the writing lesson and the time taken to teach each of the heading above.

Development of the Module

This section explains the development of the Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. Development of the OCBPS Module is reported under the following categories:

I. Recording of the ESL Writing Instruction based on Case Criteria
   i. Procedure for selecting the case based on the case criteria
   ii. Film expert's interview findings on the technical aspects for recording an authentic ESL writing lesson
   iii. Recording of the ESL writing lesson that serves as the case for the OCBPS Module
   iv. Multiple Cameras for Live Capture
   v. Editing based on Experts' Feedback

II. Experts' Feedback of the OCBPS Module

III. The OCBPS Module on the Online Platform

Recording of the ESL Writing Instruction based on Case Criteria.

Procedure for Selecting the Case based on the Case Criteria. Based on the Fuzzy Delphi findings on the case criteria of the module, the researcher selected a Form Six class and an experienced teacher. Form Six has been offered in government aided secondary schools for more than 50 years. Students may enroll for Form Six when they have completed upper secondary education with the SPM Examination (MOE, 2016). Students do the Form Six curriculum as stipulated by the Ministry of Education Malaysia. There are 22 subjects offered in the Sijil Tinggi Pelajaran Malaysia (STPM) centralized assessment. Students are required to select four or five

subjects, including Pengajian Am and MUET which are compulsory subjects for STPM (MOE, 2016).

A rural secondary school in the Klang District that offers Form Six was identified. The school is located in Kapar, the only school in the area that offers Form Six. This school is chosen because the majority of the Form Six students who attend this school are from the outskirts of Kapar and Meru, Klang, contributing to the rural demographics of the school. The researcher met the Senior Assistant of Academic and explained the purpose of her research and her intention to record a Form Lower Six ESL writing lesson. The Principal was away at the time. The researcher managed to get permission from the school's Senior Assistant of Academic (refer letter of permission in Appendix 16). An experienced English teacher with more than ten years teaching experience, who is a MUET teacher and examiner gave her agreement for her ESL writing lesson to be recorded. Upon agreement from the school and the teacher, the researcher managed to get approval from the Ministry of Education to conduct the research and to record the lesson (refer Appendix 8).

The researcher and teacher agreed on a suitable schedule for the recording of the ESL writing lesson. The argumentative genre is taught in a double-period lesson. The researcher informed the teacher that how the lesson was to be conducted was entirely up to her. It was up to her to decide on the lesson plan, and the approaches she wished to use. The researcher did not impose any conditions to the lesson. This is to maintain the authenticity of the lesson.

Film expert's interview findings on the technical aspects for recording an authentic ESL writing lesson. The next challenge is the technical aspects of recording the lesson. The researcher decided to interview a film expert who is a professor in a film faculty of a public university in Malaysia to obtain his input on the

recording process of the whole teaching, learning and classroom experience. The findings of the interview are reported below:

When asked on the technical aspects to consider when recording a video on an actual classroom teaching scenario, the expert suggested that Multiple Camera Production (MCP) is used to capture the lesson.

> *First of all, in order to record the actual scenario of teaching, the most important thing is to …[pause]… to set up a camera using the multiple camera production system which is known as MCP whereby MCP means using more than one camera to capture that actual teaching scenario (P: L6-9).*

The rationale for using MCP is that it is able to capture few types of shot, the audience, the material used by the teacher to teach, the audio visual, the reaction, audio, content, and the most suitable and effective shot when the lesson is conducted.

> *…by using MCP; Multiple Camera Unit …[pause]… we can be able to capture few types of shot and also we can be able to capture …[pause]… errr.. the audience. The material been used by the lecturer to teach the audio visual which been used to assist the teaching and also we can capture the reaction, audio and also the content of the lecturer clearly by err.. choosing the right and the most effective shot when the lecture being given (P: L23-28).*

When asked on the creative aspects to consider when recording an actual teaching scenario in a video format to be presented online, the expert said that all the visuals can be captured by the camera live. MCP can also capture the non-verbal communication by the teacher or the students. It can also capture the reaction of the lecturers, the intonation, and the non-verbal communication, like the intonation, the mimics, the gesture, the posture, and the movement of the lecturer. Everything can be captured clearly and it will be very helpful for the audience or whoever watching the output of the recording

> *Multiple Camera Production, creatively the camera can capture …[pause]… whatever content of the lectures if the lecturer is very articulate and also showing some …[pause]… err.. audio aids or video aids in the lecture hall. All the visual can be captured by the camera at the same time err.. …[pause]… this camera also can capture the non-verbal communication act which will be created by the err.. lecturer or the students. By having the camera, the students …[pause]… err.. the reaction of the lecturers, the intonation.. when you are talking about non-verbal communication, you are also talking about the intonation, the mimics, the gesture, the posture, the movement of the lecturer. Everything can be captured clearly and err.. it will be very helpful in term of …[pause]… audience whoever going to watch the …[pause]… output of the recording (P:L 46-55).*

When asked on the aspects that should be considered to make the video more interesting and effective for learning and teaching purposes, the expert said that a few cameras are needed to capture the environment, situation, and to record every detail of the lesson clearly.

> *…it must be captured using few cameras so that the angles, …[pause]… the.. the.. capturing of err.. …[pause]… the environment, situation and also the details will be clearly recorded (P: L66-68).*

When asked on how the shots can be achieved, he added that the editing process is needed. Online editing: By using few cameras, gathering all the shots, it will create online effect. Online effect will give the situation whereby when we start to edit, trim the shot, we can choose the right angle, the right alteration of lectures and also we can manage to find the right cinematography to present to the audience later on. Offline editing involves the process of gathering all the shots captured and creating what we call as a story. In teaching, it is the content of the lesson.

Of course in term of getting the right visual to be presented to.. to.. viewers after the class for them to refer …[pause]… the best method is by going through a process called …[pause]… editing! Online and offline editing.. online edit.. ahh.. …[pause]… offline editing is a …[pause]… process of gathering …[pause]… all the shots been created and creating what we call as a story. In term of teaching of course we are talking about the.. the.. the.. the content of the lectures. By using few cameras, gathering all the shots, it will create online effect. Online effect will give …[pause]… err.. situation whereby when you start to edit, trim the shot, we can choose the right angle, the right err.. alteration of lectures and also we can manage to find the right errr.. cinematography to present to the audience later on (P:L 72-80).

On how many cameras to use, the expert suggested at least five cameras to capture the actual, original action of the students while listening to the lesson. Five cameras are good enough to capture the most important things, which are the content of the lesson, the reaction of the teacher, the non-verbal communication of the teacher and also the reaction of the students.

The perfect environment in creating multiple camera production.. it must be more than one camera but at the same time err.. the content of the lectures important to determine how many.. how many camera is needed. If we need the students to write in order to capture the actual, original action of the students while listening to the lectures, it can …[pause]… we need to use more than five cameras. If we can …[pause]… if you want to capture …[pause]… err.. the lecture first and then maybe later we want to capture whatever written by the students or whatever been jot down by the students, that can be captured after the lectures. Meaning to say that whatever been …[pause]… err.. whatever been …[pause]… created by the student in their notebook or if they are …[pause]… they are discussing things like that can be created later after the recording because the most important thing is the content of the lecture …[pause]… the.. reaction of the lecturer, the non-verbal communication of the lecturer and also the reaction of the audience. By saying that, I already mentioned four different areas which need to be covered. So by having five cameras, it's good enough (P:L155-167).

Because this video is going to be used as learning and teaching module, the expert think that in the editing process, it is not necessary to put an introduction, the instruction, the objectives, and the background of the writing class. What is more important is that the graphics and texts used in the lesson must be clearly captured. For

example, if teacher draws or writes something on the board or shares audio visual aids, those have to be captured clearly displaying the actual colours, contents and points.

> *To me, it is not necessary. Because the most important thing is the topic must be introduced, and it must be also be supported with a lot of graphics, good music ...[pause]... the fast pace of editing, and also there must be some ...[pause]... elements of creating graphic to support the lecture content. For example, if the lecturer is talking about some ...[pause]... some important notes. Besides listening to the lecture, the audience who's going to watch the video must be able also to see the important points or pointers to be portrayed on the visual as a.. err.. in the form of graphic or in a form of sentence ...[pause]... and it must be presented using ...[pause]... colours (P:L194-201).*

The experts said that there must be different types of shots to capture the lesson when asked for other suggestions and considerations that can have a positive impact on the video recording.

> *...the shot must be mixed with the...extreme close up to a very long shot. The mixture of seven different type of shot will give a right impact to the audience and the.. the actual reason, the actual content, the.. the.. the content of the lectures can be delivered rightfully to the ...[pause]... viewers later (P:L210-214).*

Recording the ESL Writing Instruction on Site. For the recording of the lesson, the researcher collaborated with lecturers, students and technical staff members from the Faculty of Film, Theatre and Animation, of a public university to assist in the multi-camera set-up and recording. As suggested by the film expert, multi-camera production (MCP) recording is recommended to capture the ESL writing instruction. MCP combines video from two or more camera angles in order to capture the teacher's instruction and at the same time what the students were doing, their expressions and reactions. In addition, it can record high quality video that could be available for immediate playback (Kilburn, 2014). Kilburn (2014) also recommends the use of MCP recording to capture the fullest possible range of actions and interactions in a teaching and learning context.

The researcher informed the technical team that the cameras need to be positioned in a way of not imposing any disruption to the teaching and learning. The researcher and technical team paid attention to safety measures in the positioning of the cameras and the cables to ensure the equipment are unobtrusive and pose the least intrusion to the participants and the lesson. Safety considerations include avoiding trip hazards from wires or tripod legs, equipment securely positioned to prevent tip or fall and other safety measures relating to the whole filming process (Kilburn, 2014). Before the recording is done, the technical team checked the camera angles, audio quality and the quality of the image. Once this is done, the teacher was given the cue to begin her teaching while the recording was in progress.

The recording was captured using three cameras. One camera was hand-held and two were positioned at the two back corners of the room to capture the teacher and the classroom. The camera angles were varied from wide shots to tighter shots of the teacher and students. While the recording was in progress, the researcher guided the technical team on the different angles and shots to capture. Tighter shots were captured particularly on the teacher, what she writes on the board, and her expression. Tighter shots were also used to capture students' expressions and reactions. Wide angle shots were used to capture the teacher, students and the whole classroom. The recording needed to capture the whole teaching and learning scenario, the teacher's instruction and the students' learning, responses and participation.

Multiple Cameras for Live Capture. According to the film expert, it is more feasible to use multi-camera production to capture the ESL writing instruction live. According to Kilburn (2014), when video editing seems unfeasible, a workable solution is live capture from multiple cameras to suit the requirement of the study which is, the recording is required for immediate playback and live capture saves the

need for advance editing equipment and procedures. The photos below show the positions of the camera for the recording of the ESL writing instruction:

Figure 5.1 Position of the Cameras in the Classroom

The images in Figure 5.1 above shows the position of the cameras used for the recording of the lesson. One camera positioned at the back of the classroom captures the master shot of the teacher and students. Another camera positioned at the back captures tighter shots of the teacher, her expressions and what she writes on the board. Another hand-held camera captures the tighter shots of the students and their expressions and reactions. The live capture combines simultaneous recording from three cameras into a single video. This is important to capture various shots as the lesson progresses, for example the shots of the teacher, what she writes on the board, her movements, the students, their expressions, reactions and actions.

Figure 5.2. Briefing Given by the Technical Crew

The image in Figure 5.2 shows the technical crew giving a briefing to the teacher and students on the procedure for recording. The researcher reminds the students to be as natural as possible during the lesson and to ignore the cameras. They need to focus on the teacher and the lesson. This is to ensure the aunthenticity of the ESL writing instruction.

Figure 5.3. Laptop and Switch Board to View, Select and Combine the Shots of the Capture

The images in Figure 5.3 show the Multiple Camera Production system to view, select and combine shots of the live capture. The equipent is used to combine video from multiple camera sources using a live capture approach at the location where the ESL writing instruction was recorded. A laptop computer or a desktop PC is needed to combine video from multiple camera sources using a live capture approach (Kilburn, 2014). For the recording of the ESL writing instruction, a laptop computer and multi-camera production equipment system is used to capture and combine video feeds from three cameras. The laptop has video production software capable of combining camera sources, and record the combined video as a file on the computer's hard drive in a format that could be played back on other compatable devices (Kilburn, 2014). As the video is captured live, there is no need for rendering. Advanced computing skills are needed to configure the various components (Kilburn, 2014). The researcher required the assistance from a few film students who handled the equipment with the guidance from their lecturers who are experienced videographers and filmakers.

Figure 5.4. Various Shots of the Teacher and the Board during the ESL Writing Instruction

Figure 5.4 shows some of the shots taken during the lesson's recording. The researcher informed the technical crew the type of shots she required before the recording. She provided the necessary information on the types of shots needed as the lesson was pregressing until the end so that the director of the project can inform the camera crew on the shots required. For example, when the teacher is writing on the board, it is important that the camera captures what is written on the board. When the teacher is talking to the students, zoom shots, medium close-up and wide shots are required to show the different positions of the teacher.

Figure 5.5. Various Shots of the Students during the ESL Writing Instruction

Figure 5.5 above shows the various shots of students' expressions, reactions and actions. The hand-held camera crew is in charge of these shots. The photos are blurred to protect the privacy of the students.

Editing based on Experts' Feedback. Since the multi-camera production prepares the recording as a live capture, the product is ready after the recording is done. What is recorded and the shots selected and combined during the recording process is used as the video of the authentic ESL writing instruction. The video is viewed by three experts who are subject-matter, instructional technology and curriculum experts

with PhD qualifications. They suggested providing some information as the introduction of the video, hence the need for graphic text in the video.

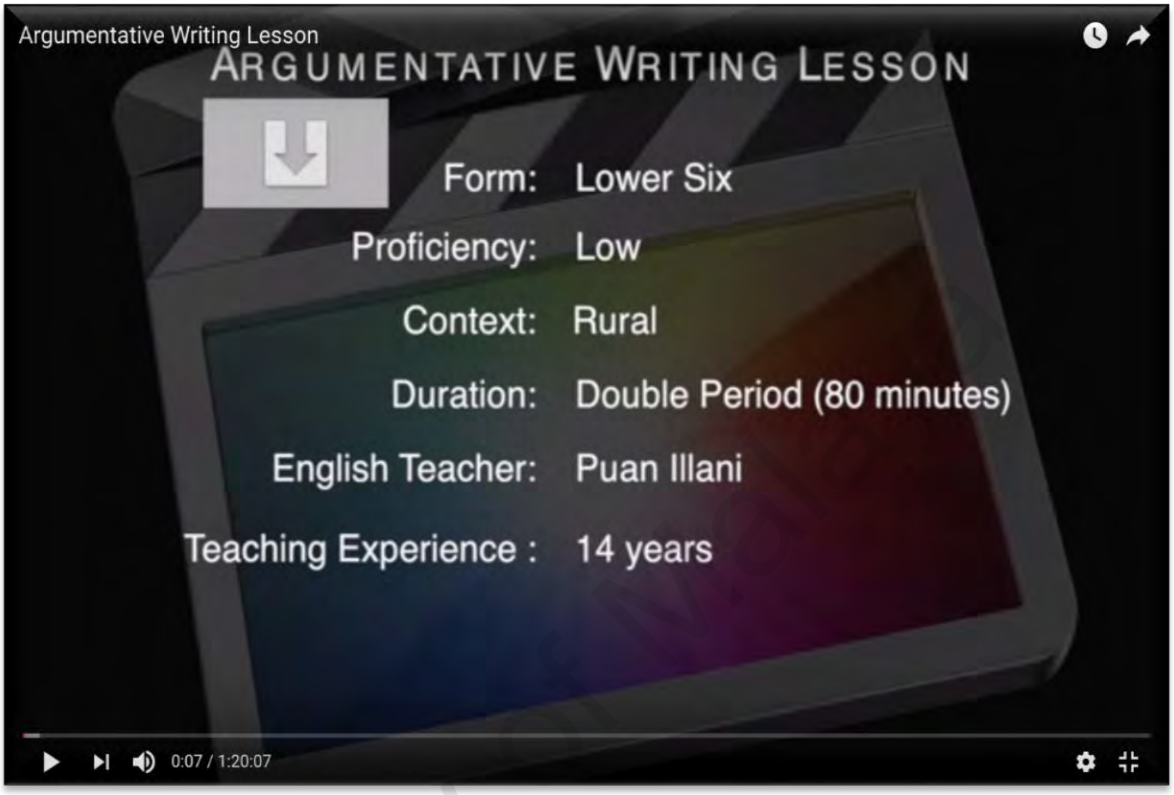


Figure 5.6 Information on the Video Case

Editing is done to put in the graphic text as the introduction of the video as shown in the figure above. The experts suggested introducing the video with the heading, Argumentative Writing Lesson. They suggested putting in information on 1) Form; 2) Proficiency; 3) Context; 4) Duration; 5) Name of English Teacher; and 6) Teacher's Teaching Experience. This is to provide information to those watching the video on the background of the case.

Next, the experts suggested that the video be divided into four parts. They suggested that one part should be the whole lesson from the beginning until the end that is to be retained in its original form and can be viewed in one sequence in its actual format of how the lesson is recorded. Then, the experts suggested that the video be

divided into a few shorter videos or parts so that there is an option of viewing the lesson in parts. They explained that dividing the video into parts will ease the process of analysis especially when there is a need to trace certain scenes that need re-viewing. The experts suggested dividing the parts according to how the teacher taught the lesson. She taught the writing lesson according to paragraphs.

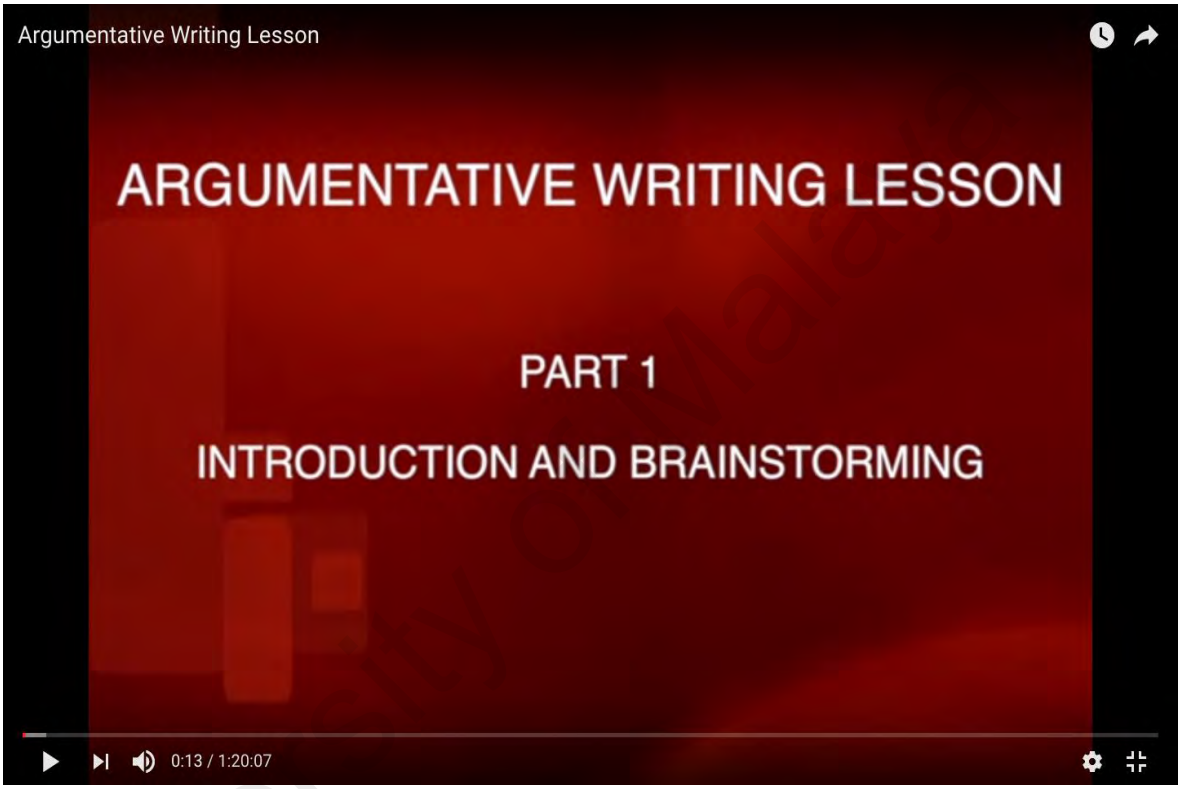


Figure 5.7. Part 1: Introduction and Brainstorming

The video is divided into Part 1: Introduction and Brainstorming (See Figure 5.7). Paragraph one is the introduction of the essay. The teacher teaches students how to brainstorm ideas, write the introduction and the thesis statement of the essay. The duration of part 1 is 19:14 minutes.

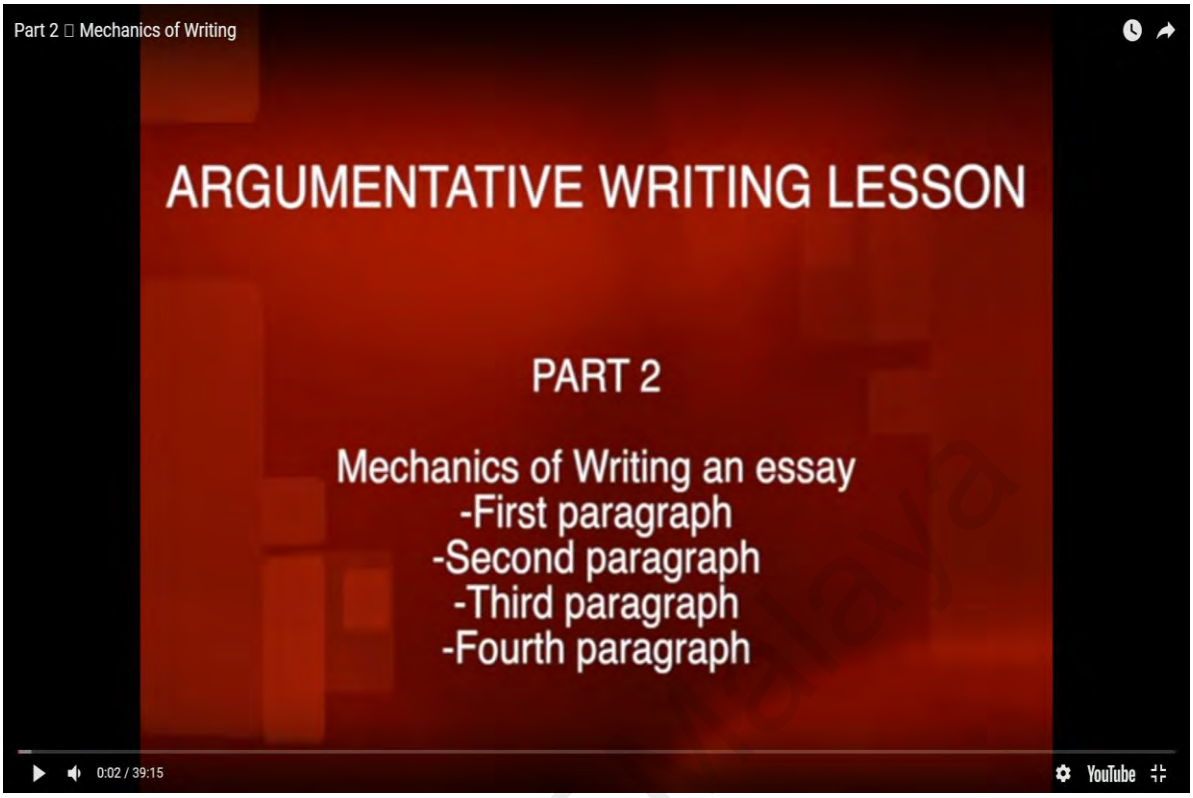


Figure 5.8. Part 2: Mechanics of Writing an Essay

The video is divided into Part 2: Mechanics of Writing an Essay as shown in Figure 5.8. The teacher teaches students how to use the main points as a topic sentence of paragraph two, three and four and how to elaborate each paragraph with supporting details. The duration of part 2 is 39.14 minutes. This part is longer because she covered paragraphs two, three and four, using linking devices and other mechanics of writing an essay.

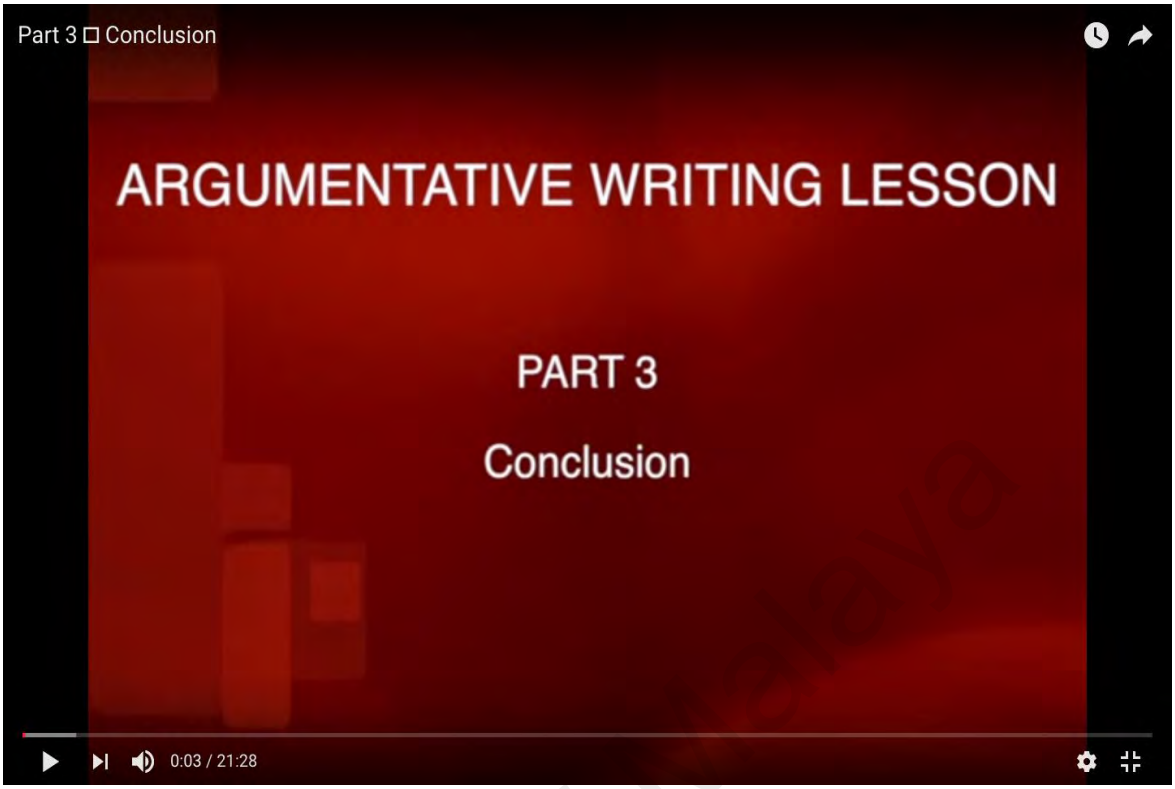


Figure 5.9. Part 3: Conclusion

The third part of the video is the conclusion. The teacher teaches students on how to write the conclusion. The duration of part 3 is 21.28 minutes. It is labelled as Part 3: Conclusion (See Figure 5.9).

After the editing process is completed, three panel experts reviewed and approved the ESL writing lesson video. The experts checked the audio, visual and quality of the video and approved that it is suitable as a case to be viewed by the pre-service teachers for problem-solving purposes. The video of the ESL writing instruction is uploaded in the online *OpenLearning* platform for implementation. The next process is the OCBPS Module being reviewed by panel experts.

Experts' Feedback on the OCBPS Module.

This section provides the feedback of the OCBPS Module that underwent two reviewing process**.** It has been reviewed by two lecturers who have taught TESL teacher education courses. They are also curriculum and instruction experts with PhD qualifications and more than 20 years experience teaching in school and higher learning institutions. Below is the summary of the experts' feedback on the module:

1. Provide an 'Overview' in the module description.
2. Under Overview, change the first sentence from 'The purpose of the module is to provide an online resource of real teaching scenario' to 'The purpose of the module is to engage students in critical problem-solution analysis'.
3. Change the heading 'Objective' to 'Learning Outcomes'.
4. Ensure the Learning Outcomes are measurable. Remove one learning outcome which is 'develop a perspective of the concepts of problem and problem solving, pedagogical and content knowledge in ESL writing instruction' because the purpose of the module is to develop problem-solving skills which is a higher order thinking skills involving application, analysis and synthesis, instead of developing a perspective of concepts which involves a lower thinking process under the domain of knowledge and comprehension in Bloom's Taxonomy. The lecturer can discuss the concepts during implementation but the focus is on the problem-solving analysis. The learning outcome should be to develop problem-solving skills or to enhance problem-solving skills.
5. The lesson should follow Bloom's Taxanomy starting from the lower order thinking skills and build up the lesson to higher order thinking skills. In each lesson plan include the domains in Bloom's Taxanomy.

6. Under the heading 'Teaching Approach' include Merrill's First Principles of Instruction (Merrill, 2002) and Problem-Solving Stages of the OCBPS Module. The earlier drafts had three approaches namely; Face-to-face case-based learning and Online case-based learning.
7. Bibliography should follow the APA format.
8. Under the heading 'Evaluation' include lesson plan as one of the tasks. The pre-service teachers should be required to write a lesson plan. This is to suit Merrill's principle: *New knowledge is integrated into learners' new world***.** **S**tudents have a microteaching assignment and have to prepare and submit micro-teaching lesson plan. After problem-solution analysis of an actual ESL writing lesson, students should be able to come up with better lessons and to have learnt from the problem-solution analysis.
9. Include 'Pre-requisite Skills' after the heading 'Duration'. Students should have learnt the theories, approaches and methodology of teaching ESL writing so as to apply the knowledge and skills in the problem-solution analysis.
10. Implementation of the entrance survey should not be part of the lesson plan. It is to determine students' level at that particular time before the implementation of the module. Do it before the module implementation.
11. Prepare information on concepts that are covered in Segment Two on PowerPoint Slides and share the slides on the online platform for students' to use as resources.
12. Adjust the timing of the lesson. Make it longer for each segment. For example, for Segment 2: Learning is promoted when existing knowledge is activated as foundation for new knowledge; change from 30 minutes to 60 minutes. Also,

Segment 3: Presenting the Problem; change the duration from thirty minutes to sixty minutes.

13. Three weeks is too long to implement the module as it might disrupt the weekly schedule of the Methodology in Teaching Writing course in which the module is to be implemented in. The experts' suggested keeping it to nine hours and present it in two weeks. Alternatively, it can be presented as a workshop to be done in two days in a few sessions or segments. It is more feasible because students have to focus on their tests and assignments. Taking too much time to implement might affect students' retention. The experts said that the module is suitable to be implemented as a Pre-Practicum workshop for students who are going for teaching practicum.
14. The lesson should follow the sequence of OCBPS Problem-Solving Stages, and Merril's Problem-Solving Principles. These principles should be included in the lesson plan.

After editing the drafts based on the experts' feedback, the researcher prepared a description of the Online Case-Based Problem-Solving Module for ESL Writing Instruction. The description of the module is important to disseminate information on the philosophy, rationale, principles, goals and other important information on the module. The description can also serve as a manual for other educators who intend to use or adopt the module in their instruction. It is prepared as an information guide or handbook for lecturers who intend to implement this module (Refer to Appendix 18 for the module description, procedure for implementing the module and lesson plans).

The Module on the Online Platform.

The Massive Open Online Course (MOOC) *OpenLearning* platform has been selected by the panel experts as the most preferred online platform to implement the OCBPS Module for ESL Writing Instruction. *OpenLearning* was initiated in the Faculty of Computer Science and Engineering of University of New South Wales, Australia. This online platform was also chosen by the Ministry of Higher Education Malaysia as its official Massive Open Online Course (MOOC) platform for all 20 public universities on 18 September 2014 (www.openlearning.com, 2016). In the *OpenLearning,* teachers play the role of a facilitator who encourages and shapes a community of learners, a guide who directs the learners towards relevant concepts, and an experienced designer who builds authentic learning experiences. The teacher supports personalised learning by creating situations, designing authentic experiences and guiding discovery and promoting reflection (www.openlearning.com, 2016). The *Openlearning*'s core principles suits the purpose of developing the OCBPS Module for ESL Writing Instruction which is to provide authentic and active learning experiences for students, to foster student empowerment and deep learning (www.openlearning.com, 2016) through relevant and meaningful content to develop problem-solving skills, bridge the theory-practice gap, and to enhance pedagogical content knowledge. The following is the Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction on the *OpenLearning* platform:

Sign-up. Before a course can be set-up, a first time user needs to sign-up on the *openlearning* platform at https://www.openlearning.com/. Once the sign-up is complete, a user can log-in anytime.

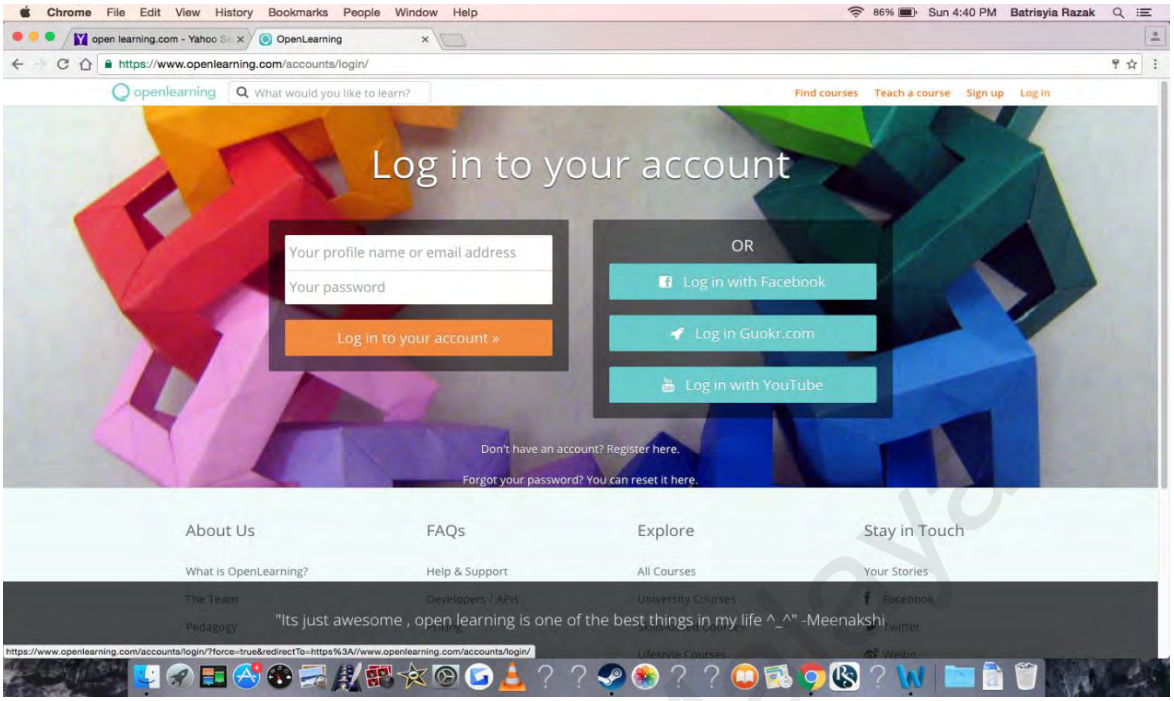


Figure 5.10 OpenLearning Accounts Log In

Figure 5.10 shows that the first time users need to sign-up and subsequently log-in to the *openlearning* account. The lecturer needs to inform students of this in her briefing on accessing the *openlearning* platform. The OCBPS Module for ESL Writing Instruction can be accessed on the *openlearning* platform which is accessible over the internet via computer or mobile devices such as Android and iOS, including tablets and smart phones (www.openlearning.com, 2016).

Information Page. The screen shot of the information page is shown below:

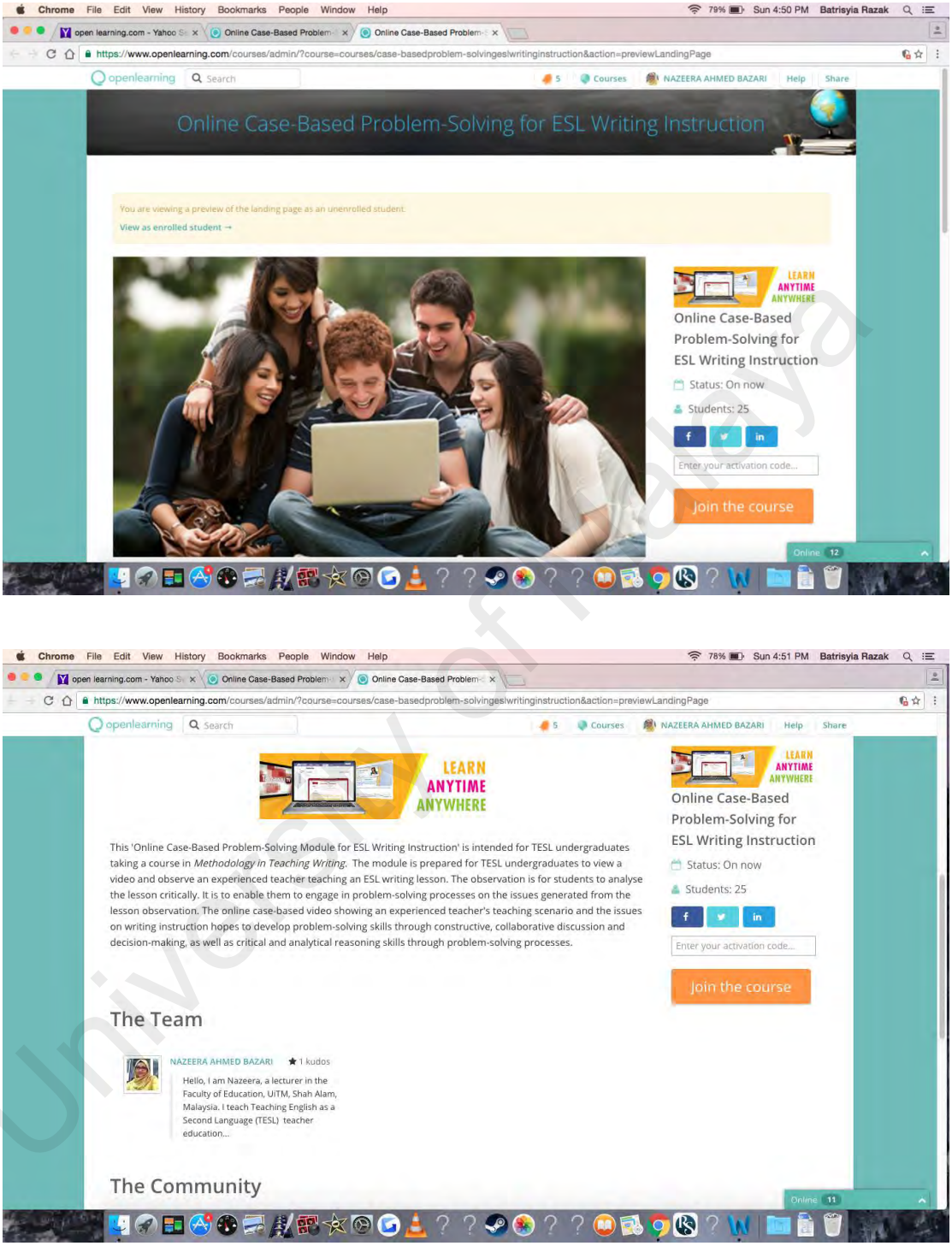


Figure 5.11. Preview of the Information Page

The images in figure 5.11 show the preview of the information page of the OCBPS Module for ESL Writing Instruction. There are 25 students enrolled in the course. The preview page shows a picture of a group of students looking at a lap top to show how students leverage on technology to learn. Technology has enabled people to learn anytime and anywhere. There is a brief introduction to the course and the researcher's name and brief information.

Home Navigation

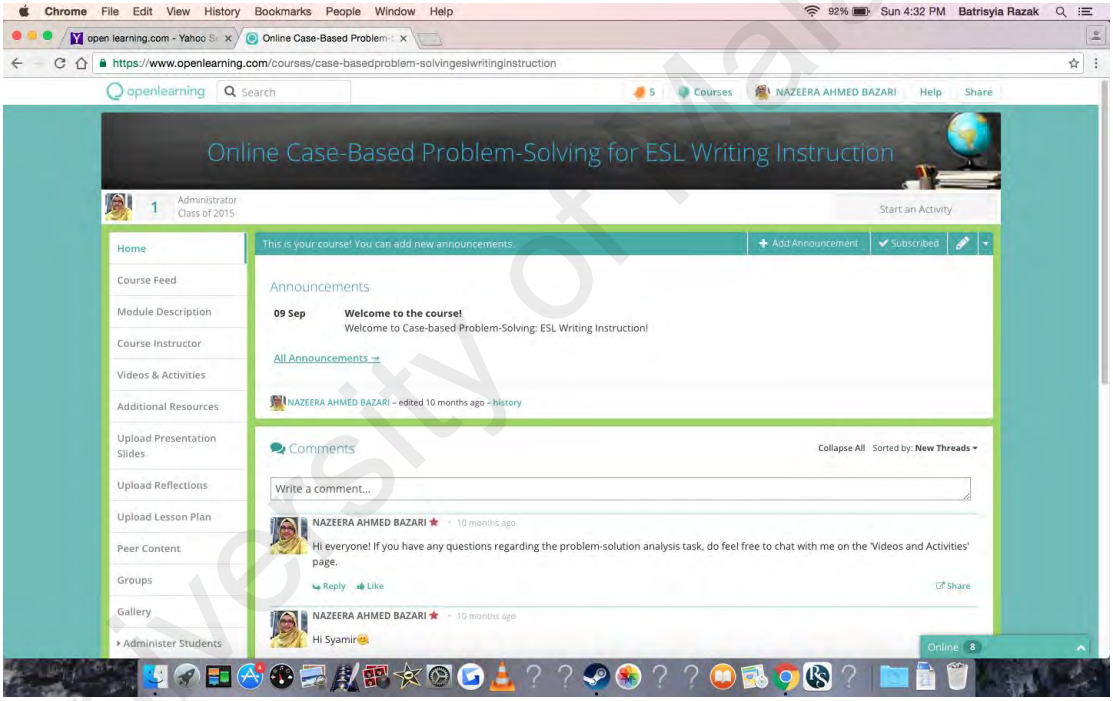


Figure 5.12 Home Navigation

Figure 5.12 shows the Home navigation page. The instructor welcomes students to the course Online Case-Based Problem-Solving for ESL Writing Instruction.

Module Description

Figure 5.13. Module Description Page

The image in figure 5.13 above shows OCBPS for ESL Writing Instruction module description. The module description is the course information which includes a synopsis of the course, the participants, in which course this module is to be implemented, the duration, objectives, learning outcomes, contents and evaluation.

Videos and Activities. In the videos and activities navigation tab, there are videos and other media to watch and learn from, followed by some activities. Figure 5.14 shows the screen shots of the activities that the pre-service teachers are required to do. The activities are authentic ESL writing lesson viewing and problem-solution analysis based on the OCBPS Problem-Solving Stages. The step-by step instructions are provided. The videos of the ESL writing instruction are provided. The participants have the option of viewing the lesson in parts or in one whole sequence.

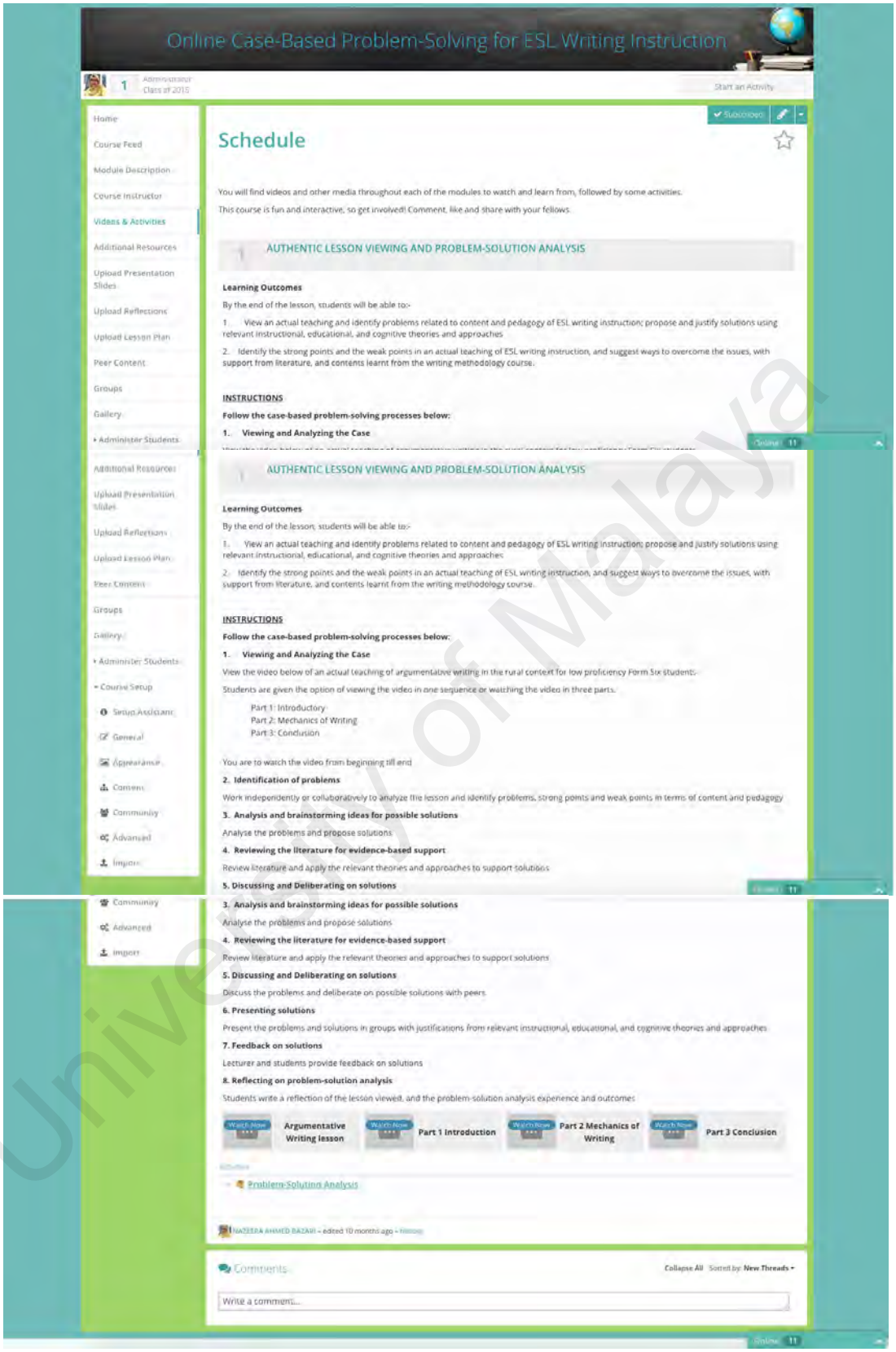


Figure 5.14 Videos and Activities Page

Additional Resources. Figure 5.17 shows the screen shots of the additional resources tab. The participants can go to the links to read the materials shared on this page. The resources are put under headings. The headings are Concepts of Problems; Pedagogical Content Knowledge; and Writing and Approaches. The participants can also share resources they think are relevant and useful for the course on this page. The experts suggested that the PowerPoint slides used in the implementation of the OCBPS Module for ESL Writing Instruction are shared on this page. The PowerPoint Slides shared are on 1) Concept of Problems in Case-Based Learning; 2) Pedagogical Content Knowledge; 3) Argumentative Essay; and 4) Learning and Cognitive Theories (refer Appendix 19 for these PowerPoint Slides). These slides are used during the implementation of the module in segment two.

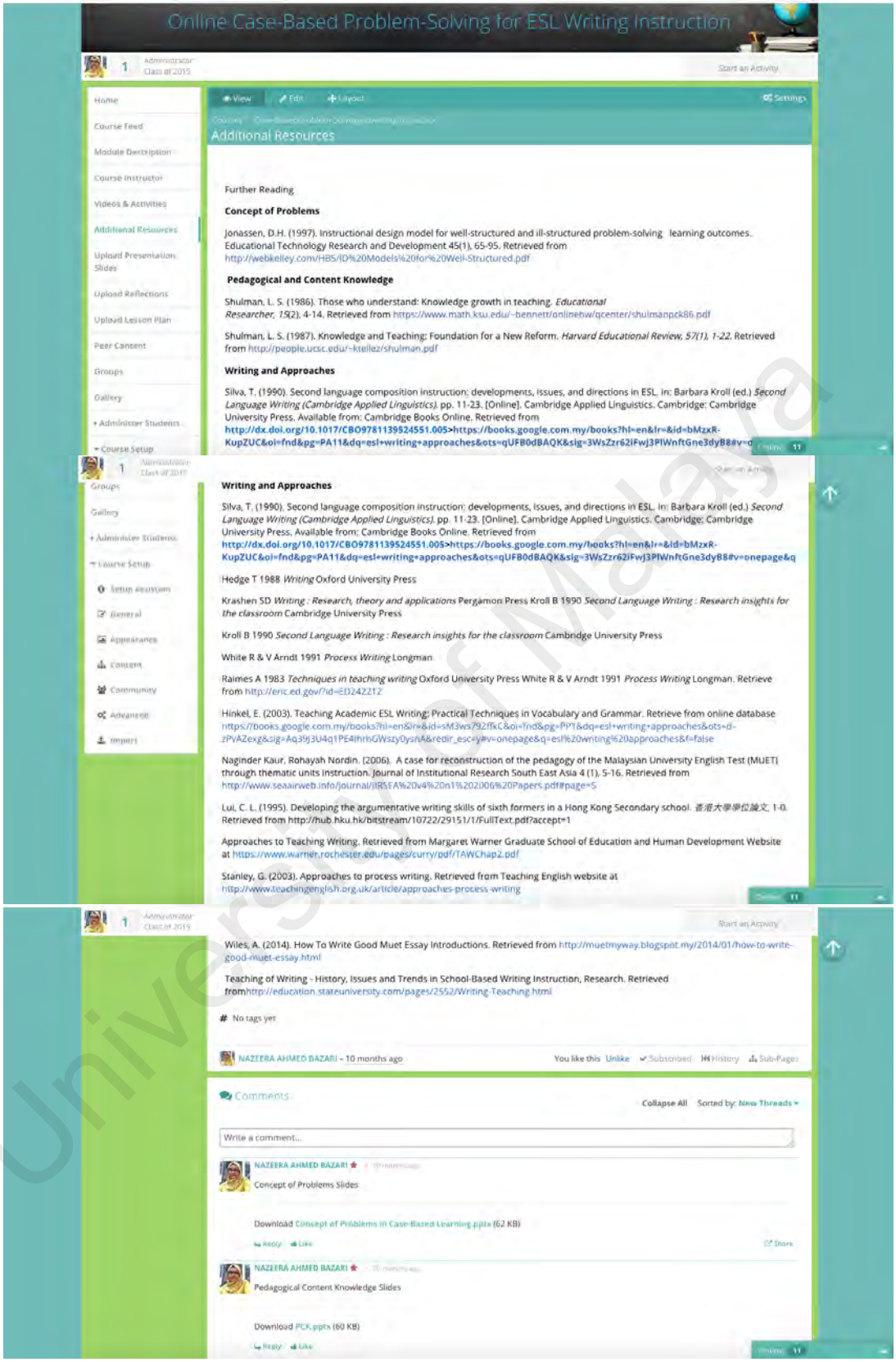


Figure 5.15. Additional Resources Page

Upload Presentation. SlidesFigure 5.16 show the screen shots of the 'Upload Presentation Slides' page.

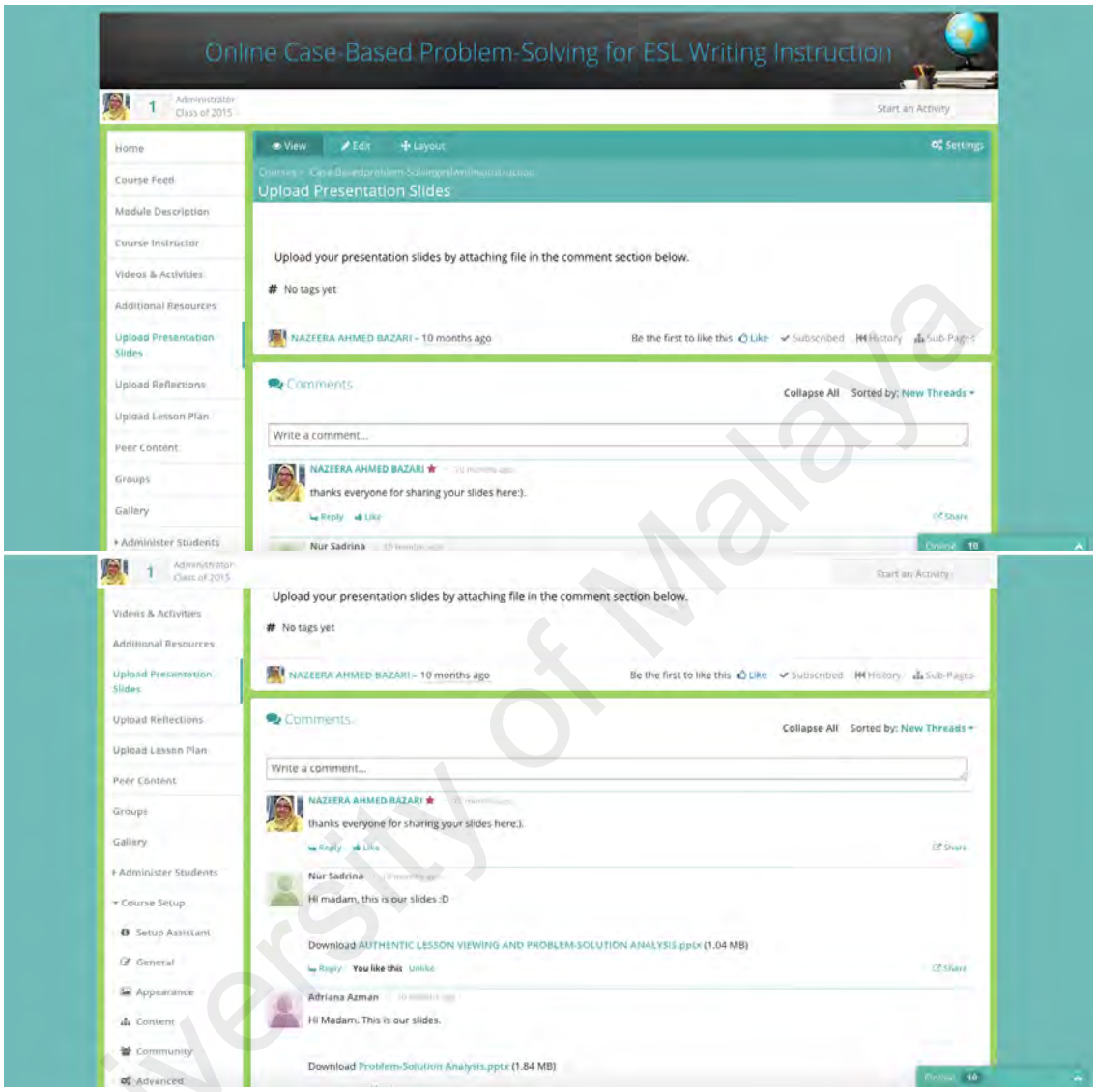


Figure 5.16. Upload Presentation Slides Page

The images in Figure 5.16 show that there is a navigation tab prepared to enable the participants to upload the problem-solution analysis presentation slides they have prepared in groups. This online platform enables the instructor and students to share learning materials and students' work. The participants can use the comment section to upload presentation slides and post comments.

Upload Reflection

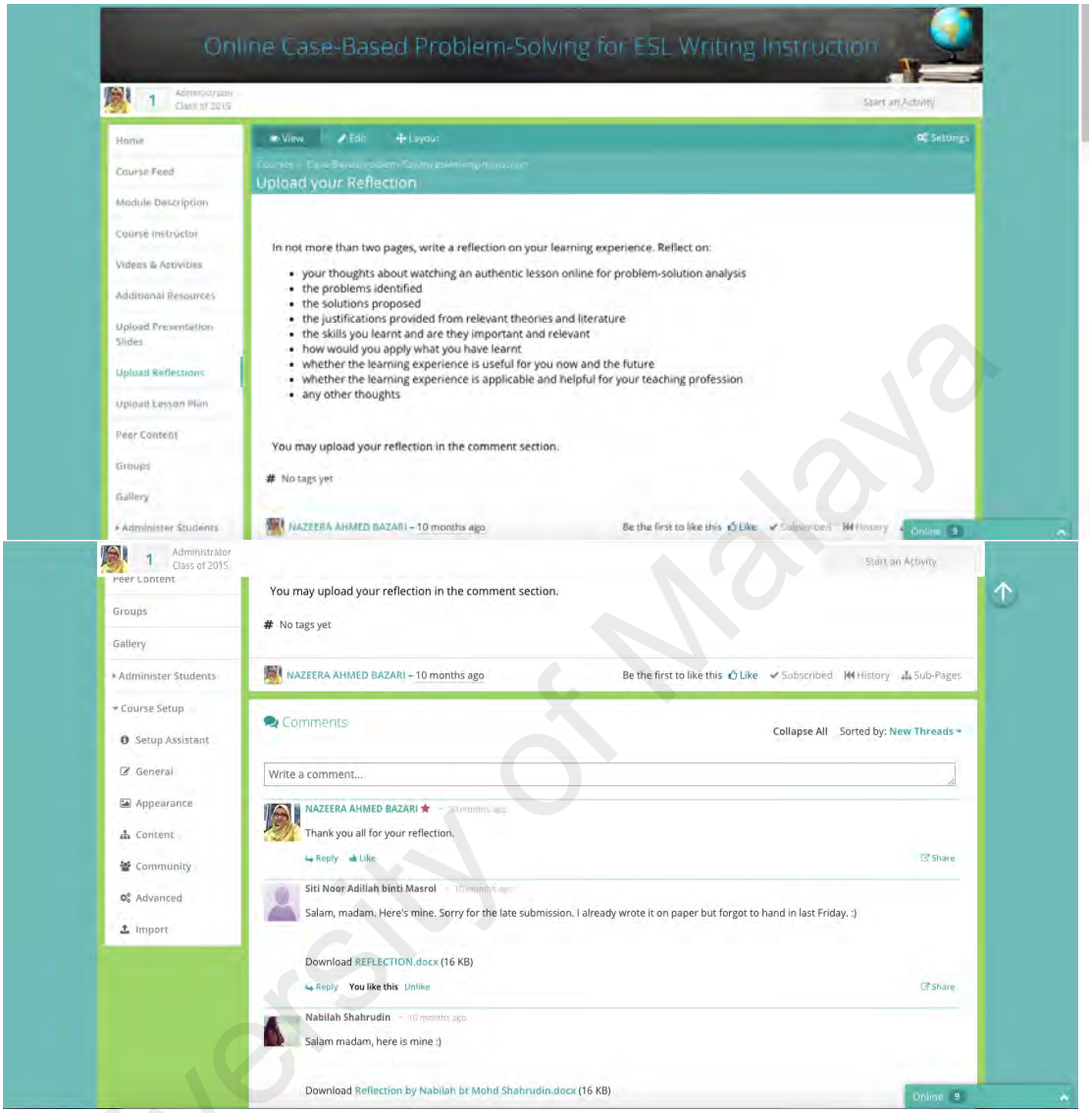


Figure 5.17. Upload Reflection Page

The participants can upload their reflection on the online platform (See Figure 5.17). The instruction for the post reflection is provided on this page for students to complete the task.

Upload Lesson Plan

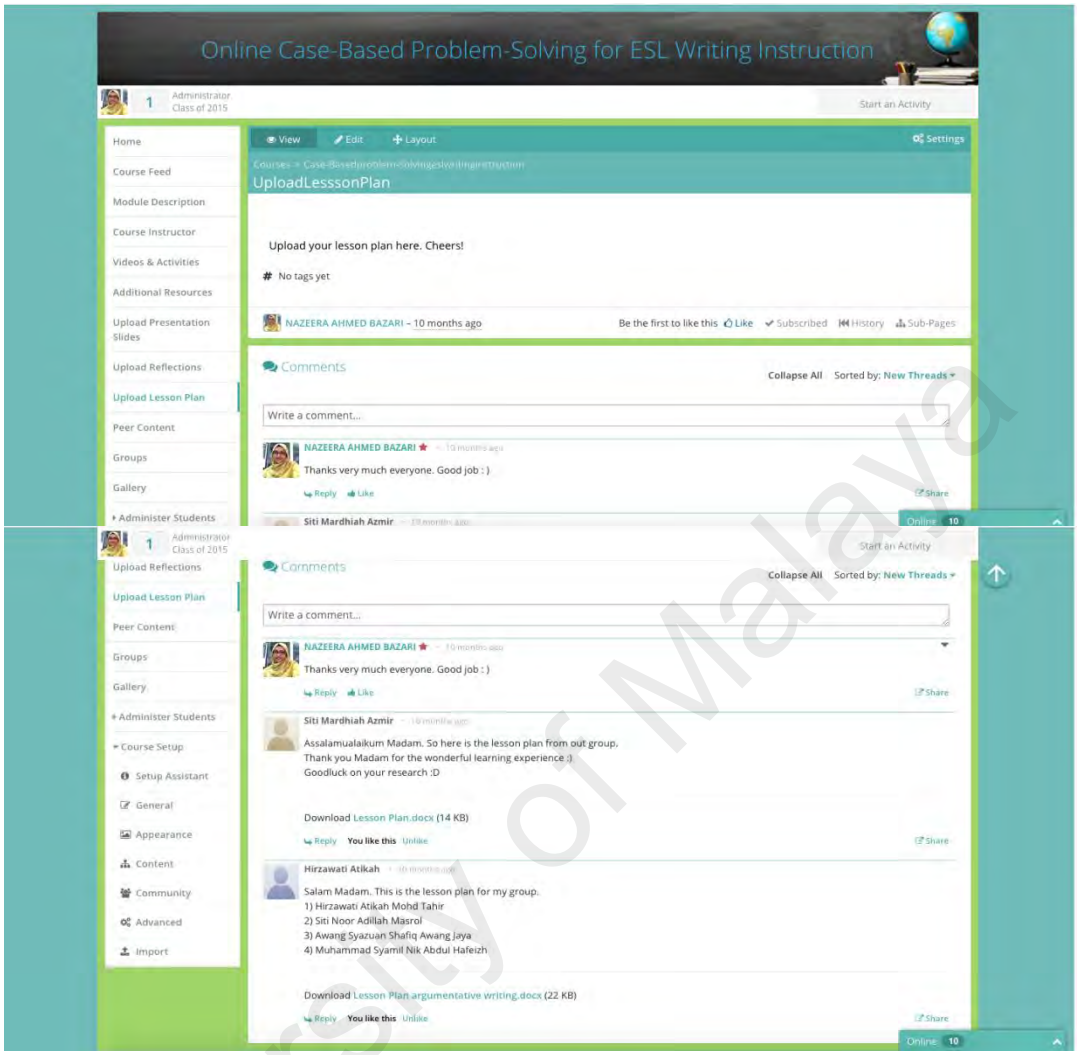


Figure 5.18. Upload Lesson Plan

The images in Figure 5.18 show the 'Upload Lesson Plan' page. Students prepare the lesson plan to submit to their Methodology in Teaching Writing lecturer and for their microteaching assignment as part of the course evaluation. It is not used as an evaluation in this study. The researcher provided this online platform for them to share their lesson plans.

The description of the module, procedure for implementing the module, lesson plans and an example of slides used in the implementation are in Appendix 18.

Conclusion

This chapter reports the design and the development of the Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. The design of the module adopts the Fuzzy Delphi Method in which a panel of experts achieved consensus on the design of the module. The findings are important to determine the most preferred case criteria, curriculum aspects and the media design for the development of the module.

The development of the OCBPS Module involved the recording of an authentic ESL writing lesson for pre-service teachers' viewing and problem-solution analysis. The OCBPS Module and resources were evaluated by panel experts before it was approved to be suitable. It is then made available on an online platform which is the MOOC *openlearning* platform. It can be accessed anytime and anywhere. During implementation students view the lesson online and engage in problem-solution analysis. The OCBPS Problem-Solving Model and Merril's (2002) Problem-Solving Principles are adopted in the development and implementation of the Online Case-Based Problem-Solving Module for ESL Writing Instruction.

Chapter 6

Phase 3: Evaluation

Introduction

The objective of this phase is to evaluate the module by discerning the perspectives of the lecturer and pre-service teachers on the usability of the Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS) after implementation. The implementation of the module was done from 27 November to 3 December 2015 involving one (1) Teaching English as a Second Language lecturer and 22 pre-service teachers who were selected through purposive sampling. The implementation was done in the Faculty of Education of a public university in the Klang Valley. The lecturer requested that the researcher was present throughout the implementation of the module and team teach with her.

Table 6.1

Implementation of the Module

	Implementation
Samples	1 TESL lecturer 22 B. Ed TESL pre-service teachers
Site	Faculty of Education of a public university in the Klang Valley
Duration	2 weeks

The evaluation of the module is done through Exploratory Implementation Process. Surveys and interviews were conducted after implementation of the module

to determine the pre-service teachers' and lecturer's evaluation of the module. The components are as follows:

1. Experience in Case-Based Problem-Solving in ESL Writing Instruction
2. Evaluation of the Usability of the Module
    - Technical Aspects
    - Strengths of the Module
    - Level of Satisfaction of the Lesson
    - Students' Evaluation of the Problems
    - Opinion of the Module
        i. Strengths the Module
        ii. The Limitations of the Module
        iii. The Problems Encountered during the Module Implementation
        iv. Suggestions and Comments for Improvements
3. Lecturer's Opinion of the Module from Interview
4. Students' Opinion of the Module from Interview
5. Comparison of Students' Pre and Post Reflection Scores
6. Pre-service Teachers' Reflection of the Module

Table 6.2

Evaluation of the Module

Evaluation Method	Usability
Exploratory Implementation Process	1. Entrance and Exit Survey: 22 pre-service teachers 2. Evaluation Survey: 22 pre-service teachers 3. Semi structured Interview: 1 lecturer 4. Interview with 4 pre-service teachers 5. Pre- and Post-Reflective Essays by 19 pre-service teachers- Single Group Pre-Test-Post-Test 6. Analysis of Post-Reflective Essays by 19 pre-service teachers

Socio-Demographics Background

Table 6.3

Number of Participants by Gender

	Gender	
	Frequency	Percentage
Male	6	27.3
Female	16	72.7
Total	22	100.0

The pre-service teachers who participated in the 'Online Case-Based Problem-Solving Module for ESL Writing Instruction' were six male (27.3%) and sixteen female (72.3%) students. A total of 22 students participated in the implementation of the module. There are only 22 students who registered for the course and there are more female students in the cohort than male as shown in the table and chart above.

Table 6.3

Number of Participants by Age

Age	Frequency	Percentage
22	15	68.2
23	2	9.1
24	3	13.6
25	2	9.1
Total	22	100.0

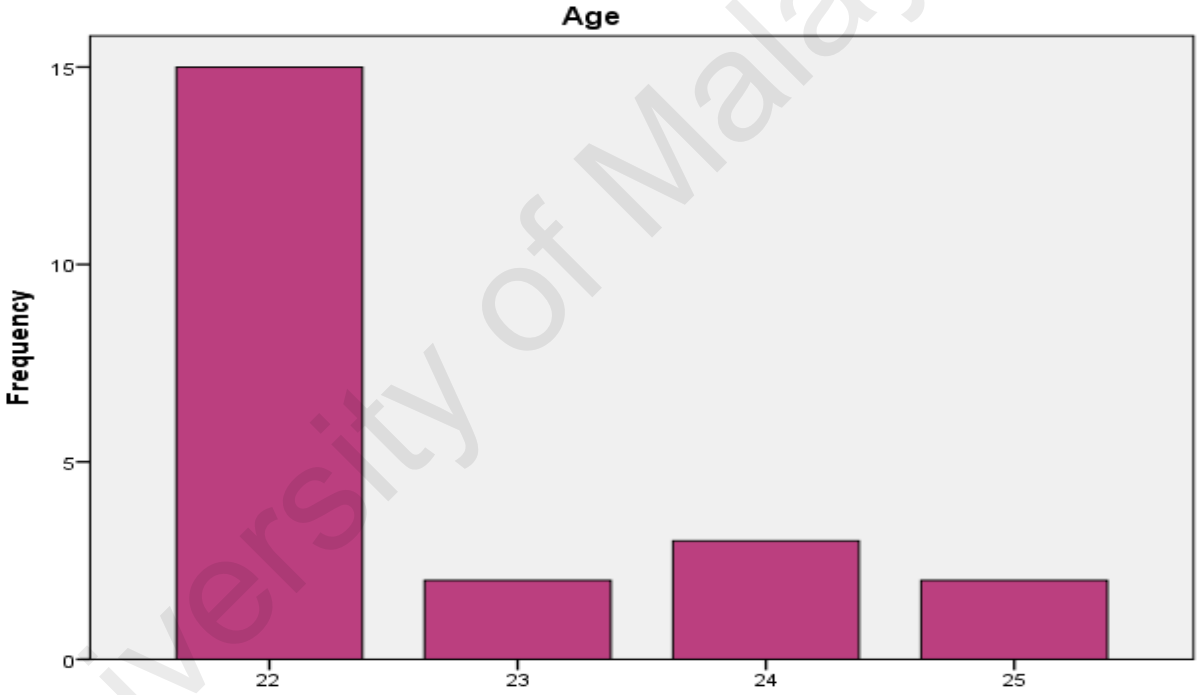


Figure 6.1. Number of Participants by Age

The table and graph above shows that a majority of the pre-service teachers who participated in the module are 22 years old. There are 15 of them (68.2%). Two other participants are 23 years old, and three participants are 24. The oldest in the group are 25 years old which consist of 2 participants. The participants are in their fourth semester of Bachelor in TESL program. The 'Online Case-Based Problem-Solving Module for ESL Writing Instruction' is implemented in the *Methodology in*

Teaching Writing for TESL course, a compulsory course for all degree in TESL students in the Faculty of Education in this university.

Experience in Case-Based Problem-Solving (CBPS) in ESL Writing Instruction

The first evaluation is on the TESL pre-service teachers' experience in case-based problem-solving in ESL writing instruction, and whether there is a significant difference in their experience before and after the OCBPS module is implemented. Before the module is implemented the pre-service teachers are asked to respond to the entrance survey that comprises 12 items. After the module is implemented, the pre-service teachers respond to the exit survey comprising the same 12 items. These surveys are to find out participants' level of agreement on a 5-point Likert scale on their ability and experience with the contents and processes that will and have been implemented in the 'Online Case-Based Problem-Solving Module for ESL Writing Instruction'. Upon completion of the implementation of the module, the participants respond to the exit survey which consists of the same statements as the entrance survey to gauge how they perceived themselves to have gained from the module. The entrance and exit survey is done to gauge the pre-service teachers' responses on the following aspects:

1. Ability to discuss concepts of pedagogical content knowledge, problems, contents in argumentative essays, pedagogy of teaching writing, and pedagogy in teaching argumentative writing.
2. Experience in observing a writing lesson online and engaging in problem-solution analysis, and writing reflections on problem-solution analysis and pedagogy and contents of ESL writing instruction.

The findings are reported in this section.

Reliability Coefficient of Experience in Case-Based Problem-Solving (CBPS) in ESL Writing Instruction

Table 6.4

Reliability Coefficient of the Entrance Survey

Reliability Statistics	
Cronbach's Alpha	N of Items
.803	12

Table 6.5

Reliability Coefficient of the Exit Survey

Reliability Statistics	
Cronbach's Alpha	N of Items
.915	12

The reliability coefficients of the entrance and exit surveys as shown in the tables above are relatively high with the Cronbach's Alpha of .803, and .915 respectively.

Comparison of Mean of the Experience in CBPS in ESL Writing Instruction between the Entrance and Exit Survey

Table 6.6
Mean Comparison between the Entrance and Exit Survey

		ENTRANCE SURVEY		EXIT SURVEY	
No	**Items**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
1	I am able to discuss the concepts of content and pedagogical knowledge	2.95	.844	4.36	.492
2	I am able to discuss the concepts of problems in ESL writing instruction	3.18	.853	4.59	.503
3	I am able to discuss the concepts of content in argumentative essays	2.95	.950	4.32	.477
4	I am able to discuss the concepts of pedagogy in teaching writing	3.09	.811	4.45	.510
5	I am able to discuss the concepts of pedagogy of teaching argumentative essays	2.64	.727	4.32	.477
6	I have observed a writing lesson online for problem-solution analysis	2.09	.811	4.55	.510
7	I have observed an argumentative writing lesson online in the rural context for problem-solution analysis	1.95	.722	4.59	.503
8	I have observed a Form Six argumentative writing lesson in a rural context for problem-solution analysis	1.82	.795	4.55	.510
9	I have engaged in problem-solution analysis in teaching writing	2.09	.610	4.50	.512
10	I have engaged in problem-solution analysis in teaching argumentative writing in the rural contexts	1.91	.610	4.55	.510
11	I have justified my problem-solution analysis of ESL writing instruction with relevant theories and approaches	2.14	.640	4.55	.510
12	I have written a reflection on problem-solution analysis of content and pedagogy of ESL writing instruction	1.77	.685	4.59	.503
	OVERALL MEAN AND STANDARD DEVIATION	**2.3826**	**.42776**	**4.4924**	**.36088**

N=22

Overall Mean of Experience in CBPS in ESL Writing Instruction for Entrance and Exit Survey

Table 6.7

Overall Mean of the Entrance Survey

Descriptive Statistics			
	N	Mean	Std. Deviation
Entrance	22	**2.3826**	.42776

Table 6.7 above shows that the overall mean for the entrance survey is *m*=2.3826. This indicates that the majority of the respondents either strongly disagree, uncertain or disagree with the items in the entrance survey on their ability to discuss concepts of pedagogical content knowledge (m=2.95), problems in ESL writing instruction (m=3.18), contents in argumentative essays (m=2.95), pedagogy of teaching writing (m=3.09), and pedagogy in teaching argumentative writing (m=2.64). Most of them also either strongly disagree or disagree with statements on their experience in observing a writing lesson online for problem-solution analysis (m=2.09), observing an argumentative writing lesson online in the rural context for problem-solution analysis (m=1.95), observing a Form Six argumentative writing lesson in a rural context for problem-solution analysis (m=1.82), engaging in problem-solution analysis in teaching writing (m=2.09), engaging in problem-solution analysis in teaching argumentative writing in the rural contexts (m=1.91), justifying problem-solution analysis of ESL writing instruction with relevant theories and approaches (m=2.14), writing a reflection on problem-solution analysis of content and pedagogy of ESL writing instruction (m=1.77).

Table 6.8

Overall Mean of the Exit Survey

Descriptive Statistics			
	N	Mean	Std. Deviation
Exit	22	**4.4924**	.36088

Table 6.8 above shows that the overall mean for the exit survey is *m*=4.4924. This indicates that the majority of the respondents either strongly agree or agree with the items in the entrance survey on their ability to discuss concepts of pedagogical content knowledge (m=4.36), problems in ESL writing instruction (m=4.59), contents in argumentative essays (m=4.32), pedagogy of teaching writing (m=4.45), and pedagogy in teaching argumentative writing (m=4.32). Most of them also either strongly agree or agree with statements on their experience in observing a writing lesson online for problem-solution analysis (m=4.55), observing an argumentative writing lesson online in the rural context for problem-solution analysis (m=4.59), observing a Form Six argumentative writing lesson in a rural context for problem-solution analysis (m=4.55), engaging in problem-solution analysis in teaching writing (m=4.50), engaging in problem-solution analysis in teaching argumentative writing in the rural contexts (m=4.55), justifying problem-solution analysis of ESL writing instruction with relevant theories and approaches (m=4.55), writing a reflection on problem-solution analysis of content and pedagogy of ESL writing instruction (m=4.59).

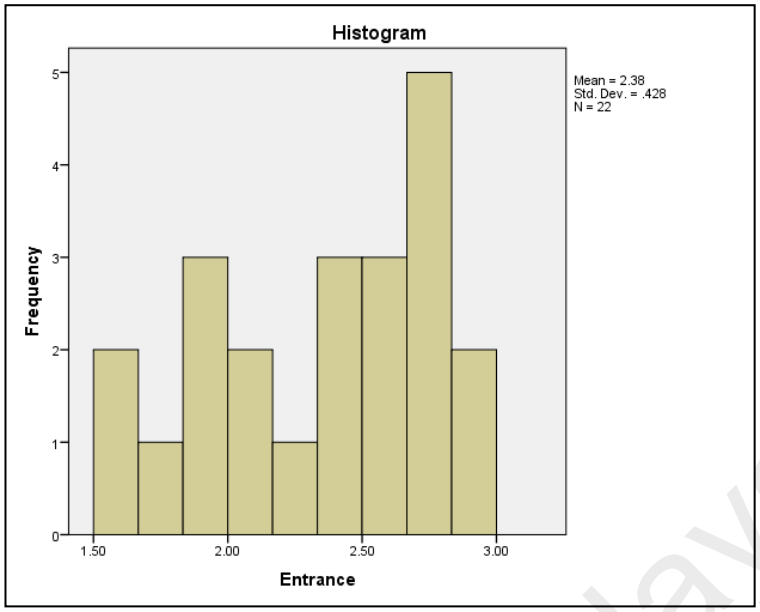
Assessing Normality of the Experience in CBPS in ESL Writing Instruction for Entrance and Exit Survey. To determine if a parametric or a non-parametric test is to be used to test if there is a significant difference between the entrance and the exit survey, a normality test is done.

Table 6.9

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Entrance	.135	22	**.200***	.946	22	**.260**
Exit	.190	22	**.037**	.878	22	**.011**

A non-significant result (Sig. value of more than 0.05) indicates normality. As shown in Table above, only the value of Kolmogorov-Smirnov and Shapiro-Wilk for the entrance survey is greater than 0.05 and this indicates the normal distribution. But for the exit survey, both the values are less than 0.05 and this indicates non-normality. Since there are two different conclusions for the normality test, the next step is to check using the histogram.



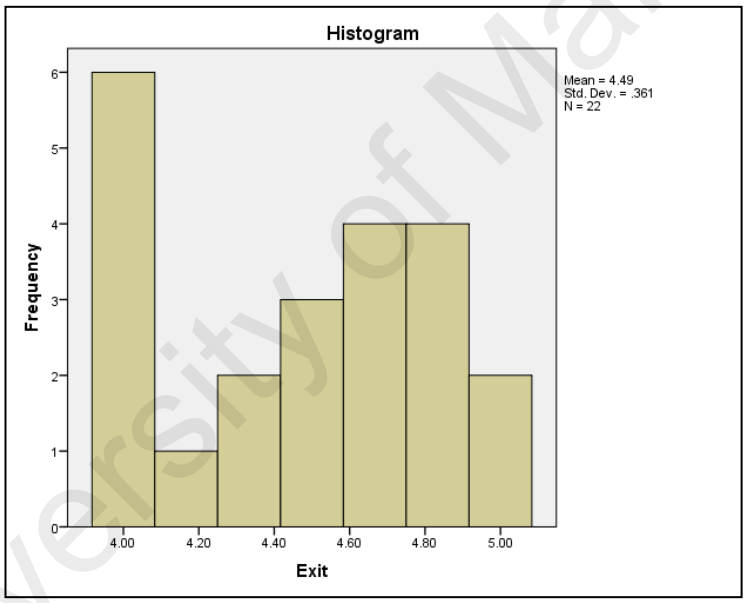


Figure 6.2. Histogram

A paired-sample T-Test is used when we have only one group of people (e.g students) and we collect data from them on two different occasions or under two different conditions (e.g pre-test and post-test). This test is a parametric test and it requires the normality test to be satisfied. Based on the figure above, both of the graphs show non-normality since the histograms are non-bell shaped. As a conclusion, the

data is not normally distributed. Since the data is not-normal', the non-parametric alternative test is Wilcoxon Signed Rank Test.

Wilcoxon Signed Rank Test. It is also called as the Wilcoxon matched pairs signed ranks test. It is the non-parametric alternative to the repeated measures t-test, but instead of comparing means the Wilcoxon converts the scores to ranks and compares them at Time 1 and Time 2.

Table 6.10

Wilcoxon Signed Rank Test

Test Statistics	
	Exit - Entrance
Z	-4.110
Asymp. Sig. (2-tailed)	**.000**

The significance level is 0.000 (less than α=0.05), thus the difference between the two scores in the level of agreement between the entrance and the exit survey is statistically significant.

Table 6.11

Median of the Entrance and Exit Survey

Descriptive Statistics				
	N	Percentiles		
		25th	50th (Median)	75th
Entrance	22	2.0000	**2.4583**	2.7083
Exit	22	4.0000	**4.5833**	4.8333

A Wilcoxon Signed Rank Test revealed a statistically significant increase in the level of agreement of the students on the implementation of the new module. The median score on the level of agreement increased from entrance survey (*Md*= 2.4583)

to exit survey (*Md*=4.5833). This indicates that students benefitted from the experience of learning from the OCBPS Module for ESL Writing Instruction. They gained experience in case-based problem-solving in ESL writing instruction.

Evaluation on the Usability of the Module

Part A: Usability of the Module. After the Online Case-Based Problem-Solving Module for ESL Writing Instruction is implemented the pre-service teachers responded to a survey evaluating the usability of the module. There are 32 items in Part A of the survey (refer Appendix 10). Part A is to find out participants' level of agreement on a 4-point Likert scale: 1) Strongly Disagree; 2) Disagree; 3) Agree; and 4) Strongly Agree. The findings are reported below:

Reliability coefficient of part a: Usability of the module

Table 6.12

Reliability Coefficient of Part A: Usability of the Module

Reliability Statistics	
Cronbach's Alpha	N of Items
.977	32

The reliability coefficients of the items on usability of the module as shown in the tables above are relatively high with the Cronbach's Alpha of .977.

Mean of each item on usability of the module.

Table 6.13

Mean of Each Item on Usability of the Module

No.	Items	Mean	Std. Deviation
1	The online video was easy to access	3.55	.596
2	The online platform where the video is available is suitable	**3.64**	**.492**
3	The online video was easy to use	3.59	.503
4	I had no problems accessing the video	3.59	.590
5	I had no problems viewing the video	3.59	.590
6	The duration of the video is suitable	3.27	.550
7	The structure of the video is easy to follow	3.59	.503
8	Problems in the module are relevant	3.45	.510
9	Objectives of the video are clearly outlined	3.41	.503
10	The audio is clear	3.55	.510
11	The visual quality is good for learning purposes	3.50	.512
12	The presentation of the module is suitable to achieve the learning outcomes	3.45	.510
13	The texts is clear	3.41	.503
14	The stages in the module are easy to follow	3.41	.503
15	The language is clear and easily understood	**3.64**	**.492**
16	The resources provided are useful to complete the given tasks	3.50	.512
17	Resources are easy to access	3.50	.598
18	The module is user-friendly	3.50	.512
19	The module helps me attain critical thinking skills to solve problems	**3.64**	**.492**
20	The module is able to encourage my friends and I to work collaboratively in problem-solution analysis	3.59	.503
21	The module helps me develop a perspective of how problems can be attended to and resolved	**3.64**	**.492**

N=22

Table 6.13, continued

No.	Items	Mean	Std. Deviation
22	I am able to communicate ideas effectively and confidently when engaged in the tasks required by the module	3.50	.512
23	The module is successful in developing my higher order thinking skills	3.45	.510
24	There should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes	3.59	.503
25	The module is able to increase my knowledge on problem-solving in ESL writing instruction	3.59	.503
26	The module is relevant to the learning outcomes of the ESL writing course	3.55	.510
27	The module is able to create awareness on the importance of problem-solving	3.50	.512
28	The module is able to expose me to some of the problems encountered in ESL writing instruction in secondary school	**3.64**	**.492**
29	Watching video at my own time and place helps me be more prepared for class discussion and activities	**3.64**	**.492**
30	I like the idea of watching video out of class and doing tasks with my friends in class	3.59	.503
31	This module is suitable to be infused in the ESL writing course	3.55	.510
32	The problem allowed for application of learning to real work situations	3.59	.503
	OVERALL	**3.54**	**.397**

N=22

The table above shows the mean of each item in the Part A: Evaluation on Usability of the Module. The highest mean is m=3.64, SD=.492 indicating a strong level of agreement for item 2: The online platform where the video is available is

suitable; item 15: The language is clear and easily understood; item 19: The module helps me attain critical thinking skills to solve problems; item 21: The module helps me develop a perspective of how problems can be attended to and resolved; item 28: The module is able to expose me to some of the problems encountered in ESL writing instruction in secondary school; and item 29: Watching video at my own time and place helps me be more prepared for class discussion and activities. The lowest mean is for the statement 'The duration of the video is suitable' (m=3.27, SD=.550). The overall mean is m=3.54, SD=.397 indicating agreement for all the items on usability of the module. The more detailed descriptive analysis of the items on Part A: Evaluation on Usability of the Module is reported below under the themes Technical Aspects and Strengths of the Module.

Technical aspects. The descriptive analysis of the items under technical aspects in the evaluation of the usability of the module is presented in the table below:

Table 6.14

Descriptive Analysis of the Technical Aspects on Usability of the Module

No.	Items	SD	D	A	SA	Mean	Std. Deviation
1	The online video was easy to access		1 (4.5%)	8 (36.4%)	13 (59.1%)	3.55	.596
2	The online platform where the video is available is suitable			8 (36.4%)	14 (63.6%)	3.64	.492
3	The online video was easy to use			9 (40.9%)	13 (59.1%)	3.59	.503
4	I had no problems accessing the video		1 (4.5%)	7 (31.8%)	14 (63.6%)	3.59	.590

5	I had no problems viewing the video	1 (4.5%)	7 (31.8%)	14 (63.6%)	3.59	.590
6	The duration of the video is suitable	1 (4.5%)	14 (63.6%)	7 (31.8%)	3.27	.550
7	The structure of the video is easy to follow		9 (40.9%)	13 (59.1%)	3.59	.503
8	The audio is clear		10 (45.5%)	12 (54.5%)	3.55	.510
9	The visual quality is good for learning purposes		11 (50.0%)	11 (50.0%)	3.50	.512
10	The texts is clear		13 (59.1%)	9 (40.9%)	3.41	.503
11	Resources are easy to access	1 (4.5%)	9 (40.9%)	12 (54.5%)	3.50	.598
12	The module is user-friendly		11 (50.0%)	11 (50.0%)	3.50	.512
	OVERALL				**3.52**	**.496**

N=22

Based on Table 6.14 above, it is found that most of the pre-service teachers agree that the module was easy to access (m=3.55, SD= .596), and they had no problems accessing the video (m=3.59, SD= .590). They also agree that the resources are easy to access (m=3.50, SD .598). The pre-service teachers agree that the online video was easy to use (m=3.59, SD= .590). They had no problems viewing the video (m=3.59, SD= .590). They say that the audio is clear (m=3.55, SD .510) and so is the text (m=3.41, SD .503). They agree that the visual quality is good for learning purposes (m=3.50, SD .598). They agree that the duration of the video is suitable (m=3.27, SD.550) and the structure of the video is easy to follow (m=3.59, SD= .590). They all agree that the module is user-friendly (m=3.50, SD .598). The pre-service teachers

mostly agree that the online platform where the video is available is suitable (m=3.64, SD= .492).

Strengths of the module. The descriptive analysis of the items under strengths in the usability of the module is reported below:

Table 6.15

Descriptive Analysis of the Strengths of the Module

No	Items	SD	D	A	SA	Mean	Std. Dev
1	Problems in the module are relevant			12 (54.5%)	10 (45.5%)	3.45	.510
2	Objectives of the video are clearly outlined			13 (51.9%)	9 (40.9%)	3.41	.503
3	The presentation of the module is suitable to achieve the learning outcomes			12 (54.5%)	10 (45.5%)	3.45	.510
4	The stages in the module are easy to follow			13 (59.1%)	9 (40.9%)	3.41	.503
5	The language is clear and easily understood			8 (36.4%)	14 (63.6%)	3.64	.492
6	The resources provided are useful to complete the given tasks			11 (50.0%)	11 (50.0%)	3.50	.512
7	The module helps me attain critical thinking skills to solve problems			8 (36.4%)	14 (63.6%)	3.64	.492
8	The module is able to encourage my friends and I to work collaboratively in problem-solution analysis			9 (40.9%)	13 (59.1%)	3.59	.503
9	The module helps me develop a perspective of how problems can be attended to and resolved			8 (36.4%)	14 (63.6%)	3.64	.492
10	I am able to communicate ideas effectively and confidently when engaged in the tasks required by the module			11 (50.0%)	11 (50.0%)	3.50	.512

N=22

Table 6.15, *Continued*

No	Items	SD	D	A	SA	Mean	Std. Dev
11	The module is successful in developing my higher order thinking skills			12 (54.5%)	10 (45.5%)	3.45	.510
12	There should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes			9 (40.9%)	13 (59.1%)	3.59	.503
13	The module is able to increase my knowledge on problem-solving in ESL writing instruction			9 (40.9%)	13 (59.1%)	3.59	.503
14	The module is relevant to the learning outcomes of the ESL writing course			10 (45.5%)	12 (54.5%)	3.55	.510
15	The module is able to create awareness on the importance of problem-solving			11 (50.0%)	11 (50.0%)	3.50	.512
16	The module is able to expose me to some of the problems encountered in ESL writing instruction in secondary school			8 (36.4%)	14 (63.6%)	3.64	.492
17	Watching video at my own time and place helps me be more prepared for class discussion and activities			8 (36.4%)	14 (63.6%)	3.64	.492
18	I like the idea of watching video out of class and doing tasks with my friends in class			9 (40.9%)	13 (59.1%)	3.59	.503
19	This module is suitable to be infused in the ESL writing course			10 (45.5%)	12 (54.5%)	3.55	.510
20	The problem allowed for application of learning to real work situations			9 (40.9%)	13 (59.1%)	3.59	.503

N=22

The descriptive analysis of the items under strengths in the usability of the module is reported below under the themes: Developing Problem-Solving Skills; Developing Higher Order Thinking Skills; Promoting Collaborative Learning and Communication; Relevance of the Module; Attitude towards the Module; Suggestions, and Other Strengths:

Table 6.16

Descriptive Analysis of Developing Problem-Solving Skills

No	Items	SD	D	A	SA	Mean	Std. Dev
1	The module helps me develop a perspective of how problems can be attended to and resolved			8 (36.4%)	14 (63.6%)	3.64	.492
2	The module is able to increase my knowledge on problem-solving in ESL writing instruction			9 (40.9%)	13 (59.1%)	3.59	.503
3	The module is able to create awareness on the importance of problem-solving			11 (50.0%)	11 (50.0%)	3.50	.512
4	The module is able to expose me to some of the problems encountered in ESL writing instruction in secondary school			8 (36.4%)	14 (63.6%)	3.64	.492
	OVERALL					**3.59**	**.4998**

N=22

Based on the table above, the pre-service teachers agree that the strength of the module is in its ability to help develop problem-solving skills. They agree that the module helps them develop a perspective of how problems can be attended to and resolved (m=3.64, SD .492). The pre-service teachers mostly agree that the module is able to increase their knowledge on problem-solving in ESL writing instruction (m=3.59, SD= .503). In addition, most of the pre-service teachers agree that the module

is able to create awareness on the importance of problem-solving (m=3.50, SD= .512). They believe that the module is able to expose them to some of the problems encountered in ESL writing instruction in secondary schools (m=3.64, SD= .492).

Table 6.17

Descriptive Analysis of Developing Higher Order Thinking Skills

No	Items	SD	D	A	SA	Mean	Std. Dev
1	The module helps me attain critical thinking skills to solve problems			8 (36.4%)	14 (63.6%)	3.64	.492
2	The module is successful in developing my higher order thinking skills			12 (54.5%)	10 (45.5%)	3.45	.510
	OVERALL					**3.55**	**.501**

N=22

Based on Table 6.18 above, the strength of the module is in its ability to develop higher order thinking skills as agreed by the pre-service teachers (m= 3.45, SD .510). They agree that the module helps them attain critical thinking skills to solve problems (m=3.64, SD .492).

Table 6.18

Descriptive Analysis on Promoting Collaborative Learning and Communication

No	Items	SD	D	A	SA	Mean	Std. Dev
1	The module is able to encourage my friends and I to work collaboratively in problem-solution analysis			9 (40.9%)	13 (59.1%)	3.59	.503
2	I am able to communicate ideas effectively and confidently when engaged in the tasks required by the module			11 (50.0%)	11 (50.0%)	3.50	.512
	OVERALL					**3.55**	**.508**

N=22

Based on the table above, it is found that the strength of the module is in its ability to promote collaborative learning and communication. The pre-service teachers

agree that the module is able to encourage them to work collaboratively in the problem-solution analysis (m=3.59, SD= .503). They are able to communicate ideas effectively and confidently when engaged in the tasks required by the module (m=3.50, SD= .512).

Table 6.19

Descriptive Analysis on Relevance of the Module

No	Items	SD	D	A	SA	Mean	Std. Dev
1	Problems in the module are relevant			12 (54.5%)	10 (45.5%)	3.45	.510
2	The problem allowed for application of learning to real work situations			9 (40.9%)	13 (59.1%)	3.59	.503
3	The module is relevant to the learning outcomes of the ESL writing course			10 (45.5%)	12 (54.5%)	3.55	.510
	OVERALL					**3.53**	**.508**

N=22

Based on the table above, it is found that the strength of the module is in its relevance to the learning process. The pre-service teachers agree that the problems in the module are relevant (m=3.45, SD .510). They also agree that the module is relevant to the learning outcomes of the ESL writing course (m= 3.55, SD .510). All of them agree that the problems identified allowed for the application of learning to real work situations (m=3.59, SD .503).

Table 6.20

Descriptive Analysis of Attitude towards the Watching Video Outside of Class Time

No	Items	SD	D	A	SA	Mean	Std. Dev
1	Watching video at my own time and place helps me be more prepared for class discussion and activities			8 (36.4%)	14 (63.6%)	3.64	.492
2	I like the idea of watching video out of class and doing tasks with my friends in class			9 (40.9%)	13 (59.1%)	3.59	.503
	OVERALL					**3.62**	**.498**

N=22

Based on the table above, the pre-service teachers like the idea of watching video out of class and doing tasks with their friends in class (m=3.59, SD= .503). They agree that watching video at their own time and place helps them be more prepared for class discussions and activities (m=3.64, SD .492).

Table 6.21

Descriptive Analysis of Suggestions

No	Items	SD	D	A	SA	Mean	Std. Dev
1	There should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes			9 (40.9%)	13 (59.1%)	3.59	.503
2	This module is suitable to be infused in the ESL writing course			10 (45.5%)	12 (54.5%)	3.55	.510
	OVERALL					**3.57**	**.507**

N=22

Based on the table above, it is found that the pre-service teachers suggested that there should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes (m=

3.59, SD= .503). They also agree that this module is suitable to be infused in the ESL writing course (m=3.55, SD= .510)

Table 6.22

Descriptive Analysis of Other Strengths

No	Items	SD	D	A	SA	Mean	Std. Dev
1	Objectives of the video are clearly outlined			13 (51.9%)	9 (40.9%)	3.41	.503
2	The presentation of the module is suitable to achieve the learning outcomes			12 (54.5%)	10 (45.5%)	3.45	.510
3	The stages in the module are easy to follow			13 (59.1%)	9 (40.9%)	3.41	.503
4	The language is clear and easily understood			8 (36.4%)	14 (63.6%)	3.64	.492
5	The resources provided are useful to complete the given tasks			11 (50.0%)	11 (50.0%)	3.50	.512
	OVERALL					**3.48**	**.504**

N=22

Based on the table above, it is found that the module has other strengths in terms of objectives, stages in the module, language used, and the resources provided in the module. The pre-service teachers agree that the objectives of the video are clearly outlined (m=3.41, SD .503). They agree that the stages of the module are easy to follow (m=3.41, SD =.503). Furthermore, the language used in the module is clear and easily understood as agreed by the pre-service teachers (m=3.64, SD .492). The pre-service teachers agree that the resources provided are useful to complete the tasks given (m=3.50, SD .512).

Part B: Evaluation on Satisfaction of the Module. After the Online Case-Based Problem-Solving Module for ESL Writing Instruction is implemented, the pre-service teachers responded to Part B of the survey evaluating their satisfaction of the

module. There are seven (7) items in Part B of the survey (refer Appendix 10). Part B is to find out participants' level of satisfaction on a 5-point Likert scale: 1) Very dissatisfied (VD); 2) Dissatisfied (D); 3) Moderately Satisfied (MS); 4) Satisfied (S); and 5) Very Satisfied (VS). The findings are reported below:

Reliability Coefficient of Part B: Satisfaction of the Module

Table 6.23

Reliability Coefficient of Part B: Satisfaction of the Module

Reliability Statistics	
Cronbach's Alpha	N of Items
.878	7

The reliability coefficients of the survey on level of satisfaction of the module as shown in the table above is high with the Cronbach's Alpha of .878.

Descriptive analysis of satisfaction of the module.

Table 6.24

Descriptive Analysis of Satisfaction of the Module

No.	Items	VD	D	MS	S	VS	Mean	Std. Deviation
1	How satisfied are you with this class?				9 (40.9%)	13 (59.1%)	4.59	.503
2	How satisfied are you with the activities done?				11 (50.0%)	11 (50.0%)	4.50	.512
3	How satisfied are you with the resources provided?			1 (4.5%)	7 (31.8%)	14 (63.6%)	4.59	.590
	How satisfied are you with the team work?			2 (9.1%)	8 (36.4%)	12 (54.5%)	4.45	.671
5	How satisfied are you with feedback?			1 (4.5%)	4 (18.2%)	17 (77.3%)	4.73	.550
6	How satisfied are you with evaluation?			2 (9.1%)	8 (36.4%)	12 (54.5%)	4.45	.671
7	Overall, I am satisfied with the module				6 (27.3%)	16 (72.7%)	4.73	.456
	OVERALL						**4.58**	**.565**

N22

Based on the table above, it is found that all the 22 pre-service teachers are satisfied with the class (m=4.59, SD= .503). They are satisfied with the activities done (m=4.50, SD= .512), and the resources provided (m=4.59, SD= .590). Almost all of them are satisfied with the team work (m=4.45, SD= .671). The pre-service teachers show a high level of satisfaction with the feedback (m=4.73, SD .550), and the evaluation (m=4.45, SD= .671) given during the implementation of the module. Overall, the pre-service teachers are satisfied with the Online Case-Based Problem-Solving Module for ESL Writing Instruction (m=4.73, SD= .456). The overall mean indicates a satisfaction towards the implementation of the module (m=4.58, SD=.565).

Part C: Evaluation on the Problems Identified in the ESL Writing Lesson. After the Online Case-Based Problem-Solving Module for ESL Writing Instruction is implemented, the pre-service teachers responded to Part C of the survey evaluating their perception on the quality of the problems identified. There are eleven (11) items in Part C of the survey (refer Appendix 10). Since it is a problem-solving module, the pre-service teachers provided their opinion on the nature and quality of the problems identified in the ESL writing lesson. They state their level of agreement on a 5-point Likert scale: 1) Strongly Disagree (SD); 2) Disagree (D); 3) Undecided (U); 4) Agree (A); and 5) Strongly Agree (SA). The findings are reported below:

Reliability Coefficient of Part C: Evaluation of Problems

Table 6.25

Reliability Coefficient of Part C: Evaluation of Problems

Reliability Statistics	
Cronbach's Alpha	N of Items
.905	11

The reliability coefficients of the survey on evaluation of the problems identified in the ESL writing lesson as shown in the table above is high with the Cronbach's Alpha of .905.

Descriptive Analysis on the Evaluation of Problems Identified in the ESL Writing Lesson

Table 6.26

Descriptive Analysis on Evaluation of Problems

No.	Items	SD	D	U	A	SA	Mean	Std. Dev.
1	The problems in the module are apparent			5 (22.7%)	12 (54.5%)	5 (22.7%)	4.00	.690
2	The problems have the ability to engage my interest and motivate me to probe for deeper understanding of concepts, and approaches learnt in the course			2 (9.1%)	8 (36.4%)	12 (54.5%)	4.45	.671
3	I am able to relate subject-matter to the real-world problems in the case			4 (18.2%)	6 (27.3%)	12 (54.5%)	4.36	.790
4	The problems are critical and I consider them important to find solutions			2 (9.1%)	8 (36.4%)	12 (54.5%)	4.45	671
5	The problems require me to make decisions or judgments based on facts, logic, information and rationalization			2 (9.1%)	8 (36.4%)	12 (54.5%)	4.45	.671
6	I am able to justify my decisions and reasoning based on theories, approaches, and principles being learned			4 (18.2%)	10 (45.5%)	8 (36.4%)	4.18	.733

Table 6.26, continued

No.	Items	SD	D	U	A	SA	Mean	Std. Dev.
7	The problems are relevant and there is a need for my friends and I to engage in the problem-solution process			1 (4.5%)	9 (40.9%)	12 (54.5%)	4.50	.598
8	The problems require me to use critical thinking skills and higher order thinking skills like, application, analysis, evaluation and synthesis			2 (9.1%)	9 (40.9%)	11 (50%)	4.41	.666
9	The problems are complex enough for me to work in groups to effectively work towards solutions			5 (22.7%)	6 (27.3%)	11 (50%)	4.27	.827
10	The problems enable me to synthesize what I have learned and connect that new knowledge to the framework of understanding that I am building, based on the concepts in the course			2 (9.1%)	9 (40.9%)	11 (50%)	4.41	.666
11	The problems are open-ended enough for me to explore in seeking solutions			2 (9.1%)	9 (40.9%)	11 (50%)	4.50	.673
	OVERALL						**4.364**	**.5003**

N22

Based on the table above, it is found that the pre-service teachers' evaluation of problems is positive for all the items. Most of them agree to the statements on the evaluation of the problems identified in the ESL writing lesson (m=4.364, SD=.5003). Most of the pre-service teachers agree that the problems in the module are apparent (m=4.00, SD= .690). This shows that they are able to identify the problems in the lesson because it is apparent. They agree that the problems are critical and they

consider them important to find solutions (m=4.45, SD= .671). They also agree that the problems are relevant and there is a need for them and their friends to engage in the problem-solution process (m=4.50, SD= .598). They state their level of agreement that the problems are open-ended enough for them to explore in seeking solutions (m=4.50, SD= .673). In addition, the pre-service teachers agree that the problems are complex enough for them to work in groups to effectively work towards solutions (m=4.27, SD= .827). The findings show that the pre-service teachers perceive the problems to be apparent, critical, relevant, and open-ended to explore solutions. It is also complex enough for a collaborative effort to seek for solutions.

Furthermore, the pre-service teachers agree that the nature of the problems requires the application of theories and approaches to the problem-solution analysis. They agree that the problems have the ability to engage their interest and motivate them to probe for deeper understanding of concepts and approaches learnt in the course (m=4.45, SD .671). Most of them agree that they are able to relate subject-matter to the real-world problems in the case (m=4.36, SD .790). They also agree that the problems require them to make decisions or judgments based on facts, logic, information and rationalization (m= 4.45, SD .671). Most of them agree that they are able to justify their decisions and reasoning based on theories, approaches, and principles being learned (m=4.18, SD .733).

Based on the findings from Table 6.26 above, the pre-service teachers agree that the problems require them to engage in higher order thinking processes. The problems require them to use critical thinking skills and higher order thinking skills like, application, analysis, evaluation and synthesis (m=4.41, SD .666). They also agree that the problems enable them to synthesize what they have learned and connect

that new knowledge to the framework of understanding that they are building, based on the concepts in the course (m=4.41, SD .666).

Part D: Opinion on the Module. Part D of the survey on Evaluation of the Module contains open-ended questions (refer Appendix 10). The pre-service teachers have the option of providing their honest feedback on the Online Case-Based Problem-Solving Module for ESL Writing Instruction after its implementation. They responded to open-ended questions on the strengths of the module, its limitations, and the problems faced in using the module. They may also give comments and suggestions. The findings are reported below:

Strengths of the Module. The pre-service teachers were given the option to provide their honest feedback on the strengths of the module. From the analysis, several themes emerged as the strengths of the module. They are reported in the sub-headings below:

a. Sharpens Higher Order Thinking Skills

Two pre-service teachers said that the module sharpens higher order thinking skills since critical thinking is needed in the problem-solution analysis.

The module sharpens our higher order thinking skills to be critical in finding problems and solutions (P1).

Gives students the chance to think critically and analyse problem and come out with solution (P3).

b. Authentic

The pre-service teachers said that authentic materials are being used. The module provides them with clearer picture of theories, approaches of real situations that happen in the real life situation. It is interesting to analyse the problems as it involves a real case. One pre-service teacher said that the module

exposed him/her to the real classroom situation and what can be improved. Another said that the module is based on real classroom situation so it is very helpful in getting new perspectives. One pre-service teacher said that the module is suitable for the targeted audience.

It provides us with clearer picture of theories, approaches of real situations that happen in the real life situation (P2).

As it involves real case, it is interesting to analyse the problems (P5).

It exposed me to the real-life classroom situation and what can be improved (P11).

Authentic materials (P19)

Based on real classroom situation so very helpful in order to get new perspective (P21)

Authentic material being used (P22).

Suits with the targeted audience (P22)

c. Opportunities for Authentic Problem-Solving

One pre-service teacher said that the module provides the opportunities to solve authentic problems. Another said that participants are exposed to the real problems in teaching argumentative essay; the solution is useful for future reference

It gave opportunities to solve authentic problems (P6).

Participants are able to be exposed on the real problem on teaching argumentative essay and the solution which would be useful for future reference (P16).

d. Student-Centred Learning

The pre-service teachers said that the module is student-centred. It engages students in asking and sharing opinions and stories. The strength is that the module encourages open discussions in which anyone can provide inputs, tips, and sharing of ideas.

Student-centred (P3)
Learner-centred (P8)
Always ask for students' opinion (P14)
Allow students to share their opinions/stories (P14)
The strengths of this module would be that it is open for discussion. Everyone was welcome to give their inputs and ideas. The lecturer has successfully created a good rapport with the participants (P17).
Tips on the step from friends and lecturers (P21)

e. Clear and Concise

Two pre-service teachers said that the module's strength is that it is clear and concise. The contents are clear and the pre-service teachers are briefed on the implementation of the module.

The fact that everything is stated in a clear and concise manner (P4)

The contents are clear; we are informed about this module beforehand (P5)

f. Interesting and engaging

The module is interesting and engaging.

Interesting and engaging (P4).

g. Use of Technology

The module makes use of technology and up-to-date multimedia.

The usage of up-to-date multimedia (P10)
The module makes use of the facilities and technology we have (P20)

h. User-Friendly

The module is user-friendly and easy to access.

This module is user-friendly (everything is easy to access) (P5)

i. Preparation for Teaching

The module provides an idea of what a real writing class is likely to be and it helps the pre-service teachers to be more prepared during practicum teaching.

It provides the information and knowledge about what a real writing class would be. It helps me to be prepared to face the real situation later during practicum (P7).

j. Leverage on the Flipped Classroom Technique

The module being online helps the students to work at their own time and pace to complete tasks, and then engage in discussion in class. They said that it is flexible, more effective, and saves class time.

The access to online material to relate with specific class assignment where students could discuss it further in class (effective and saves time) (P9)

The flexibility in terms of watching videos whenever free (P13).

k. Promotes Reflective Skills

The module promotes active reflection amongst students.

It promotes students to actively engaging in the reflecting session. Students realized that teaching writing is much harder in actual context than what we actually had in mind earlier (P12).

Application of Theories and Approaches to Problem-Solving

Students are exposed to tasks that require the application of writing approaches to problem-solving.

Exposed to writing approaches and problem-solving to the approaches (P14)

l. Emphasizes the Importance of Pedagogical Content Knowledge

The module emphasizes on the importance of pedagogical content knowledge and how these two are important for a holistic learning experience.

This module emphasizes on the importance of pedagogical content-knowledge. One knowledge is not sufficient to ensure holistic learning experience (P18).

Limitations of the Module. The pre-service teachers were given the option to provide their honest feedback on the limitations of the module. From the analysis, several themes emerged as the limitations of the module. They are reported in the sub-headings below:

a. Need More than One Video

The pre-service teachers said that they would like to watch more videos of actual teaching.

Maybe if we are provided with more than one video (P1, P11)
If could upload more videos of real life situation (P2).
Instead of showing 1 video, should show 2 videos: 1. Fun class; 2) boring class (too technical, exam-oriented) (P14).

b. Time Constraint

The pre-service teachers said that time were the main limitations of the implementation of the module. More time is needed for the implementation of the module to fully enjoy and learn. They would like more exposure to the problem-solving module. They think that more time will provide optimum outcome. They had limited time to complete the tasks.

2-week time module is not enough for me since there are lots of activities can be done (P2)

Time constraint (P3, P19, P20, P21, P22)

Maybe more time is needed in order to fully enjoy & learn completely (P4).
There is not enough time I think. I'd like to have this module longer (P5).
The time constraint. I want to have more exposure to the problem-solving module (P7).

Limited time (P8, P9)

Case-based learning should be provided more time to be applied in order to have optimum outcome (P10).
Time constraint. To be able to develop problem-based context, we would need more time (P12).

Require more than 9 hours (P13).

The period of the course is too short (P15).

Time constraint; time was very limited to complete the tasks (P16).

c. Problem with Accessibility if Internet is Slow

One pre-service teacher highlighted that those with slow internet capacity would have problems accessing the video

People who have slow internet capacity would have problems in accessing the video (P6).

Problems in using the module. The pre-service teachers were given the option to provide their honest feedback on whether they had any problems in using the module. From the analysis, it is found that most of the pre-service teachers did not have any problems in using the module. However, two participants highlighted that

they faced problems. One participant said that "the online app crashes (iPhone/android too I think) but on laptop version is good' (P4). Another pre-service teacher said that he/she "had problems relating suggested problems to the literature/ resources' (P11).

The analysis under this question found that the pre-service have a positive attitude towards using the module. One said that she is happy to use the module (P2). The module is really easy to access (P3). Everything is good and the guidelines were really helpful (P12). There are no major problems involved and the module went smooth (P18).

Other comments or suggestions. The pre-service teachers were given the option to provide their comments and suggestions. From the analysis, several themes emerged and they are reported in the sub-headings below:

a. Provide more videos

The pre-service teachers suggested providing more than one video. One is not enough. They would like to watch a variety of teaching styles and have wider perspectives of authentic teaching scenarios.

> *Other than just having only one video everything else is very engaging and interesting* (P1).
> *I am happy to be part of the module. Plz upload more videos for us to refer to. TQ!!!* (P2).
> *More videos to be analysed so that students will not have to present the same points since they might find the same problems* (P3)
> *Maybe varieties/different kind of videos to analyse for more riveting data* (P4).
> *It would be much better if there are more videos to analyse and more lessons to scrutinize* (P6)
> *Maybe more authentic videos can be included* (P11).
> *Give more samples of actual teaching. One is not enough* (P12).
> *Suggestion: It'd be good if we are exposed to good and bad styles of teaching* (P15).

Perhaps we can get more videos for this module as we are able to see different perspectives and different teachers (P17).

b. Introduced as a Course

One pre-service teacher suggested that this module be made into a course, as teaching writing is not easy and a domain that needs more attention.

This module can be introduced as a course in the study, as teaching writing is not easy and more attention has to be given to teaching writing (P5).

c. Include the Module in the Writing Course

The pre-service teachers suggested that the module be included in the writing course.

Overall, it was a very good module. It should be included in the course in the future (P7).

Maybe this course can be inserted in writing course officially (P22).

d. Useful for Future Teachers as a Preparation for Teaching Writing

One pre-service teacher said that the module is very useful especially for future teachers to prepare them for the teaching of writing in a more effective and interesting way.

The course/module is very useful especially for future teachers in preparing themselves in teaching writing in a more effective and interesting way (P16).

e. Cater the Module to Students from Other Contexts, Semester, and for Those Going for Practical

The pre-service teachers suggested that the module be implemented with students from other universities as participants to share their views, and also students from various semesters. The module should be introduced to all the students who are going for practicum teaching.

It would be more impactful if the module can include students from other universities as the participants can have their contextual knowledge (P18).
Involve students from various semesters in one class (P19).
Should introduce this module for all students that are going for practical (P21).

Lecturer's Evaluation of the Module

After the module was implemented, the lecturer who taught the module was interviewed to get her opinion on the Online Case-Based Problem-Solving Module for ESL Writing Instruction. Due to time constraint, the lecturer chose to provide her views by documenting her answers to the interview questions. She then responded to the interview based on the answers she had written to the question given prior to the interview. The findings of her responses are reported below. They are coded and presented based on themes related to the usability of the module.

Attitude towards the module.

New and interesting experience. he lecturer said that it's a new experience for her teaching the Online Case-based Problem-Solving for ESL Writing Instruction module. She has never used this approach and said that it was interesting. She said that it's a new experience for the pre-service teachers because most of them did not study Form 6 and observing a Form 6 class is a new experience for both lecturer and students.

It's a new experience for me. Erm…Before this I have not used this approach….observing a teacher teaching writing…argumentative writing to Form 6 students. And it's a new experience for the students especially observing a form 6 class. Most of them did not study form 6 so it's new for them (L4-7).

The lecturer said that it was the first time she is watching an actual writing lesson online.

Yes it's my first time (L146).

Happy to have implemented the module. She is happy to be part of the teaching team and she learnt a lot. She thinks there should be more videos available for the pre-service teachers to view and learn from other teachers.

> *I am very glad to be part of it. I learnt a lot. I think there should be more videos I can use with my students and learn from other teachers. (L160-161).*

Positive towards using the module again. She said she will use the module again for the Methodology in Teaching Writing course.

> *I think I will use this again for my Methodology in Teaching Writing class if it's available (L161-162).*

Strengths of the module

Preparation for teaching. The lecturer said that the module is useful for the pre-service teachers who were going to do their mock teaching to avoid the problems faced in teaching.

> *It's interesting to watch and as they are…the students are going to do the mock teaching, I think it is useful for them emm…in terms of avoiding the problems seen in the teaching (L7-9).*

She said it is helpful for the students' practical teaching. They can apply the theories covered in the module.

> *Yes it will be helpful for their practicum to teach in a more interesting way. They can apply some of the theories we did…mmm useful ones like how to use Gagne when doing lesson plan. The different theories used to write lesson plan. Next week is their mock teaching and mmm they can use the tips given (L175-178).*

When asked if she thinks the module is good for the pre-practicum seminar, she is positive that it will because it will help the pre-service teachers teach writing better,

vary the approaches to teaching, and observing from experienced teachers and analysing the lesson will help them teach more confidently.

> *Yes for sure. It will help them teach writing better hmm… and avoid the problems. maybe not speak Malay when teaching English unless necessary and more student-centred lessons. They can vary their approach to teaching. Perhaps they can observe different forms and levels as well. And it will help them on how to teach more confidently especially teaching writing (L192-196).*
> She affirmed that it will prepare the pre-service teachers for teaching.
>
> *Yes (L198).*

Bridge theory and practice. The module is able to bridge theory and practice. The lecturer said that the theories covered and discussed during the implementation of the module are significant and important. The pre-service teachers can apply the theories to their teaching. Relating the theories to teaching will help them remember how to apply the theories in the future.

> *mmm…yes of course…the theories are significant and important theories that these students need to know, well… at least they can apply some if not all in their teaching. They will remember the theories now as we discussed and related them to the teaching. Mmm…like why use Constructivism. They know that lessons should not be teacher centred and group activities are a better way for students to learn especially for language skills and writing (L11-16).*

The lecturer said that the strengths of the module are that it is not available before this. It is based on real classroom teaching which makes it relevant. Students watch critically because they need to identify problems and propose solutions. They also have to apply theories to the problem-solution analysis. This helps them to link the education theories to practical situations.

I think we don't have this module before. I think it is based on real classroom teaching so it is relevant. And when the students watch they are more critical because they are identifying problems and they need to propose solutions. Hmm… Not just identify problems but they have to explain based on theories. They learn how to apply the theories to teaching and problem-solving (L169-173).

Relevant for Educators and Future Educators. Besides being interesting, the lecturer said that the module is relevant to the Methodology in Teaching Writing course. She said that she learnt a lot from it and that it helps educators to reflect on their own teaching. Looking at the problems help her see what she should avoid in her teaching.

Ermm… very interesting. And it's relevant to the Methodology in Teaching Writing course. I learnt a lot. Watching the lesson is interesting because I too can learn a lot from it. It helps educators to reflect on their own teaching. Looking at the problems help me to see what I should not do in my teaching. The lesson was teacher-centred. Luckily, the teacher has interesting personality. Just that mmm her approach is not so suitable for the students…and… the students are form six they can do a lot more (L31-36).

The module is related and relevant to teaching writing. Seeing examples and learning from it can help the pre-service teachers become effective teachers.

Yes certainly because it is very related. It is relevant to teaching writing. If we see examples we can learn from it…it will help prepare the students to be more effective teachers (L131-133).

The lecturer said that the module is helpful, relevant and applicable to the course and the students are able to apply a lot of the contents covered in the module.

Yes. It was a new experience for me. It is very helpful and relevant for my course. The students are able to apply a lot of what is covered in the module (L165-166).

Relevant and helpful resources. The lecturer said that the slides were informative and helpful. The pictures made the slides interesting. More importantly the pre-service teachers can benefit from the slides when they are taught with examples and visuals.

> *Yes, they were informative and helpful. The pictures made them interesting. They could see how the theorists look like, emmm but what's more important is that the application of these theories in teaching English. The application is what's important. Some actually see the benefit of these theories when they are taught with examples and visuals (L21-26).*

When asked if the lecturer find the materials posted on the *open learning* platform relevant and helpful in the problem-solution process, she said yes.

> *Yes especially the ones on content and pedagogical knowledge, problem solving, and how to teach writing. They were relevant and helpful (L47-48).*

Regarding the articles brought by the students, the lecturer said that the students found some useful articles to support the problems of using mother-tongue to teach a second language. They know when it is appropriate to code-switch and code-mix and when not to with reference from research studies.

> *Yes… emmm they found some articles to support, like… like…aa teaching English using the mother-tongue. Now we know what research says about it. Still I think the teacher used too much Malay and she should minimize like the student in the interview said she should speak English mmm because only during English class they use English. so mmm even in rural school mmm…I think we should analyse our students proficiency and teach. They must understand what we teach. Yet, I told the students that they must speak English during practicum. You know… many supervisors are serious about this. They want English teachers to teach using 100% English. They do not see that it is necessary sometimes to use Malay. At least now the students know where this issue stands and the different arguments for it. Practicum is graded so they need to teach in English (L50-60).*

When asked if the module promoted reading literature and search for relevant materials to seek for solution and support their answers, the lecturer said it was stressed during the implementation so the pre-service teachers read articles to support their analysis which helps them more about teaching English.

> *Yes since this was stressed… that they needed to support with literature so they read a few articles to support their analysis and the reading was helpful and they learnt more about teaching English (L111-113).*

Develop problem-solving skills. The lecturer said that in the process of doing the problem-solution analysis task, the pre-service teachers needed to search for relevant materials to support and apply the theories to support their analysis. She gave them the freedom to think and solve problems without being an authoritarian. The module supports critical problem-solving skills. Students research for support for their analysis and in the process read more to promote thinking, application and problem-solving skills.

> *It was good watching the lesson and working with the students to identify the problems. I let them do the thinking and the problem-solving. I facilitated. We discussed a lot and the materials for support were good. Students managed to search for the materials to support. I stressed on that so that they can apply the theories they have learnt and give the support. Luckily they could find the support. And we did some reading of articles too (L38-43).*

When asked if the module help students develop a perspective of how problems can be attended to and resolved, the lecturer said that the problem-solving stages is a new approach for them. They learnt a lot and that the module is effective in developing problem-solving skills.

> *Yes they were presented with a lesson. They need to observe and identify problems, …and give their response on the problems identified and then discuss the solutions. amm…they have not done this before and they find it to be very useful for them especially that they have a mock teaching assignment coming up. They learnt a lot through the lesson observation…. and teachers' interviews. Also the students' interview. Mmm… I would say that the module is effective in developing problem-solving skills (L94-100).*

When asked if the module enable students to develop generic learning skills, such as problem-solving, team collaboration, communication and reflection, her response was positive. They engaged in discussion and critical and constructive problem-solution analysis. It trains them to be professional in their job, and see problems as opportunities to solve not complain and criticise.

> *Yes definitely, they discussed a lot and presented what were discussed as a group on the problems identified and the solutions suggested. And they supported with findings so… I think they were able to critically highlight the problems…you know… not just to criticise the teacher but to identify the good and the bad in the teaching. The module taught them to identify and solve problems constructively. We are training them to be professional in their job….not just complain and criticise but to solve problems (L103-108).*

When asked if the module helpful in helping students solve teaching of writing problems, the lecturer said yes. The experience with the module will help them be more prepared to teach.

> *Yes. They observed the lesson and discussed the good and the bad, the strengths and the weaknesses…ermmm and it will help them be more prepared in teaching not just writing but also teaching English (L127-129).*

Develop pedagogical content knowledge. The lecturer said that the contents covered in the course were relevant and useful, like contents and pedagogical knowledge, learning and cognitive theories, teaching argumentative writing and problem-solution analysis. They are able to grasp the concepts through the lesson observation and analysis. They are able to apply the concepts of content and pedagogy in the problem-solution analysis. The module assists students in applying content and pedagogical knowledge to real-world problems and problem-solving.

Yes of course. hmm… although they have learnt content and pedagogical knowledge in first year, hmm… this is a refresher because they said they have forgotten. Mmm and we relate it to the teaching so we can really understand the difference between content and pedagogy in teaching. I explained to them clearly and asked their feedback on their understanding of contents and pedagogical knowledge. Why are they important? They could relate to the problem-solving. Like the teacher had the content knowledge but lacked the pedagogy, or perhaps she felt she needed to give them all the points when in fact she should allow them to think. Basically, argumentative writing is a good genre to highlight. It is difficult to teach and at least the students learnt something from the teacher. She has some strong qualities despite the problems with teaching in Malay and doing all the talking (L65-75).

They learnt how important content and pedagogical knowledge is for teachers. They were told to…hmm they analysed the lesson in terms of content and pedagogy. What should be avoided or how to deal with the problems…and it will help them for their mock teaching (L121-124).

Develop collaborative learning. When asked if the module was able to help students work collaboratively, the lecturer said that the pre-service teachers discussed, shared and exchanged ideas, and they are able to learn from each other's analysis.

Yes they discussed a lot on the problems and solutions. They managed to share and exchange ideas. Each came up with articles to support their analysis in the presentation…. and some even saw problems that others didn't see (L86-88).

The lecturer said that group work is helpful as the pre-service teachers can learn from and scaffold each other.

Yes group work is very helpful. They can learn from each other and scaffold each other (L90-91).

Develop higher order thinking skills. When asked if the module helps students attain critical thinking skills to solve problems, the lecturer explained that it does as the lesson involved discussion aspects in the problem-solution analysis, the strengths and the weaknesses of the lesson, critical problem-solving because the analysis is justified. The pre-service teachers had to do a lot of thinking, problem-solving and justifying.

Yes we discussed on the aspects we should be looking at, the strength of the lesson and the weaknesses and also be critical about the problems and the dos and don'ts. And this is backed up by theories so it is well justified. A lot of thinking, problem-solving and justifying went through in the process (L115-118).

Technical aspects.

Easy access. When asked if it is easy to get on the *openlearning* online platform, the lecturer said that it is as long as the internet is available and the capacity is not too slow.

Yes it's very easy. And you showed us how to do it so we tried and it is easy. Although some of the students said internet was slow but they managed to get in (L136-137).

When asked if the lecturer had any technical problems accessing the video, she said no.

No, it was easy to access (L140).

Clear audio and image. When asked if the image and audio of the video was clear, the lecturer said that it was.

Yes, it was very clear (L143).

Problems and Challenges Faced

Time constraint. When asked if there were any problems or challenges faced, during the implementation of the Online Case-Based Problem-Solving module, the lecturer suggested that more time should be allocated. Anyhow, she managed to get the pre-service teachers to complete the tasks and they did well.

Mmm not really. Just that we need more time for it. But it was ok.
We managed to complete the tasks and the students did well (L181-182)?

Due to time constraint, the lecturer said she had to rush through the slides. She suggested breaking down the slides to two classes or sessions. Due to the pre-determined weekly schedule, the lecturer had to complete the implementation to move on to the next topic scheduled in the Methodology in Teaching Writing course information.

> *There were too many so we could break the slides to two classes. We had time constraint so we were rushing it a bit (L25-26).*

Suggestions. When asked if the lecturer thinks there should be more case-based learning videos of actual lessons online for problem-solution analysis and for teachers to view, she said yes, and suggested videos of different levels, locations, more scenarios of teachers teaching English, writing genres, approaches, and also to learn from the teachers' experiences and stories.

> *Yes… there should be more videos of different levels, and maybe different locations, students, …and of teachers teaching English. We can watch and learn from them, mmm we can get ideas of how English is taught in schools and what approaches teachers use for their diverse students. Perhaps also, why some teachers teach the way they do. Also, getting the teachers to tell their story, their experience will be helpful. Case lessons of various approaches to teaching writing should be shown. In this video the teacher uses genre- approach. Perhaps, other lessons with process approach or mixture of approaches…top down, bottom up approach and other methods of teaching writing to provide examples for the TESL students (L149-157).*

More time is needed. When asked if the lecturer has any suggestions to improve this Online Case-based Problem-Solving Module, she said that module is good for her and that more time should be allocated to cover all the theories. She would like to watch more teaching videos in the future.

> *Mmm… it is all good for me. Mmm… maybe more time should be allocated….especially to cover the theories. We cannot do all the theories in one class. And… we would like to watch more videos in the future (L188-190).*

Since this is a prototype to investigate the effectiveness of the Online Case-Based Problem-Solving Module, the findings will determine if the module is to be expanded with more examples of authentic teaching scenario.

Students' Opinion of the Module

This section provides the findings from interviews with four pre-service teachers who participated in the implementation of the module. The pre-service teachers expressed their views and opinions in the interview sessions conducted by the researcher. The interview sessions were conducted after the module was implemented. The one-on-one face-to-face interview sessions were held in a PhD. room of a library close to the classroom where the module was implemented. The atmosphere was silent and conducive for the interview sessions to proceed without distractions and interruptions. The pre-service teachers participated on a voluntary basis after the module implementation. The findings of the interview are presented in themes below:

Attitude towards the Online Case-Based Problem-Solving Module.

New experience. When asked if the pre-service teachers have experienced learning through this type of module, all four mentioned that it was their first time. They have never experienced learning from an online case-based problem-solving module before.

Before this I haven't had any chance of doing so (AD, L10).
Yeah. Yes, this is my first time (AM, L10).
This is my first time (N, L36).
...it was my first time having it…(S, L3-4)

Module is helpful, relevant and applicable. On whether they found the experience of viewing the lesson and engaging in problem solution process useful and relevant for them, all four responded positively.

> *I think that one is quite useful (AM, L15).*
>
> *Yeah. It was very useful because we did a very thorough discussion on it (N, L86).*

AD found it useful because she was exposed to the actual situation of teaching in a rural school; especially argumentative writing which for her is a difficult genre to teach as she has never been to any schools before for lesson observation.

> *I found it to be useful because err.. it revealed ermm.. the real situation of teaching in rural school because I haven't been in any schools before and how ....[pause]... how difficult it was to actually teach argumentative because it ....[pause]... it is a difficult level ....[pause]... level of writing (AD, L13-16).*

AD said that it is relevant because someday she will teach low proficiency students whether in rural or urban schools so it is useful that she can apply the knowledge gained.

> *Personally I think it is relevant because ermm.. somehow and someday I'm going to teach those kind of students even though ermm.. in urban schools we still have students who are ....[pause]... who have low proficiency so it is useful to me (AD, L24-26).*

Situation in school in a more convenient and less time-consuming way. AD said that her experience of learning from this module provided the opportunity to observe real teaching and to know the realities of teaching. The module being online makes the process easier since the pre-service teachers did not have to go to schools which can be difficult and time-consuming. The online case-based problem-solving module is very helpful to learn problem-solving and also to know about the real teaching

Ermmm.. ….[pause]…personally I think, this is a ….[pause]… a great chance to me to participate in this module because it really opens ….[pause]… open up my eye to what is really happening around me. So, I think it's a great way for students to be able to be exposed to this kind of errr.. real life teaching and you errr.. ….[pause]… plus that it is online so it's easier for us because we don't really have time to go to schools and it is really hard to go to school actually. So, by having this online platform err.. to learn about errr.. problem solution and also about the real teaching situation in school, it is really helpful for us (AD, L155-122).

AM stated that the module and its contents are relevant because the key features are covered and will be helpful for him when he does his practicum teaching.

*Yes. Of course it's quite err… relevant for me because I will be ermm… ….[pause]… become a practicum teacher, trainee teacher. So I think it will be good for me to know all these because ….[pause]… this is err… the… ….[pause]… what do you call it… ….[pause]… the… ….[pause]… **the** major key to actually go ….[pause]… to the teaching ….[pause]… experience (AM, L30-34).*

N was glad that she joined the online case-based problem-solving classes because it was very helpful and beneficial for her. She could access many lesson plans shared on the platform.

Yeah. I'm glad to be part of it and I'm glad that some of my friends had decided to …[pause]… come along thought I feel sorry for those who turned it down. I think they have missed ermm.. a big.. a big chance actually. And it was really helpful because I thought we could access so many lesson plans on the website that you had created, the open learning. So it was very beneficial actually (N, L146-150).

S said that it was his first time, yet it was insightful. It gave him useful knowledge and new information about the pedagogy of teaching writing and how to reflect on teaching through problem-solving.

Well, first of all ermm.. this is ….[pause]… this is ….[pause]… it was my first time having it and I find it to be a lot of ….[pause]… full of insights and also ermm.. ermm.. I had a lot of good knowledge in learning about pedagogical in teaching writing ….[pause]… and also how to find problems in teaching (S, L3-6).

…like I said just now, this is my first time joining such a course so ermm.. to me it was really insightful because I find that the course had helped me in quite a lot about getting new information on ….[pause]… teaching (S, L9-12).

Strengths of the online case-based problem-solving module.

Interesting and applicable to the teaching profession. The pre-service teachers said that the module is interesting and taught them on how to attend to problems that happen in school and during teaching.

AM said that the module is interesting because it taught him how to solve problems that are prevalent in school. Watching the video gave him the opportunity to think of solutions to solve problems that occur during teaching.

The module is interesting because it actually taught me ….[pause]… on how to solve the err.. ….[pause]… all the kind of problems that happen ….[pause]… at school. So I ….[pause]… for example we have the.. the.. the video, so actually we can think of some of the solutions to actually solve the problem that occur during the teaching (AM, L3-7).

AM said that the module is interesting because it taught him to become aware of some of the problems in the lesson which he hadn't noticed at first but after discussing the lesson observation with his friends, he realized that there are strengths in the teaching as well as problems faced by experienced teachers so it is advisable for teachers to always reflect and get opinion from others. Even experienced teachers make mistakes and need to reflect on their teaching.

Oh. I think this one errr… is quite interesting for me to actually go to this err… module because it actually taught me to become ….[pause]… aware of the ….[pause]… some of the problems that we actually ….[pause]… we cannot see because at the first time when I watched the video, actually I feel that there is not.. not… not much problem. But when we discuss and discuss, then only we realize that the teacher actually do slight mistakes. You know, so then only I realize that "oh okay!". So we ….[pause]… even in ….[pause]… even if you have become a good err.. ….[pause]… an

experienced teacher, you still do some mistakes so you need to actually ask opinion from ….[pause]… from others (AM, L107-115).

Preparation for teaching. When asked if the pre-service teachers develop a perspective of how they can apply the problem-solving case-based learning in their teaching from identifying the problems and proposing solutions, they said yes.

AD said that the case-based problem-solving module will help the pre-service teachers a lot in the future because observing the lesson and engaging in problem-solution analysis actually taught them that it is good to reflect after every lesson and problem-solution analysis could help them improve their own teaching.

Yes, I think that will help us a lot because ermmm.. ….[pause]… like what we have viewed so when we ….[pause]… we are going to school later, after we teach our student we can actually reflect whether ermm.. ….[pause]… we can use that problem-solution analysis to help us to improve our own teaching (AD, L66-69).

AM said that the module helped with the teaching of writing because it is a difficult skill to teach especially for a novice teacher. The module helped the pre-service teachers realize that they need to know the most suitable approach to teach writing and how to help students produce good essays.

Errr.. of course. I think it's more to ….[pause]… the writing one because I think errr.. for… ….[pause]… for novice teacher, I think it will be quite difficult to actually ….[pause]… to know how ….[pause]… a good approach to actually teach writing because you know ….[pause]…err.. writing is quite ….[pause]… tough to teach because we.. we… we don't usually ask them to write a ….[pause]… one essay, one long essay so we need ….[pause]… we need to actually know how to teach the ….[pause]… the correct way to teach them ….[pause]… to.. to… to actually make them to think how to write a good essay. Yeah (AM, L62-69).

N said that the case-based problem-solving module can be applied in future teaching because it trained them to outline the problems that are very common in classrooms regardless of the location of the school. Although the problems are common, they may be difficult to solve if the teacher doesn't know how to attend to them and solve them. The module taught her and her friends to get input from each other and evaluate which solution is better and how they can solve the problems identified. The experience was very insightful for her.

> *Yes, it did (N, L75).*
>
> *Oh. Ermm.. …[pause]… like I've said before ermm.. we outline the problems, I think which are very common problems in classrooms no matter where you are; in Malaysia, or wherever. So, some.. sometimes problems like that ermmm… …[pause]… is very hard to solve if you don't know the way. So I think when we did it, errr.. we actually had …[pause]… inputs from many …[pause]… many people. So, we could actually weigh "okay, which one is better. Errr.. how can we solve this?" So, I think it's.. it's.. very …[pause]… I don't know …[pause]…it's very insightful for me (N, L77-83).*

S too was glad he joined the online case-based problem-solving classes. He gained a lot of good information and wished he had had the course earlier. Still, he said the module was helpful in preparing him to go for his practicum.

> *I… I'm so glad that I had entered this module. Ermmm.. it helped me a lot. It gave me a lot of good information although I thought that err… it would be great to have this course earlier before I had my Methodology in Teaching Writing, but I guess errr… it's… it's still ermmm…. It ….[pause]… it's very very helpful in terms of err.. preparing me myself to go for my practicum (S, L124-128).*

Helpful for practical teaching. When asked if they think this module will be helpful for their practical teaching, they said it will help them.

Yeah. Of course (AM, L117).
Oh yes! It will be very helpful (N,L160).

AD said that it will be helpful because she has problems in teaching writing.

Yes I think it will be really helpful because I have problems in teaching writing actually (AD, L125-126).

When asked if it is a good module for pre-practicum seminar, one pre-service teachers said that it would help them be more prepared.

So I think if we include that in our pre-practicum seminar, it could help ermm.. ….[pause]…the students to be more prepared (AD, L142-144).

S said that the online case-based problem-solving module helped him a lot and thinks that there should be similar modules for reading, grammar and other aspects of teaching English.

Definitely. Ermmm… If… If… errrr…. If modules like this helped me a lot, I… I think ….[pause]… there should also be reading and also grammar and also ermm… ermm.. other… other…. aspects of teaching English. Should be ….[pause]… should be used like this ….[pause]… like this module (S, L133-136).

Bridge theory and practice gap. AD became more critical about which theory she can apply to specific problem or situations. Viewing the video helped her to analyse the situation with support from some of the theories she had learned but she said not all can be applied to the case she viewed. This is something she said was useful from the experience she had from the online case-based problem-solving module.

It is of a great help to me because ….[pause]… err.. even though we did learn about the theories and the ….[pause]… ermm… the content and pedagogical and what not but err.. when we viewed the video, we know that not everything that we learn can actually be applied in real life situation. So, ….[pause]… we can see what can be used and what cannot be used. So it's really useful (AD, L41-45).

N stated that the online case-based problem-solving module is an interesting technique as it bridges the gap between theory and practice. She said that it is very good that the pre-service teachers get a first-hand look at what really happens in the classroom. Viewing the lesson helps her to evaluate if the theories learnt can be applied in the classroom. It provides opportunity to evaluate if the solutions and strategies to solve problems are applicable in the class observed. It can be done there and then similar to practical experience, hence the lesson becomes more memorable.

Errr.. okay. First of all, I think it is a very interesting technique. Err.. we have been learning theory for years and years in classes but we have never seen it put into practice. So, when I was introduced to this online case-based umm.. problem solving, errrrr… …[pause]… I think it's really good because you get a first-hand look on …[pause]… what really …[pause]… happens in the classroom. Sometimes when you learn theory, it is not …[pause]… is.. is not really the case in classroom. So, when you see it live, and.. …[pause]… and then you can like …[pause]… you can see if the theory is applicable or …[pause]… whatever you have learnt, solutions or strategies to solve problems; whether it's applicable in the class. So, I think it's very interesting because it can be done there and then …[pause]… and the lesson becomes more memorable (N, L3-13).

N thinks that the strength of the module is it bridges the gap between theory and practice. N said that having the opportunity to look at real classroom environment and having to apply theories and learning to solve problems was useful for any education student. She said that her previous courses taught many theories but they were not memorable.

The strength of the module would definitely be …[pause]… err.. having the opportunity to look at a real classroom environment and having to apply the theories, having to solve the problems. That's definitely …[pause]… very useful for any.. any.. education students because we learn theory, we take PELT, we take so many theory courses but …[pause]… they are all not memorable at all. I.. I don't even remember what I learnt …[laughs]…(N, L153-158).

Learning from this module helped her and her friends to apply different theories and strategies revolving round behaviourism and cognitivism to tackle the problems.

Yeah I think what I did was err.. …[pause]… the.. the strategies that we suggested, my groupmates and I suggested, were mostly revolving around behaviourism and cognitivism. That's …[pause]… just about errr.. how we …[pause]… learn and how we tackle the problems with.. …[pause]… with the students (N, L26-30).

Useful, relevant and helpful resources. When asked if the resources posted online and those shared during the module implementation were useful for them, all of them affirmed that they were useful.

AD said that the resources and materials shared online during the module implementation helped her prepare for her presentation

Yes, it did because err.. the materials helped me in preparing the presentation that I have to do with my groups so the materials that posted online like the articles, it really helped (AD, L29-31).

Yeah. Ermm.. ….[pause]… it did help me ….[pause]… in a way that it guides me when ….[pause]… when I have to prepare for the materials to be presented (AD, L54-55).

AD found most of the articles useful. The teacher in the case lesson used Malay frequently in her English instruction. Many students shared articles on code-switching in L2 instruction. AD found the articles on code-switching useful as it justifies when and how much English teachers can code-switch.

Most of the articles, they are really useful such as the code switching and how we are supposed to use code-switching in schools (AD, L35-36).

AD said that the articles gave input on the various kinds of students with different levels including how different urban and rural students can be and which approach is suited for each.

> *When we ….[pause]… look at the articles, it actually tells us more on various kinds of students. We have the various kinds of level, so maybe different area ….[pause]… for example, rural and urban students a bit different. So, the approach will be different (AM, L18-24).*

N found the articles useful and the most useful one was on code-switching because it's a critical issue in Malaysia.

> *Yes, definitely (N, L47).*

> *Yah, they were useful. I think the most useful article would be on code-switching …[pause]… because it's a very ermm… prominent issue in Malaysia, I think (N, L49-50).*

S found the articles and videos shared useful as users can gain knowledge and make use of the videos for learning purposes.

> *Well, ermm.. yes, of course. Ermm.. since it provided ermm.. several ermm.. articles and also a video ….[pause]… I mean several videos also err.. included. I believe that ermm... users can use the videos to gain knowledge and also to err.. to make use of.. of.. the videos for their learning purposes (S, L15-18).*

S added that there were many articles presented by others and all were very helpful because they are related to his Teaching English as a Second Language (TESL) programme and the materials help him remember the methodology of writing.

> *Errr.. there were a lot of articles presented by them and ermm.. ….[pause]… errr… I've.. I've… ermm.. I've heard ….[pause]… there were some articles that were familiar to me and there were some new ones. Ermm.. all of them are very very helpful also because ….[pause]… err.. the programme I'm.. I'm.. I'm doing right now is very very err.. related to it so err.. ….[pause]… the articles presented is a very good reminder to me to ….[pause]… in.. in.. in remembering on the methodology of err.. writing (S, L20-26).*

Develop problem-solving skills. When asked if they think that they actually developed problem solving skills, all four said they did.

AD said that she developed problem-solving skills from the case-based problem-solving module like identifying and analysis of problem and suitable solution. She also learnt on how to ensure the feasibility of the solution.

> *Yeah I develop the problem solving skills like what….[pause]… what kind of problem that we attend to and what kind of solution and also ….[pause]… what are the measures that we have to take to ensure that the solution is actually feasible or not (AD, L74-76).*

AM is also positive that he developed problem-solving skills. The module gave him the opportunity to engage in discussion as well as argument to justify the solution so that they were able to provide reasoning for the best solution to the problem.

> *Yes, of course (AM, L48).*
>
> *During our discussion, as I said we err… we actually ….[pause]… we… we… we… argue ….[pause]… we actually… we… ….[pause]… we justify our reason for the solution and we also ….[pause]… errr… err… ….[pause]… give the reasoning so we actually think what is actually the best solution for the problem (AM, L52-55).*

N said that she and her friends being immersed in the process of talking about how to tackle the problems in the lesson viewed, and to discuss how they could improve the lesson by suggesting different approaches and actually coming up with lesson plans on how the lesson could have been done differently reflect their ability to engage in problem-solution analysis and applying problem-solving skills to authentic teaching situation.

> *Oh, yes. We actually sat down and talked about …[pause]… how could we tackle the problem or what would we do differently and we even came up with like.. …[pause]… different ideas and I came up with.. …[pause]… I think about two lesson plans. Two different lesson plans on how the lesson could have been done differently (N, L67-71).*

S found that his first experience watching an actual classroom teaching video and analysing the right and the wrong in the teaching gave him useful insight and prepared him for problem-solving.

> *Ermmm.. yeah. Ermm.. I think the video was the one that helped me most because ermm.. I did ….[pause]… it was also my first time watching an actual classroom video and so ermm.. when I saw it, I felt it was err.. pretty helpful because I've never thought about ermm.. watching a video and analysing what.. what.. err… whether.. whether.. whatever the teacher doing is wrong or right. So ermm.. when it was done in.. in this module and we were.. we were also prepared to.. to actually analyse ermm.. what's wrong and what's not. It ermm.. it gave me a lot of ermm.. useful insights (S, L47-54).*

S said that the module gave him and his friends a platform to critically view the video and simultaneously discuss on issues in the teaching, one of it being the frequent use of Malay to teach English and how much is allowed.

> *Yes. Ermmm.. ….[pause]… my friends and I were talking ….[pause]… were.. were.. also discussing while.. while the video was playing, we were discussing on how ermmm.. like for example, the teacher was ermm.. was err… using quite a lot of Malay in the video. So, we were… we were… discussing on how much err… how ….[pause]… how can there be a limit on.. on.. code switching and stuff like that (S, L57-61).*

Develop pedagogical content knowledge. When asked if the pre-service teachers were able to apply pedagogical content knowledge to real world problems and problem solving in teaching writing, they gave mixed reactions.

AD said that she had learnt about code-switching, some theories and methods such as product and process approach in teaching writing. She realized that teachers cannot and should not stick to the same method when teaching writing. AD implied that teachers should try various approaches and methods since there are many different genres of writing.

Yes. Like for example I have mentioned before about code switching and also emmm… ….[pause]… about some of the theories and methods that we have learnt errr.. for example like we learn about product and ….[pause]… product and process approach but in real life, sometimes, we cannot really stick to the same errr… method for writing other genres of writing (AD,L79-83).

On whether she would apply PCK in her teaching, her initial response was that she has not taught writing so she is not sure. Anyhow, she went on to say that she would be able to apply PCK in teaching (God willing).

Because I haven't been teaching writing but I think Inysallah I will be able to ermmm… ….[pause]… apply that skill ….[pause]… in teaching (AD, L90-91).

AM thinks that he can apply PCK.

Yes, I think I can apply the… ….[pause]… the content and pedagogical knowledge. I think yes (AM, L76-77).

N said that the pre-service teachers were able to apply PCK.

Yes, yes. We were able to apply that (N, L64).

She implied that PCK was apparent in the whole process since argumentative writing is not an easy topic to teach, thus having the opportunity to watch how to teach argumentative writing helped them.

Yes. Err... ... [pause]… because …[pause]… she was teaching …[pause]…argumentative writing which I.. ... [pause]… I don't think it's an easy topic to teach. So, to get a first-hand look on ... [pause]… the classroom environment and we had ... [pause]… we had the opportunity to actually watch how to teach argumentative writing (N, L100-104).

S said that the module is a good reminder for him to not do the same mistakes when he starts his practicum in the coming week.

…it is a great reminder for me especially that I'm going for practicum next week. Ermmm… I will definitely err.. err.. think that err.. ….[pause]… it's.. it's.. a great reminder for me to go into class and to.. to.. think about

ermm… ….[pause]… whatever I have learnt in this module and also err.. to not do the same mistakes I've taught ….[pause]… I've been taught in this module (S, L84-89).

Develop collaborative learning. When asked if the module was able to help the student and friends work collaboratively, the responses were positive.

AD said that working collaboratively helped her and her friends to think of a suitable way to analyse the situation and to think of the best solution together.

Yes, it helped a lot ….[laughs]… because ermm.. ….[pause]… from then we know what kind of solution that we have to come up with and.. and we can actually errr.. ….[pause]… together think of a ….[pause]… the ….[pause]… suitable ….[pause]… way how ….[pause]… how we should analyse the situation (AD, L57-60).

As for AM, working in groups helped members support each other in delegating the work for example each had to find articles. Another advantage of working collaboratively is that members could actually discuss the relevance of the ideas and to actually integrate each member's problem and solution to complete the problem-solution analysis task.

Yes. I think yes because we do have the ….[pause]… the ….[pause]… group. We have ….[pause]… we need to actually get to find some articles ….[pause]… you know, you have to divide. For example, I will be doing the ….[pause]… one part and he would do the second part and we get some ideas. For example, err… if I can remember ….[pause]… they.. ….[pause]… some.. ….[pause]… some my friends said this.. this.. this.. is quite relevant, my opinion is. ….[pause]… so we actually integrate the… the… the problem and the solution (AM, L39-45).

N and her friends talked about the problem-solution analysis task as to how they tackled the problem and negotiated different ways and ideas of handling the situation. They even came up with lesson plans on how they would conduct the lesson differently. There was interaction, brainstorming, sharing of ideas and debating

Oh, yes. We actually sat down and talked about …[pause]… how could we tackle the problem or what would we do differently and we even came up with like.. …[pause]… different ideas and I came up with.. …[pause]… I think about two lesson plans. Two different lesson plans on how the lesson could have been done differently (N, L67-71).

Another strength is that the activities is done in groups thus, the pre-service teachers can work together to come up with solutions which makes the process faster than having to think of solutions individually.

…and second thing because err.. the activities is done in collaboratively. So it's really easy for us ermm.. to work and to come up with solutions rather ….[pause]… rather than thinking on our own, it will take longer time (AD, L129-132).

S said the module actually helped the pre-service teachers work collaboratively as they discussed the real issues in the teaching case, what they can learn from it, and what to avoid doing when they teach in future.

Oh, yes. Ermmm.. ermm… by doing group work, ermm.. we discussed a lot about ermm.. what are the real issues in… in.. in… the teaching and also what ….[pause]… what can be learnt from and what not to be err.. to be.. to be done when.. when.. you teach in your class in the future (S, L35-38).

Develop higher order thinking skills. When asked if the module helped the pre-service teachers attain critical thinking skills to solve problems, they answered yes.

S said that the thinking process that went on in the analysis and deciding on the solutions certainly helped developed critical thinking.

Yes. Because we really have to think before we come up with some solutions so it really helped in developing our critical thinking (AD, L86-87).

N said she definitely attained critical thinking skills. The module helped her realize that the problems may be common but the solutions cannot be the same every time. She discovered that using the same solution repeatedly makes it ineffective so the same solution cannot be applied each time a problem arises. Teachers have to think of what may work and what won't in the process of tackling

problems. She and her friends had to think of a few solutions and determine if each would be effective or otherwise. This process trains them to think critically.

> *Definitely! Of course. Because err.. those problems might be common but the solutions ...[pause]... cannot be ...[pause]... the same solution over and over again. It's like ...[pause]... how you tackle things. If you use the same solutions over and over again, it becomes ineffective ...[pause]... in the long run. So, we had to come up with a few. Err.. yeah. So, it was ...[pause]... it was good (N, L93-97).*

S said by watching the video and simultaneously analysing it makes the process active because he and his friends had to critically analyse the video.

> *Ermm... I guess so because errmm.. by watching it, we.. we.. we... ....[pause]... we simultaneously analyse the... the video itself. So, I ....[pause]... I'd like to think that we were critically analysing ....[pause]... ermm.. the video (S, L75-77).*

Reading relevant literature for support. When asked if the module encouraged them to read relevant literature and search for relevant materials, all four said it did.

> *Yes, because we do have to find and search for the articles (AM, L58).*

N said that she and friends had to go through more than five articles to support the solutions they suggested.

> *Yes, definitely. I think we had to go through about ...[pause]... five or six materials to actually back up our solutions (N,L89-90).*

N added that the process was very interesting. One of the requirements of the task in the module is to support solution presented with support, hence the need to review literature to provide support. She and her friends did that; supporting the solutions with proof and justification which made the solutions more valid and applicable.

Errr… I think it was really interesting. Err… because …[pause]… we.. We did a presentation on that and the fact that we had to back it up with literature …[pause]… ermm… …[pause]… what… with proofs. So, I think it's not just something that you suggest. We had to suggest it with proof … [pause]… and when we did that ermm.. … [pause]… it becomes.. err…[pause]… the solution becomes more valid and it's.. It's more applicable I think (N, L39-44).

S and his group discussed more on code-switching which is a big concern for English teacher. They searched for articles on this issue to be well informed about how to deal with this issue.

Yes (S, L64).

Ermmm.. for my group, err...we discussed more on code switching because ….[pause]… because err… ermm… I think code switching issue has been a big concern since forever. So, ermm.. I thought it would be great to… to find articles related to code switching and whether ….[pause]… and.. and… we ….[pause]… we ….[pause]… it's like ermmm.. ….[pause]… people macam future teachers ….[pause]… future teachers should know ermmm.. how much they can code switch and how much they should not (S, L66-72).

The module can be integrated in the writing methodology course. When asked if the module is suitable to be integrated into the writing methodology course, all answers were positive.

AD said that exposing students to such module will help them to attend to problems and develop thinking skills which she thinks students are not good at.

I think it will be of a great ….[pause]… greater help because if the students are exposed to such a module, they will be able to ermm.. attend to a problem and develop such err… ….[pause]… thinking skills because we are not very good in that (AD, L94-96).

AM thinks that the module can be integrated not only in writing but also in every teaching skill including reading.

Yes, of course. I think it can be integrated and ….[pause]… but not only in writing but also in every ….[pause]… teaching skill ….[pause]… including like reading (AM, L80-81).

N said that it would certainly help her because she always had difficulty in teaching writing because it required many stages. The stages in the video helped her see the flow of the lesson.

> *Oh yeah! Yes yes yes. I would say yeah yeah. It will definitely help me, yeah. Because teaching writing …[pause]… I always had.. had.. difficulty in teaching writing because it requires many stages. So when I watched her …[pause]… and the video was also separated in three stages. So, it was a clear-cut …[pause]… I could really see the flow of the lesson. So, it was really helpful (N, L107-111).*

S thinks that more exposure to this type of module will definitely help future teachers learn a lot.

> *Ermmm… yes. If we were given ermm.. more exposure to it, I think that err… ….[pause]…future teachers will definitely learn a lot (S, L92-93).*

S is in favour of including the case-based problem-solving module. It would be refreshing as compared to how he is normally taught in all the methodology courses which are theories first then microteaching. He suggested including more case-based problem-solving modules to provide more opportunities for problem-solving.

> *Ermmm….Yes! Why not? Ermm.. since ….[pause]… since all of methodology course are.. are.. are.. just about the same, we would learn theories just for a start and then ermm.. a lot ….[pause]… most of the time during the semester will be given on microteaching so why not just include like a bit of ermm.. ….[pause]… subtopic or a main topic on… on this problem solving…(S, L96-199).*

Technical aspects.

Easy access. AD said that the module's strength is that it is accessible because it is an online module.

> *The strength of the module is one, it is accessible ….[pause]… because it is online (AD, L129).*

When asked in terms of technical aspect, was it easy to get into the *openlearning* online platform, the pre-service teachers gave positive responses.

It is very easy because with a just simple click and you can get inside (AD, L99).

Errr.. yes. Yes. It's quite ….[pause]… I think it's quite easy ….[pause]… to open (AM, L84).

Yes, it was very easy (N, L125).

N said that it was very easy to get into the open learning online platform. She said that the method used in this module is memorable and education courses should use case-based learning because you have a first-hand look. Through this case-based problem-solving module, information is retained longer and is easier to retrieve.

Yes, it was very easy. Ermm. You should …[pause]… I think education courses should have that because err.. …[pause]… throughout my years of learning here, whenever we learn theory, it's not memorable at all. I can tell you I.. I don't remember probably ninety-five percent of what I've learnt. So, when …[pause]… I.. I think learning has to be memorable like…[pause]… this case based learning, you have a first-hand look and now, I can still recall because it was memorable (N, L137-142).

S said that it was simple to use the online platform, it was easily accessible and there were no technical problems.

Ermm…. I.. I… I use internet a lot and I.. I.. spend a lot of time on computer and I think the website is err… is very very simple. It's easily accessible so I don't think it has any problem regarding technical issues (S, L110-112).

All four did not have any technical problems accessing the video.

No (AD, L101).

AM did not have any problems. He said having good internet connection to watch the video is vital.

Mmm… I don't think so. I don't know. Only that ….[pause]… we need to have good connection because we need to ….[pause]… err.. watch the video you know. So we need to get a really good internet lah because or not it will be quite ….[laughs]…(AM, L86-88).

No (N, L127).

It's easily accessible so I don't think it has any problem regarding technical issues (S, L111-112).

Clear image and audio. On whether the image and audio of the video were clear, the pre-service teachers' responded that the image and the audio were very clear with good resolutions.

Yes. The image and audio was very clear (AD, L103).
Errr.. yes (AM, L90).
Yes. Very clear (N, L129).
Yes. Ermmm.. it was clear. The video had ....[pause]... had good resolution and there was no problem with it (S, L114-115).

Prospect of having more problem-solving case-based videos online. Asked if the pre-service teachers think there should be more case-based learning videos of actual lessons online, all are favourable to the idea.

Yeah, I think yeah (N, L134).

AD thinks that there should be more case-based learning videos on teaching other genres of writing besides the argumentative genre shown in this module.

*...teaching writing? Yes. I think there should be more than just ....[pause]... **on one genre** (AD, L110-111).*

AM said that there should be more case-based learning videos for novice teachers. He suggested that the case-based problem-solving module be included in the syllabus.

Yeah! I think there should be more. I mean err.. ....[pause]... should be more to ....[pause]... novice teachers like us because ....[pause]... they can put it in ....[pause]... you know, inside in our syllabus. Yeah... (AM, L98-100).

S said that the video being authentic helped the pre-service teachers to relate whatever they have learnt to the real world. They would learn a lot through authentic materials than just reading from texts.

Yeah! Because ermm.. since the video is err.. authentic, ermm… we can relate to… to.. to…. real world and also errr.. we would learn a lot by.. by… by… learning through authentic errr…. materials instead of just reading… reading text forms (S, L104-106).

S added that after learning from this module, he believes that there should be more exposure to this type of module.

Yeah. Ermmm… after having the module, I ….[pause]… I really believe that ermm… there should be more exposure to… to this (S, L120-121).

Problems and challenges

More time needed. Two pre-service teacher interviewed suggested that the module is lengthened. One had no problem while one said it was challenging to find materials to support solutions.

Hmmmmm.. ….[pause]… maybe the module is short ….[pause]… so, it could be lengthened (AD, L134-135).

I… I… I don't think so. I think the module went… went… went… went good. It went well. Ermm.. just that ….[pause]… it felt like ….[pause]… it felt too short (S, L130-131).

AM had neither problems nor challenges in the module.

Hmmm no. I don't think so (AM, L119).

Challenge in looking for evidence. N said she had no problems but for her it was a challenge to find evidence to back up her solutions.

*No problems just err.. challenges I would say. When we had to come up with the solutions and back it up with materia**ls** (N, L163-164).*

Suggestions

More authentic case scenarios online required. When asked if there should be more authentic case scenarios on teaching ESL writing in the Malaysian context available online for learning and problem solving purposes, the pre-service teachers affirmed that there should be more because it will be helpful for them to know the

realities of teaching, and to make comparisons form the strengths and the weaknesses of the lessons.

> *I think there should be err.. more ....[pause]... examples of errr.. real-life teaching because what we have been heard is all the pretty and the good things but not the reality so more examples would be really helpful for us (AD, L148-150).*
>
> *Yes (AM, L127).*
>
> *Yeah, I agree (N, L183).*
>
> *Oh yes! (S, L138).*

N said that more case-based problem-solving videos are required showing the lessons of a very good teacher, a mediocre teacher and a weak teacher to see the strengths and weaknesses in each lesson and to learn from real teachers' experiences.

> *...what you can do probably get a weak ...[pause]... no, it's not nice to say weak teacher but yeah, a weak teacher and a very good teacher so we can see the comparison. Like extreme and extreme so you can see. And probably a mediocre (N, L175-177).*
>
> *... very strong examples like that so we can see the ...[pause]... contrast. (N, L179)*

Report for Pre and Post Reflection

This section reports the findings of the scores generated from nineteen (19) pre-reflection essays written by the pre-service teachers at the beginning of the module implementation, and the scores of post reflective essays written at the end of the module implementation. The scores of pre- and post-reflections are compared to determine if there are significant differences in the scores. If the scores have significant difference, it can be concluded that the module is able to improve the pre-service teachers' reflective abilities in the following aspects:

1. Pedagogical Content Knowledge
2. Problem-Solving

3. Theory and Practice

4. Overall Scores

Analysis of inter-rater reliability. The nineteen (19) pre and post reflections were evaluated by two raters in the field of TESL using a rubric (refer Appendix 17). In order to establish reliability in the scores given by Rater 1 and Rater 2, an inter rater reliability test is done using SPSS. This is to test the consistency of scores given by Rater and Rater 2 and to determine that the range of scores between Rater 1 and Rater 2 is not significantly different. The findings are reported in this section.

Normality test. A normality test is conducted to determine if the scores are normally distributed and to determine if the inter-reliability measure is to be determined by a parametric or nonparametric statistical analysis.

Table 6.27

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality for Inter-rater Reliability

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diff	.180	19	.104	.919	19	**.109**

Normality Test	Kolmogrov-Smirnov	Shapiro-Wilk
Sig. Value	.104	0.109

Table 6.27 above shows the result of testing normality of data using Kolmogrov-Smirnov and Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the sig. value for Kolmogrov-Smirnov is 0.104 and Shapiro-Wilk is 0.109 and both values are greater than α=0.05. Thus, it shows that the data is normally distributed. Since the data is normal, to test for inter-rater reliability, the suitable statistical analysis is paired t-test.

Paired-Samples T-Test for Inter-Rater Reliability

Table 6.28

Paired-Samples T-Test for Inter-Rater Reliability

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TotRater1 - TotRater2	.76316	1.66973	.38306	-.04163	1.56794	1.992	18	**.062**

Test	p-value
Paired-Samples T Test	**0.062**

Based on the table above, the significant value is 0.062. A significant value is set at α= 0.05. From the analysis, it was found that there is no significant difference between the overall scores given by Rater 1 and Rater 2. Hence, it can be concluded that there is inter-rater reliability in the scores given by the two raters. The scores given by Rater 1 do not differ much from the scores given by Rater 2.

Pedagogical Content Knowledge (PCK). The two raters evaluated the pre-service teachers' pre- and post-reflective essays. The scores given for the reflective essays written before and after the module implementation can be compared to determine if the pre-service teachers' pedagogical content knowledge improved from their experience participating in the Online Case-Based Problem-Solving Module. The results are reported below:

Normality test

Table 6.29

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality for PCK

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diff	.200	19	.044	.927	19	**.153**

Normality Test	Shapiro-Wilk
Sig. Value	**0.153**

Table 6.29 above shows the result of testing normality of data using Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the sig. value for Shapiro-Wilk is 0.153 and the value is greater than α=0.05. Thus, it shows that the data is normally distributed. Since the data is normal, to test for the significance in mean differences for pedagogical content knowledge, the most suitable statistical analysis is paired t-test.

Paired-Samples T-Test for PCK

Table 6.30

Paired-Samples T-Test for PCK

Paired Samples Test									
		Paired Differences							
		Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pre - Post	-2.89474	3.67264	.84256	-4.6649	-1.1246	-3.436	18	**.003**

Test	p-value
Paired-Samples T Test	**0.003**

Based on the table above, the significant value is 0.003. A significant value is set at α= 0.05. If the value is less than 0.05, we can conclude that there is a significant

difference between the two scores (pre and post scores). From the analysis, it was found that the significant value = 0.003 which is less than α=0.05, thus we can conclude that there is a significant difference in the scores for pre and post reflections showing improved pedagogical content knowledge.

Problem-Solving (PS). The two raters evaluated the pre-service teachers' pre- and post-reflective essays for problem-solving skills. The scores given for the reflective essays written before and after the module implementation can be compared to determine if the pre-service teachers' problem-solving skills improved from their experience participating in the Online Case-Based Problem-Solving Module. The results are reported below:

Normality Test

Table 6.31

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality for PS

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diff	.119	19	.200	.965	19	**.672**

Normality Test	Shapiro-Wilk
Sig. Value	**0.672**

Table 6.31 above shows the result of testing normality of data using Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the sig. value for Shapiro-Wilk is 0.672 and the value is greater than α=0.05. Thus, it shows that the data is normally distributed. Since the data is normal, to test for the significant in mean differences for problem-solving skills, the most suitable statistical analysis is paired t-test.

Paired-Samples T-Test for PS

Table 6.32

Paired-Samples T-Test for PS

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pre - Post	-5.61842	3.72060	.85356	-7.41169	-3.8252	-6.582	18	**.000**

Test	p-value
Paired-Samples T Test	**0.000**

Based on the table above, the significant value is 0.000. A significant value is set at α= 0.05. If the value is less than 0.05, we can conclude that there is a significant difference between the two scores (pre and post scores). From the analysis, it was found that the significant value = 0.000 is less than α=0.05, thus we can conclude that there is a significant difference in the scores for pre and post reflections indicating improved problem-solving skills.

Application of Theory-Practice (TP). The two raters evaluated the pre-service teachers' pre- and post-reflective essays for application of theory and practice. The scores given for the reflective essays written before and after the module implementation can be compared to determine if the pre-service teachers' application of theory and practice improved from their experience participating in the Online Case-Based Problem-Solving Module. The results are reported below:

Normality Test

Table 6.33

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality for TP

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diff	.110	19	.200*	.975	19	**.862**

Normality Test	Shapiro-Wilk
Sig. Value	**0.862**

Table above shows the result of testing normality of data using Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the sig. value for Shapiro-Wilk is 0.862 and the value is greater than α=0.05. Thus, it shows that the data is normally distributed. Since the data is normal, to test for the significant in mean differences for application of theory and practice, the most suitable statistical analysis is paired t-test.

Paired-Samples T-Test for TP

Table 6.34

Paired-Samples T-Test for TP

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pre - Post	-4.35526	4.04258	.92743	-6.30373	-2.40680	-4.696	18	**.000**

Test	p-value
Paired-Samples T Test	**0.000**

Based on the table above, the significant value is 0.000. A significant value is set at α= 0.05. If the value is less than 0.05, we can conclude that there is a significant

difference between the two scores (pre and post scores). From the analysis, it was found that the significant value = 0.000 is less than α=0.05, thus we can conclude that there is a significant difference in the scores for pre and post reflections indicating improved application of theory and practice in the reflection.

Overall scores. The two raters evaluated the pre-service teachers' pre- and post-reflective essays and obtained the overall scores. The scores given for the reflective essays written before and after the module implementation can be compared to determine if the pre-service teachers' scores improved from their experience participating in the Online Case-Based Problem-Solving Module. The results are reported below:

Normality Test

Table 6.35

Kolmogorov-Smirnov and Shapiro-Wilk Test of Normality for Overall Scores

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Diff	.449	19	.000	.343	19	**.000**

Normality Test	Shapiro-Wilk
Sig. Value	**0.000**

Table above shows the result of testing normality of data using Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the sig. value for Shapiro-Wilk is 0.000 and the value is less than α=0.05. Thus, it shows that the data is not normally distributed. Since the data is not normal, to test for the significant in mean differences, the most suitable statistical analysis is Wilcoxon Signed Rank Test.

Wilcoxon Signed Rank Test

Table 6.36

Wilcoxon Signed Rank Test for Overall Scores

Test Statistics	
	Post - Pre
Z	-3.461
Asymp. Sig. (2-tailed)	**.001**

Test	p-value
Wilcoxon Signed Rank Test	**0.001**

Based on the table above, the significant value is 0.001. A significant value is set at α= 0.05. If the value is equal to or less than 0.05, we can conclude that the difference between two scores (pre and post-test) is statistically significant. From the analysis, it was found that the significant value = 0.000 is less than α=0.05, thus we can conclude that the two sets of scores are significantly different. The overall scores improved after the Online Case-Based Problem-Solving Module was implemented.

Summary of Pre-and Post-Reflective Scores. The following are the summary of findings for all the components evaluated in the pre- and post-reflective essays.

Normality Test

Table 6.37

Summary of Shapiro-Wilk Test of Normality for All Components

Components	Normality Test (Shapiro-Wilk)
Pedagogical Content Knowledge (PCK)	0.153
Problem-Solving (PS)	0.672
Theory-Practice (TP)	0.862
Overall	0.000

Table 6.37 above shows the result of testing normality of data using Shapiro-Wilk value. A non-significant result (Sig. value of more than 0.05) indicates normality. Based on the table above, the Shapiro-Wilk's sig. value for PCK, PS and TP is 0.153, 0.672 and 0.862 respectively. These value are greater than α=0.05. Thus, it shows that the data is normally distributed. Since the data is normal, to test for the significant in mean differences, the most suitable statistical analysis is paired t-test.

Based on the table above, the sig. value for Shapiro-Wilk for the overall scores is 0.000 and the value is less than α=0.05. Thus, it shows that the data for overall scores is not normally distributed. Since the data is not normal, to test for the significant in mean differences, the most suitable statistical analysis is Wilcoxon Signed Rank Test.

Summary of the difference in the mean scores between pre and post reflective essays for all components

Table 6.38

Summary of the Difference in the Mean Scores between Pre and Post Reflective Essays for All Components

Components	Test	p-value
Pedagogical Content Knowledge (PCK)	Paired-Samples T-Tests	0.003
Problem-Solving (PS)	Paired-Samples T-Tests	0.000
Theory-Practice (TP)	Paired-Samples T-Tests	0.000
Overall	Wilcoxon Signed Rank Test	0.001

The analysis was done using the Paired-Samples t-test for normal data (PCK, PS, and TP), and Wilcoxon Signed Rank Test for the overall data that is not normally distributed. The significant value is used to determine if there is any significant differences in the scored obtained for pre and post-reflective essays. The level of

significance was set at α=0.05. The output produced shows that the p-value obtained for each of the three components; PCK = 0.003, PS and TP =0.000. The p-value obtained for each of the component is less than α=0.05. It is therefore proven that there are significant differences between the mean scores produced for pre and post-test. The significant differences are apparent in terms of PCK, PS and TP. In addition, the overall scores between pre and post reflective essays show statistically significant difference (p-value 0.001 < α=0.05). From the results, it can be concluded that there are significant improvements in the scores obtained by the pre-service teachers in their post reflection essays at the end of the module implementation. This shows that the module is effective in improving the pre-service teachers' abilities to reflect on pedagogical content knowledge, problem-solving, application of theory and practice and the overall abilities in these aspects.

Findings from Pre-Service Teachers' Post Reflection

Pre-service teachers' reflection. To determine the general attitude of pre-service teachers on the online case-based problem-solving module, a reflective writing assignment is given to gauge pre-service teachers' opinion and thoughts about the whole learning experience. The 22 pre-service teachers wrote a reflective essay with guided instructions (Appendix 9) after the case-based learning module is implemented. From the reflections, the lecturer can ascertain if the students have positive attitudes or otherwise from the learning experience through the online case-based problem-solving module. This will help to determine their views and attitudes of the case-based learning module in enhancing problem solving skills and other generic skills.

This section reports the findings from the analysis of nineteen (19) reflective essays written after the implementation of the module. The pre-service teachers

recorded their opinions on the module in their reflective essays. The reflections are analysed thematically to derive data for the findings on opinions on the usability of the module. The findings from the reflections are presented in themes below:

Attitude towards the module

New exposure and experience. They gained good exposure and new experience especially that the module integrates technology. The workshop is able to increase the pre-service teachers' motivation.

> *I personally think that this activity is a good exposure in giving new experience in learning. This is because, unlike the typical teaching and learning process in the classroom, this activity integrates the usage of technology. This could lead to the increment of motivation among learners. (PR17).*

Module is valuable, relevant and applicable. The pre-service teachers said that they had a valuable experience watching an authentic lesson. They can relate to the context and content of the instruction.

> *In my opinion, based on the experience that I have gained throughout the process is that this learning experience is indeed valuable as we were exposed to the real life teaching and learning from an authentic lesson and we were asked to analyse the videos as well, sharpening our analysis skill. The three videos that we have watched were based on the local context which is Malaysia. Therefore, I think it is suffice to say that we are able to relate to the teachers' context and content of the teaching and learning process (PR4).*

> *We thought this learning experience is very valuable as we were able to watch an authentic lesson and analyze the video. As the video was in local context; Malaysia, we were able to relate to the teaching and learning process easier as we were taught in that context before when we were in our secondary schools (PR8).*

Module is authentic, interesting, challenging, engaging and beneficial. The pre-service teachers state that the case-based problem-solving module is authentic and beneficial. They found viewing an authentic lesson and identifying strengths and weaknesses interesting

> *Case-based analysis module is really authentic and beneficial to us, the students. It is really interesting as the module required the students to watch an authentic lesson online in order to identify the strengths and weaknesses of the lesson (PR6).*

> *It was very interesting to observe the teacher in the video because I had never seen an authentic video lesson before, and it was very much educational, as by watching the video one could observe the teacher and how she approached teaching in its entirety (PR6).*

The workshop is interesting, beneficial and the pre-service teachers said that it could be adopted in their teaching.

> *…Basically what I have experienced in this workshop is interesting and beneficial which I think I might also use the same technique when I teach (PR17).*

The online case-based problem-solving module is interesting, challenging and engaging due to its authentic nature that involves students in meaningful learning relevant to their profession.

> *This module is a very interesting, challenging and most of all very engaging for me as it gets me involve in a real situation of a classroom lesson therefore it gave me a lot of insight on what to do and what not to do as I watch the video (PR11).*

Happy to be part of the module. From the pre-service teachers' reflections, it is found that they appreciate the opportunity of observing an actual lesson from a Malaysian school.

> *I'm thankful that I joined this course. It was an eye-opening opportunity for me to be able to observe a lesson in an actual classroom, not like the microteachings that I have done or seen throughout my degree years (PR3).*

The pre-service teachers said that the module is very helpful and they are grateful to have participated.

> *Overall, this module is very helpful and we are grateful to be given the opportunities to participate in this module. Thank you very much (PR9).*

Strengths of the module.

Preparation for teaching. The activities done during the workshop, for example, deliberating on problems and solutions are helpful, and can prepare future teachers emotionally and mentally. The preservice teachers are fond of the case-based problem-solving approach used in the module and would certainly help them if implemented at the end of their degree program as a preparation for teaching.

> *The problems and solutions and theories that every group has presented are helpful, of course. At least, having to be reminded of all these familiar problems, I can prepare myself emotionally and mentally. I am quite fond of the approach that this short course has adapted. I think if I have a full course like this towards the end of my degree then it will be most helpful (PR 15).*

> *The suggestions provided by my classmates are all very helpful as well as they share ways to tackle the problems and not to make the same mistakes when we teach (PR5).*

> *The idea of the module is amazing in preparing students to go into a real-life teaching experience (PR11).*

They said that the module has given them a new perspective about teaching and to face the challenges of teaching. They added that more modules like this should be implemented for future teachers to be more prepared.

> *All in all, this two-week learning experience has brought a lot of changes in me as a teacher to be and this learning experience acts as an eye opener for me to face the real teaching and learning later. I hope there will be more experience with regard to this kind of authentic learning so that the student- teacher will be more well- prepared later (PR13).*

The online case-based problem-solving module is applicable and useful for the teaching profession. It helps develop important skills like building rapport with students and other teaching skills.

Building a rapport with the students is important too actually so that they would not be shy to ask questions when they do not understand. Besides, they will be more comfortable to ask questions (PR2).

The first thing that came into my mind was how well the relationship between the teachers and the students. The teacher has definitely succeeded in building a good rapport between her and her students which is a really plus point. Rapport is not something developed by announcement. Rapport is developed by actions—it results from things teachers do and it increases the approachability factor and the willingness to cooperate and to communicate with the teachers (PR4).

The teacher's strength is profound where we could see she has a good rapport with the students; she added some humours in her lesson and contemporary issues which is relatable with students which could engage the students' motivation in the learning of the lesson (PR10).

This workshop proves to be great help as writing is not my forte. Of course, what I have learned plus the experience are applicable and helpful in my teaching profession. It showed me ways on how to build rapport with my students in order to understand them better as well as developing my teaching skills (PR19).

The pre-service teachers state that the module is useful for future teachers in lesson planning, suitable pedagogical approaches to use and in the planning of activities.

This module is very useful for future teachers. It can help us in planning our lesson and determining what teaching methods and approaches are suitable to help us planning the activities for the lesson (PR 8).

Helpful for practical teaching. The pre-service teachers state that the case-based problem-solving module is useful for their practicum teaching. The module exposed them to real life teaching environment and how to handle problems.

I can actually learn from the video and use it for my future practicum next semester (PR2).

This is definitely useful for my upcoming practicum as it gives me an early exposure to the real life teaching environment. Before joining the course, I had no idea as to what to expect for my practicum. However, after watching the online video, I now have a rough idea as to what will be waiting for me for my practicum and how to handle any problems if they arise which they will, I'm very sure (PR5).

As we are going for our teaching practicum next semester, this module has been a big help to prepare ourselves with the real situation that we might face in the future (PR9).

It is a very good insight of an authentic teaching in a classroom full of students that I can use and avoid at the same time when I am going for practicum (PR11).

In the learning experience, we have been given an opportunity to watch an authentic lesson online for problem- solution analysis. The authentic lesson is basically based on Lower Form Six with low proficiency students and the location of the school is in rural area. It is a very good lesson to be watched as it provides us with a real teaching and learning session and from it, we can expect certain behaviour that we might encounter later, be it in the practicum later or after graduation itself.

It is useful for practicum and future teaching because it helps them evaluate their own teaching methods and application.

The learning experience was very useful due to the fact that as a part 4 student, I will be going to do my Practical next year, and observing a teacher teach English and analysing how she does it allows me to evaluate my own teaching methods and apply it better on the students during my practical (PR7).

The learning session through watching and analyse an authentic lesson has provided me with deeper insights which are valuable for me to apply in the practicum as well as a future teacher …From the identification of the problems in the authentic lesson that we have viewed, we came out with possible solutions that might be helpful for us as the trainee teachers (PR14).

I must say the learning experience is very useful for my practicum and if I want to be a teacher one day (PR18).

The learning is definitely useful now and the future as I am going for my practicum early next year (PR19).

Bridge theory and practice. The pre-service teachers reflect that the module has helped them to think about the application of theories to practice. It inspires them to think about the theories and approaches they would use in the future when they become teachers.

As a TESL student, I have been stuffed with so many theories of teaching and learning for so many years and never really put it to practice and I'm not even sure if I know how to do so. Therefore, when I watched the video, I saw very little of the theories being put to practice. It was then I understood that some theories are there just for the sake of learning it, building my background knowledge to support whatever that I will be doing in classroom. Those theories would probably come in handy in getting my students to be engaged in the learning process or to guide me when I do something fun in the classroom so I won't easily stray away. In fact, the teacher even mentioned that a very little percentage of what is learnt is applied in the real teaching context which I very much agree with. A good teacher is a teacher who can improvise, and make the students love the subject (PR5)!

Through this module, I have learned a lot of things explicitly and implicitly. It showed me the real life implementation of theories and techniques in teaching ESL (PR11).

It inspires me to think about the theories and methods that I would use in the future when I myself am a teacher (PR11).

The module has helped the pre-service teachers to have a frame of reference of the theories and approaches they have learnt. Being prepared to use the theories and approaches can guide the pre-service teachers during practicum and as future teacher.

I would apply what I have learnt by giving a deep thought on any case-based problems and if I encountered any, I would refer to the skills or theories or approaches that I have learnt so that if anything happens, I am still in the right track because of the frameworks and proper guidance. As for the learning experience, it is very useful and beneficial as a student- teacher as it makes me well- prepared on what am I going to face whether it is good or bad as long as I am well- prepared with the theories and approaches and what's left is for me to practice it during my practicum or as a teacher later (PR13).

Indeed the lesson is very useful for me to apply in my teaching approach in the future (PR14).

Develops problem-solving skills. The online case-based problem-solving module trains students to develop their problem-solving skills. From observing an authentic lesson in a video, students engage in problem-solution analysis processes. The idea is not to criticize the lesson but to analyse it through the support of relevant theories and practical approaches and methods.

I am also able to find the weaknesses, strengths and probably solutions from a point of view of a student (PR2).

In the video, there are several problems that can be identified. Rather than to criticize, students are given the chance to analyse and identify the problems before generating some ideas for the solutions of the problem (PR6).

The case-based problem-solving module has helped the pre-service teachers with soft skills and how to handle problems creatively.

Though I do not intend to be a teacher, the skills that I have learnt from your module have definitely helped me in further developing my soft skills and how to creatively handle problems. In short, it was a brilliant module and it was a shame that not all was willing to join (PR5).

The problem-solution analysis has benefitted the pre-service teachers and gives them some ideas and the confidence to teach in the future. They are grateful to be part of the module.

This activity has benefited me in many ways. I learn a lot by just watching on how the teacher teaches her students. I managed to analyse some of the problems that her lesson had and identify suitable solutions for it. It gives me confident and provides me some ideas on how to conduct my lessons later in the future, if I am to become an English teacher. Thank you so much for allowing me to take part in your programme (PR12).

The problem-solution analysis tasks helps the pre-service teachers face problems and be prepared with solutions. The experience has given them meaningful insight and a powerful knowledge to be applied in the future as teachers.

My thoughts after watching the authentic lesson online for problem-solution analysis are quite good actually. I am able to analyse the methods that the teacher used. I am also able to find the weaknesses, strengths and probably solutions from a point of view of a student. ...I am grateful to be part of this problem-based solving module as I have seen an authentic writing lesson, identified problems that might arise in the future, as well as be prepared with solutions to the problems. Overall, this experience has given me a meaningful insight and a powerful knowledge to be applied in my endeavour as a teacher in the future (PR14).

The pre-service teachers are exposed to real life teaching and learnt that problems are inevitable and solutions need to cater to the students' needs in order to help them learn.

> *The authentic material is also important in giving students the exposure on real life teaching session where there are problems that teachers need to face and solve in order to cater the students' need and help them in the learning (PR6).*

The pre-service teachers state that the case-based problem-solving module provides a framework of how to handle low-proficiency students and prepare them to face the reality of teaching. They compare the module with their ROS and field experience and are more favourable to the case-based problem-solving module that showcases an authentic lesson in a video format. The problem-solution analysis discussed was helpful and meaningful because it is based on an authentic context.

> *The video also provides us, the student- teacher to have basically the framework of how to handle the students with low- proficiency level and can prepare us to face the reality. During the ROS, the same things are done where we sat at the back of the class, observe the way the teacher taught the students and take note on what can be observed from the teachers. The same goes to this video- watching. Somehow, this video-watching is very helpful as well because we can discuss regarding the problems detected in this video and propose solutions to it. What is being discussed in the class was very helpful as not everything can be figured out by ourselves (PR13).*

> *Basically, when I watched the authentic teaching and learning process, it reminded me of my field experience which did not focus on any analysis, but this is focussing on problem-solution analysis. Field experience is totally vague as I still wasn't exposed to different types of methods and pedagogies thus I can only see it as an introduction to teaching. But now, I can relate and manage to distinguish the problem and possible solution that had happened in the video (PR 18).*

Develops pedagogical content knowledge. The pre-service teachers are well-informed about not being too technical and rigid in their pedagogy. When the lesson is too teacher-centred, it becomes boring. Student-centred activities should be used to make the lesson fun and to enable students to retain information longer. The pre-

service teachers agree that teachers should be equipped with pedagogical content knowledge for effective instruction.

> *I have learnt that I should not be too technical or teacher-centred. Somehow when I do my microteaching, I tend to be technical and teacher-centred actually. So I should have thought of other methods or approaches so that my students would not get bored with the lesson. Besides, I should think of fun activities that I can use in class in order for the students to retain the lessons that they have learnt in class. As an educator, one must be equipped with all sorts of pedagogical and content knowledge in order to impart them to the students. These knowledges will be reflected through the lessons (PR3).*

> *In short, learning about pedagogical content knowledge has really opened up my eyes on the importance of how and what in teaching students (PR4).*

From the case-based problem-solving module, the pre-service teachers learn that knowing methods and theories can help with creative and effective instruction.

> *Having to know the methods and theories can help teachers to be more creative in teaching. They can also integrate the methods in their teaching in order to have a more effective teaching and learning session (PR6).*

> *This module also helps future teachers in the preparation of being a good and creative teacher (PR6).*

> *Having to know the methods and theories can help teachers to be more creative in teaching. They can also integrate the methods in their teaching in order to have a more effective teaching and learning session (PR6).*

One of the important pedagogical elements highlighted by the pre-service teachers after the problem-solution analysis of the case-based problem-solving module is that an interesting set induction is important to prepare students for the lesson.

> *Next, is to teach by approaching the topic in an interesting manner, so that the students will be more prepared and interested. This is because the teacher in the video begins teaching by jumping straight into the topic of her teaching of the day- It is direct and concise, however in doing so students are slightly bewildered, and might not follow thoroughly (PR7).*

From the problem-solution analysis, the pre-service teachers state that they will be able to apply what they have learnt to teaching. Elements of pedagogy such as good voice projection and the ability to provide a clear framework for argumentative essay including relatable and appropriate examples, and using humour in teaching are useful to emulate.

> *By noting the teacher's teaching strengths and drawbacks and trying to come up with better methods I will be able to apply what I have learnt in my teaching. Her strengths like, good voice projection and ability to provide a clear framework for the argumentative essay with relatable and appropriate examples were given, as well as have a humorous approach to teaching the material is very useful to emulate, in order to have a better teaching experience. However, from her mistakes, one could summarize that a more detailed lesson with students being more engaged in the teaching and learning experience will be better in terms of learning argumentative essays (PR7).*

The pre-service teachers are able to reflect on the lessons strength and weaknesses. The problem-solution analysis becomes more valid and reliable when supported by literature and theories. The case-based problem-solving module taught them that pedagogical and content knowledge in combination is important for teachers to apply in their instruction.

> *This could be seen in the video for example, the teacher's content knowledge is high which most likely because her familiarity towards the topic however her pedagogical skill is questionable when it comes to the level of interaction and attentiveness of the lesson. She taught and talked for one and a half hour without any insertion of interactive activities etc. It could be "painful" for the students to learn such lesson in this way (PR10).*

> *All the solutions given are actually supported by some literature and theories of English second language learning. Therefore, it is valid and reliable. I learnt that teaching skills required pedagogy and practical skills to be combined together, which is very important for students' comprehension and improvement. This solution actually has been implemented during my microteaching, so I guess there will be no problems in applying this technique and method. ...I believe that all teachers should apply this technique to make the lesson interesting (PR18).*

Develops responsible and independent learning skills. The student-centred approach in the module is interesting and helps the pre-service teachers develop their skills and train them to be responsible and independent of their learning.

> *…this module is a very interesting module which helps students to develop their skills and also train themselves to be more responsible in their learning as it is more students-centred (PR6).*

Develops life-long learning. The module is good as the pre-service teachers are able to analyse the methods used by the teacher. As future teachers, the module helped them realize the value of life-long learning and being able to apply knowledge to real life, instead of learning solely for examinations.

> *My thoughts after watching the authentic lesson online for problem-solution analysis are quite good actually. I am able to analyze the methods that the teacher used (PR2). … I may not be in the right place to comment on other people's teaching but this is just my point of view as I am a student myself and I would think how I want my teacher or lecturer would be so that I do not only learn for the sake of examinations but for life-long learning (PR2).*
>
> *I do not want the students to only study for the sake of examinations and later forget everything. I want them to be able to apply what they have learned to the real life (PR3).*

Develops higher order thinking skills. The experience has been valuable for them as the learning experience is based on an authentic scenario. The problem-solution analysis sharpens their analytical skills. The pre-service teachers can relate to the context and content of the instruction.

> *In my opinion, based on the experience that I have gained throughout the process is that this learning experience is indeed valuable as we were exposed to the real life teaching and learning from an authentic lesson and we were asked to analyse the videos as well, sharpening our analysis skill. (PR4).*

The case-based problem-solving module helps students develop higher order thinking skills, such as analytical skills in the problem-solution analysis task. They also develop critical thinking skills when proposing solutions. They take responsibilities for their own learning and become more autonomous in their learning. They develop problem-solving skills in the process.

> *This module helps students to develop several skills. One of the skills is the analytical skill where students have to analyze the video and identify the weaknesses and also strengths of the lesson or the material. Students will also use critical thinking in order to find the solution. They have the responsibilities to find the solution and become more autonomous in their learning. It is really relevant since students need to be more independent in learning and able to use higher thinking order skills in order to solve problem, especially in real world. The skills should be applied in real life in order to avoid from being judgmental and also to be more critical in finding solutions for problems. Students can also train themselves to avoid from making decision in haste (PR6).*

The module challenged the pre-service teachers to be more critical in terms of thinking and handling problems and applying solutions. It also trains them on the application of theories and methods that they would use in the future as teachers.

> *Through watching the authentic lesson online, there are quite a few problems that can be identified. Through those problems we did a problem solving task and brainstormed for solutions in a group of two people. It really challenged us a lot to be critical in terms of thinking and to relate it to theories and methods that we have learned and after, we get a more in depth understanding of all the theories we learned since we relate all of them to the authentic lesson online to make comparison (PR11).*
>
> *It also triggers me to think very critically in finding both problems and solution from the video. It inspires me to think about the theories and methods that I would use in the future when I myself am a teacher (PR11).*
>
> *I think the module is very useful as it helped me to think critically through a video where there is no other pressure as compared to sitting in a classroom and observe a lesson with so many distractions. Through watching the video I can be very detailed in my thinking because I can watch and pause and review the notes that I made throughout watching it. The idea of the module is amazing in preparing students to go into a real-life teaching experience (PR11).*

Develop knowledge, skills and confidence in teaching writing. They learn a lot about teaching writing and the importance of being equipped with the knowledge and skills that teaching writing demands.

> *From watching the video, we learnt a lot about teaching writing. We learn that not one skill is sufficient for teaching. We have to be equipped with the knowledge so that we will be able to teach the students appropriately (PR8).*

They learnt new things, gained more knowledge and skills on teaching argumentative writing and also identifying problems and providing solutions. These and the peer discussion in class have increased their confidence to teach writing

> *Overall, the session had given me opportunity to learn new things, to develop my skills, gained more knowledge about teaching an argumentative essay, identify problems and provide possible solutions and increase my confidence to teach writing after the peer discussion in the class (PR14).*

Watching an authentic lesson online for problem-solving analysis exposes the pre-service teachers to the mechanics of teaching writing.

> *I really believe that watching an authentic lesson online for problem analysis is a great way to better understand the suitable mechanisms in teaching writing (PR12).*

The pre-service teachers believe that the problem-solution analysis task can help current and future teachers. The context is a writing class; hence the analysis focuses on elements of writing instruction.

> *We were able to identify the problems and come up with proposed solutions that we thought might help current and future teachers. This module has taught us very important lesson especially in teaching writing (PR8).*

Develops classroom teaching and classroom management skills. Viewing the online case-based video helped the pre-service teachers reflect on how to teach writing,

taking into considerations the students' needs, as well as classroom management. It helps the pre-service teachers with pedagogical applications.

> *From the authentic lesson analysis, I learnt skills that the teacher taught such as ways to write an introduction, connect students to the lesson by integrating it with students' culture, and skills in managing the flow of the lesson. All of the skills and pedagogy technique that the teacher executed help me in my teaching in the future. The Genre-based method that she applied in her teaching provided me a clearer framework on how to apply the approach in the real classroom (PR14).*

> *The learning session has also widened my view about the implementation of approaches and classroom management in a real classroom. The teacher's strength in her teaching is valuable for me to apply in my teaching techniques in the future (PR14).*

The case-based problem-solving module provided the pre-service teachers the opportunity to search relevant literature and read numerous research done on code-mixing and code-switching in L2 instruction. The activities and discussions done during the workshop have changed their perspectives on this issue.

> *One of the main issues discussed was code mixing in the classroom. I have always had the perspective that a teacher should try the very best to try not to speak the native language to allow more exposure to the students. However, after all the discussions, I realize that code-mixing is not that harmful after all if exercised with caution. In fact, I also got to know that no research has been able to prove that teaching using only the target language is good for the students. However there are researches done to prove that code mixing is actually helpful for the students. Then it got me thinking…. I would have felt totally lost if my third language lecturer did not code switch between French and English. So the discussions I had during this short course with you had got me thinking that there are students who have zero knowledge of English and if I do not code switch, they would gain nothing from the lesson. Therefore, thank you for widening my perspectives on the issue of code mixing (PR5).*

> *Teacher begins in English, but then constantly use the first language (this could be due to the fact that the teacher did not get much response from the students when she spoke in English in the beginning. Hence, this taught me that in order to teach English and make the students more interested to listen, certain concessions have to be made- that is, the instructions should be given in the first language or certain words can be used, in order of full understandings (PR7).*

Develops reflective skills. The preservice teachers found that the module provides them with the opportunity to reflect on what to improve on to be a well-prepared. It taught them that teachers should always seek ways to improve themselves, be open to new challenges and seek ways to let students to experience learning.

> *The video provides me great knowledge on what I should and what to improve as a teacher in the future based on the strengths and weaknesses of the lesson. …Watching the video has made me realize that I have so many things to improve on and that one should not take teaching lightly as teachers affect people's life in closest manner. I have to be mindful and I should remind myself regularly that what is important is the students' education. This experience have made me realize that I, as future teacher should always improve myself, open to new challenges and seek ways to let my students experience learning (PR1).*

> *I have learnt so much from this module such as what to do and what not to do in a lesson, when to code switch and so much more (PR5).*

One pre-service teacher changed her perception about teaching writing. After participating in the module, she reflects that teachers can make writing a fun skill to teach and learn.

> *Personally, I have always felt that writing is the most difficult skill to teach to our Malaysian students. Even I didn't enjoy the process when I was in school because writing essays took a lot of time and efforts and one cannot simply write an essay without having inputs at his disposal. Somehow, reviewing the videos in this course made me realize that writing can be a fun process of learning (PR3).*

The pre-service teachers state that being updated with knowledge, assessing and reflecting on teaching and pedagogy can improve instructions and students will benefit from the process.

> *A well-equipped educator will constantly be updated with the knowledge that he has and continuously assess his teaching. It is essential to reflect on one's strengths and weaknesses to ensure that the students will benefit from all the efforts that a teacher pours in his teaching. Consequently, the lesson will be more meaningful and engaging for the students and the teacher as well (PR3).*

> *In terms of teaching, this module can help future teacher to train themselves to observe their teaching and also to reflect on their teaching method (PR6).*

The learning experience is very applicable because by observing another teacher it will without a doubt make oneself more aware of the do's and don'ts of teaching, as well as scrutinise one's own teaching methods and see if there is any improvement that can be made in order to teach better (PR7).

We were able to watch an authentic classroom lesson and reflect on that (PR8).

Research has indicated that novice teachers often teach the way they were taught in school. From the module, the pre-service teachers are able to reflect on the way they were taught.

Back in my schooling years, there are some of my English teachers who used code-switch when teaching but only to a certain degree. Due to that matter, when I watch this video, I was able to see that there are some similarities and differences between how my former teachers teach and how the teacher in the video teaches (PR4).

When learning English as a second language, our teachers back in the days did not use English all the time, just like the teacher in the video (PR8).

Up-to-date approach integrating technology. The pre-service teachers think that online case-based problem-solving module is an up-to-date approach in learning with technological affordance that helps them with the problem-solution analysis such as the rewind and fast forward features which enable them to view and review specific parts. They can access the module anytime and anywhere.

I believe watching an authentic video online for problem analysis is yet one of the most up-to-date approaches in learning. Watching it through video also is highly helpful in problem analysis since we could flexibly rewind or fast forward to the part which we would like to focus (PR10).

Through this video- watching also we can fast forward it or rewind it as it is in the form of a video. If there is something that we missed out, we can always go back to see what we have missed. Unlike ROS, there might be certain things that distract the student- teacher from being able to see the whole things that happened in the classroom (PR13).

And the best part it is online! I can access it anytime and anywhere (PR5).

Observing a lesson from a teachers' perspective. The module provided the pre-service teachers with a new and refreshing learning experience. They take on the role of a teacher in the lesson. It empowers them to think like a teacher and to present their analysis from a teacher's point of view. They think that the online case-based problem-solving module is brilliant.

> *Honestly, it was very interesting to watch the video because this time I was not in the class as a student, but as an observer. It was refreshing, indeed to have that kind of outlook. And as an observer on top of being a future educator, it can be seen how much effort the teacher put in making the students to understand the lesson (PR1).*

> *As a student, I have only seen a lesson from the perspective of a student sitting on a chair listening to the teacher's lecture all day long. However, to see it from the perspective of a teacher is very much different. There are many things that I have never noticed as a student and now I see it when I look at it from the teacher's point of view. I think the concept of getting soon-to-be-teachers students to watch this authentic lesson in classroom is just brilliant (PR5).*

Promotes autonomy. The pre-service teachers acknowledge the benefits of watching the video before class which helped them to be more prepared in class after viewing the video and engaging in self-directed as well as collaborative learning tasks. It trained them to be more autonomous.

> *Having to watch the video give students the opportunity to use audio – visual in their learning and it is interesting rather than just listen to lecture. Since students had to watch the video first outside of the classroom, they are more prepared when they enter the class in order to discuss the topic with the teacher. Indirectly, it trains the students to be more autonomous (PR6).*

Technical aspects.

Easy access. The pre-service teachers had no problems accessing the video and the *openlearning* platform.

> *The procedure is convenient and I had no trouble using the website (PR12).*

Suggestions.

Should be implemented in education courses. The pre-service teachers believe that the case-based learning method can bring prominent positive outcomes and should be implemented in education courses. It could assists in students' preparation at various levels.

> *All in all, I believe case-based analysis has been used and still being used in some courses such as law and medical studies and it shows prominent positive results. So it left us with the question, why not in education? This approach shows students with what has happened, is happening and highly likely to happen again thus could assist students' preparation at so many level (PR10).*

Discussion of Findings

The evaluation on usability of the module covers the pre-service teachers' perception of their abilities and experience before and after the module is implemented through the entrance and exit surveys, their level of satisfaction towards the lessons, their opinion of the problems embedded in the ESL writing lesson for problem-solution analysis, strengths of the module, the technical aspects, their attitude towards the module, problems and challenges faced, limitations, and suggestions.

The findings of the entrance and exit surveys show that after the implementation of the module, the pre-service teachers perceive their ability to discuss concepts of pedagogical content knowledge, problems, contents in argumentative essays, pedagogy of teaching writing, and pedagogy in teaching argumentative writing improved. The findings also show improved results in the pre-service teachers experience in observing a writing lesson online and engaging in problem-solution analysis, and writing reflections on problem-solution analysis and pedagogy and contents of ESL writing instruction. A Wilcoxon Signed Rank Test revealed a statistically significant increase in the level of agreement of the students on the

implementation of the new module. The median score on the level of agreement increased from entrance survey (*Md*= 2.4583) to exit survey (*Md*=4.5833).

The 5-point Likert scale survey evaluating the pre-service teachers' level of satisfaction of the OCBPS module revealed that they are satisfied (m=4.58, SD= .565) with the class, the activities done, the resources provided, the team work, the feedback, the evaluation given, and the overall implementation of the OCBPS module. The overall mean indicates a satisfaction towards the implementation of the module (m=4.58, SD=.565).

The 5-point Likert scale survey evaluating the pre-service teachers' perception of the problems identified in the ESL writing lesson revealed agreement toward the quality of the problems (m=4.364, SD=.5003). The findings show that the pre-service teachers perceive the problems to be apparent, critical, relevant, and open-ended to explore solutions. It is also complex enough for a collaborative effort to seek for solutions. Furthermore, the pre-service teachers agree that the nature of the problems requires the application of theories and approaches to the problem-solution analysis. They agree that the problems have the ability to engage their interest and motivate them to probe for deeper understanding of concepts and approaches learnt in the course. The pre-service teachers agree that the problems require them to engage in higher order thinking processes. The problems require them to use critical thinking skills and higher order thinking skills like, application, analysis, evaluation and synthesis and connect the new knowledge to the framework of understanding that they are building, based on the concepts in the course.

The evaluation of usability from the 4-point Likert scale survey, interviews, and reflective essays found that there are many strengths of the OCBPS module. The strengths of the module are summarized under the sub-themes below:

Develops problem-solving skills. It was found that the strengths of the module is it develops problem-solving skills (m=3.59, SD= .4998). One pre-service teacher commented in the open-ended section of the survey that the module provides the opportunities to solve authentic problems. Another said that participants are exposed to the real problems in teaching argumentative essay; the solution is useful for future reference. The lecturer in the interview said the module supports critical problem-solving skills. They learnt a lot and that the module is effective in developing problem-solving skills. From the interview, the pre-service teachers said that the OCBPS module developed their problem solving skills. One pre-service teacher interviewed said that she and her friends being immersed in the process of talking about how to tackle the problems in the lesson viewed, and to discuss how they could improve the lesson by suggesting different approaches and actually coming up with lesson plans on how the lesson could have been done differently reflect their ability to engage in problem-solution analysis and applying problem-solving skills to authentic teaching situation. From the t-test analysis, it was found that the significant value = 0.000 is less than α=0.05, thus we can conclude that there is a significant difference in the scores for pre and post reflections indicating improved problem-solving skills. The pre-service teachers' reflections also revealed that the OCBPS module develops problem-solving skills. From observing an authentic lesson in a video, students engage in problem-solution analysis processes. The case-based problem-solving module has helped the pre-service teachers with soft skills and how to handle problems creatively. The problem-solution analysis tasks helps the pre-service teachers face problems and be prepared with solutions. The experience has given them meaningful insight and a powerful knowledge to be applied in the future as teachers.

Preparation for teaching. From the open-ended responses, it was found that the OCBPS module prepares the pre-service teachers for teaching. One pre-service teacher said that the module is very useful especially for future teachers to prepare them for the teaching of writing in a more effective and interesting way. The lecturer in her interview affirmed that it will prepare the pre-service teachers for teaching, even for their mock teaching and practical teaching. The experience with the module will help them be more prepared to teach. She thinks the module is good for the pre-practicum seminar. The students gave similar responses in their interview that the OCBPS module prepares them for teaching. The module will help the pre-service teachers in the future because observing the lesson and engaging in problem-solution analysis actually taught them that it is good to reflect after every lesson and problem-solution practice could help them improve their own teaching. It also prepares them for practical teaching. It provides an idea of what a real writing class is likely to be and it helps the pre-service teachers to be more prepared during practicum teaching. In the reflection, the pre-service teachers said that the activities done during the workshop, for example, deliberating on problems and solutions are helpful, and can prepare future teachers emotionally and mentally. The preservice teachers are fond of the case-based problem-solving approach used in the module and would certainly help them if implemented at the end of their degree program as a preparation for teaching. They added that more modules like this should be implemented for future teachers to be more prepared. It is useful for practicum and future teaching because it helps them evaluate their own teaching methods and application.

Develops pedagogical content knowledge. The pre-service teachers commented that in the open-ended section the module emphasizes on the importance of pedagogical content knowledge and how these two are important for a holistic

learning experience. The lecturer said that the contents covered in the course were relevant and useful, like contents and pedagogical knowledge, learning and cognitive theories, teaching argumentative writing and problem-solution analysis. They are able to grasp the concepts through the lesson observation and analysis. They are able to apply the concepts of content and pedagogy in the problem-solution analysis. The module assists students in applying content and pedagogical knowledge to real-world problems and problem-solving. The pre-service teachers had learnt about code-switching, some theories and methods such as product and process approach in teaching writing. One pre-service teacher realized that teachers cannot and should not stick to the same method when teaching writing. Teachers should try various approaches and methods since there are many different genres of writing. The pre-service teachers said that they were able to apply PCK in the problem-solution task and they will apply PCK in their teaching. From the t-test analysis for PCK, it was found that the significant value = 0.003 is less than α=0.05 indicating that there is a significant difference in the scores for pre and post reflections showing improved pedagogical content knowledge. In their reflection, the pre-service teachers wrote that they are well-informed about not being too technical and rigid in their pedagogy. When the lesson is too teacher-centred, it becomes boring. Student-centred activities should be used to make the lesson fun and to enable students to retain information longer. The pre-service teachers agree that teachers should be equipped with pedagogical content knowledge for effective instruction. From the case-based problem-solving module, the pre-service teachers learn that knowing methods and theories can help with creative and effective instruction. The pre-service teachers are able to reflect on the lessons strength and weaknesses. The problem-solution analysis becomes more valid and reliable when supported by literature and theories. The case-based problem-solving

module taught them that pedagogical and content knowledge in combination is important for teachers to apply in their instruction.

Develops higher order thinking skills. From the survey, the pre-service teachers agree that the strength of the module is in its ability to develop higher order thinking skills (m= 3.455, SD .501). From the open-ended responses, **t**wo pre-service teachers said that the module sharpens higher order thinking skills since critical thinking is needed in the problem-solution analysis. In the interview, the lecturer explained that it develops higher order thinking skills as the lesson involved discussion aspects in the problem-solution analysis, the strengths and the weaknesses of the lesson, critical problem-solving because the analysis is justified. The pre-service teachers had to do a lot of thinking, problem-solving and justifying. The pre-service teachers in the interview said that the module helps with higher order thinking skills**.** The thinking process that went on in the analysis and deciding on the solutions certainly helped developed critical thinking. In the reflection, similar findings emerged. The pre-service teachers said that the experience has been valuable for them as the learning experience is based on an authentic scenario. The problem-solution analysis sharpens their analytical skills. The pre-service teachers can relate to the context and content of the instruction. The case-based problem-solving module helps students develop higher order thinking skills, such as analytical skills in the problem-solution analysis task. They also develop critical thinking skills when proposing solutions. They take responsibilities for their own learning and become more autonomous in their learning. They develop problem-solving skills in the process. The module challenged the pre-service teachers to be more critical in terms of thinking and handling problems and applying solutions. It also trains them on the application of theories and methods that they would use in the future as teachers.

Bridge theory and practice. From the open-ended survey, the pre-service teachers said that they are exposed to tasks that require the application of writing approaches to problem-solving. The lecturer interviewed said that the module is able to bridge theory and practice. She said that the theories covered and discussed during the implementation of the module are significant and important. The pre-service teachers can apply the theories to their teaching. They also have to apply theories to the problem-solution analysis. This helps them to link the education theories to practical situations. Relating the theories to teaching will help them remember how to apply the theories in the future. From the interview, one pre-service teacher said that she became more critical about which theory she can apply to specific problem or situations. Viewing the video helped her to analyse the situation with support from some of the theories she had learned but she said not all can be applied to the case she viewed. This is something she said was useful from the experience she had from the online case-based problem-solving module. Another pre-service teacher stated that stated that the online case-based problem-solving module is an interesting technique as it bridges the gap between theory and practice. She said that it is very good that the pre-service teachers get a first-hand look at what really happens in the classroom. Viewing the lesson helps her to evaluate if the theories learnt can be applied in the classroom. It provides opportunity to evaluate if the solutions and strategies to solve problems are applicable in the class observed. It can be done there and then similar to practical experience, hence the lesson becomes more memorable.

One related that the strength of the module is it bridges the gap between theory and practice. Having the opportunity to look at real classroom environment and having to apply theories and learning to solve problems was useful for any education student. She said that her previous courses taught many theories but they were not memorable.

From the t-test analysis, it was found that the significant value = 0.000 is less than α=0.05, indicating that there is a significant difference in the scores for pre and post reflections indicating improved application of theory and practice in the reflection. The pre-service teachers reflect that the module has helped them to think about the application of theories to practice. It inspires them to think about the theories and

The module has helped the pre-service teachers to have a frame of reference of the theories and approaches they have learnt. Being prepared to use the theories and approaches can guide the pre-service teachers during practicum and as future teacher.

Relevant, applicable, useful. The evaluation of usability from the 4-point Likert scale survey found that one of the many strengths of the OCBPS module., is that the module is relevant to the learning process of ESL writing instruction and allowed for application of learning to real work situation with overall mean (m=3.53, SD= .508). The lecturer said that the strengths of the module are that it is not available before this. It is based on real classroom teaching which makes it relevant. Students watch critically because they need to identify problems and propose solutions. The pre-service teachers interviewed said that the module is helpful, relevant and applicable. On whether they found the experience of viewing the lesson and engaging in problem solution process useful and relevant for them, all four responded positively. One pre-service teacher found it useful because she was exposed to the actual situation of teaching in a rural school; especially argumentative writing which for her is a difficult genre to teach as she has never been to any schools before for lesson observation. She said that it is relevant because someday she will teach low proficiency students whether in rural or urban schools so it is useful that she can apply the knowledge gained. She said that her experience learning from this module provided the opportunity to observe real teaching and to know the realities of teaching. The

module being online makes the process easier since the pre-service teachers did not have to go to schools which can be difficult and time-consuming. The online case-based problem-solving module is very helpful to learn problem-solving and also to know about the real teaching situation in school in a more convenient and less time-consuming way. Another pre-service teacher stated that the module and its contents are relevant because the key features are covered and will be helpful for him when he does his practicum teaching. From the pre-service teachers' reflection, it is found that the module is valuable, relevant and applicable. The pre-service teachers said that they had a valuable experience watching an authentic lesson. They can relate to the context and content of the instruction.

Promotes collaborative learning. The evaluation of usability from the 4-point Likert scale survey found that one of the strengths of the OCBPS module is it promotes collaborative learning and communication (m=3.55, SD= .508). In the open-ended section, the pre-service teachers said that the module is student-centred. It engages students in asking and sharing opinions and stories. The strength is that the module encourages open discussions in which anyone can provide inputs, tips, and sharing of ideas. The lecturer interviewed said that the module was able to help students work collaboratively. She added that the pre-service teachers discussed, shared and exchanged ideas, and they are able to learn from each other's analysis. The pre-service teachers interviewed said that working collaboratively helped them to think of a suitable way to analyse the situation and to think of the best solution together. They talked about the problem-solution analysis task as to how they tackled the problem and negotiated different ways and ideas of handling the situation. There was interaction, brainstorming, sharing of ideas and debating. The pre-service teachers worked collaboratively as they discussed the real issues in the teaching case, what they

can learn from it, and what to avoid doing when they teach in future. In the reflection, the pre-service teachers said that the student-centred approach in the module is interesting and helps the pre-service teachers develop their skills and train them to be responsible and independent of their learning.

Promotes autonomy. The evaluation of usability from the 4-point Likert scale survey found that the module being online contributes to the strengths of the OCBPs module. The pre-service teachers perceive this as positive and helpful (m=3.62, SD= .498). From the open-ended response, the pre-service teachers said that the online platform makes the module flexible, more effective, and saves class time. The module being online helps the students to work at their own time and pace to complete tasks, and then engage in discussion in class. In the reflection, one pre-service teacher acknowledged the benefits of the module being online. It helped her and her friends to be more prepared in class after viewing the video and engaging in self-directed as well as collaborative learning tasks. It trained them to be more autonomous.

Authentic. Form the open-ended survey, the pre-service teachers said that the module is authentic and suitable to the target audience. One pre-service teacher said that the module exposed him/her to the real classroom situation and what can be improved.

Interesting and Engaging. One pre-service teacher commented in the open-ended section that the module is interesting and engaging. Another said that it is interesting to analyze the problems as it involves a real case. The pre-service teachers interviewed said that the module is interesting and applicable to the teaching profession. The pre-service teachers said that the module is interesting and taught them on how to attend to problems that happen in school and during teaching. One pre-service teacher said that the module is interesting because it taught him how to solve

problems that are prevalent in school. Even experienced teachers make mistakes and need to reflect on their teaching. Analysis of the reflective essays found that the pre-service found the module to be authentic, interesting, challenging, engaging and beneficial. The online case-based problem-solving module is interesting, challenging and engaging due to its authentic nature that involves students in meaningful learning relevant to their profession.

Up-to-date approach integrating technology. The pre-service teachers commented in the open-ended section that the online case-based problem-solving module makes use of technology and up-to-date multimedia. The pre-service teachers reflected that the online case-based problem-solving module is an up-to-date approach in learning with technological affordance that helps them with the problem-solution analysis such as the rewind and fast forward features which enable them to view and review specific parts. They can access the module anytime and anywhere.

Promotes reflective skills. The module promotes active reflection amongst students. The preservice teachers reflected that the module provides them with the opportunity to reflect on what to improve on to be a well-prepared. It taught them that teachers should always seek ways to improve themselves, be open to new challenges and seek ways to let students to experience learning. One pre-service teacher changed her perception about teaching writing. After participating in the module, she reflects that teachers can make writing a fun skill to teach and learn. The pre-service teachers state that being updated with knowledge, assessing and reflecting on teaching and pedagogy can improve instructions and students will benefit from the process. Research has indicated that novice teachers often teach the way they were taught in school. From the module, the pre-service teachers are able to reflect on the way they were taught. Viewing the online case-based video helped the pre-service teachers

reflect on how to teach writing, taking into considerations the students' needs, as well as classroom management. It helps the pre-service teachers with pedagogical applications. The case-based problem-solving module provided the pre-service teachers the opportunity to search relevant literature and read numerous researches done on code-mixing and code-switching in L2 instruction. The activities and discussions done during the workshop have changed their perspectives on this issue.

Relevant and helpful resources. The lecturer said that the slides were informative and helpful. The pictures made the slides interesting. More importantly the pre-service teachers can benefit from the slides when they are taught with examples and visuals. She said that the materials posted on the *openlearning* platform relevant and helpful in the problem-solution process, she said yes. When asked if the module promoted reading literature and search for relevant materials to seek for solution and support their answers, the lecturer said it was stressed during the implementation so the pre-service teachers read articles to support their analysis which helps them more about teaching English. The pre-service teachers interviewed revealed that the module has useful, relevant and helpful resources posted online and those shared during the module implementation.

They said that there were many articles presented by others and all were very helpful because they are related to his Teaching English as a Second Language (TESL) programme and the materials help him remember the methodology of writing. When asked if the module encouraged them to read relevant literature and search for relevant materials, all four said it did. One pre-service teacher explained that the process was very interesting. One of the requirements of the task in the module is to support solution presented with support, hence the need to review literature to provide support.

She and her friends did that; supporting the solutions with proof and justification which made the solutions more valid and applicable.

Develop vital skills. When asked if the module enable students to develop vital learning skills, such as problem-solving, team collaboration, communication and reflection, the lecturer's response was positive. The pre-service teachers engaged in discussion and critical and constructive problem-solution analysis. It trains them to be professional in their job, and see problems as opportunities to solve not complain and criticise.

Develops life-long learning. The pre-service teachers mentioned in the reflection that the module is good as the pre-service teachers are able to analyse the methods used by the teacher. As future teachers, the module helped them realize the value of life-long learning and being able to apply knowledge to real life, instead of learning solely for examinations.

Develop knowledge, skills and confidence in teaching writing. They learn a lot about teaching writing and the importance of being equipped with the knowledge and skills that teaching writing demands. They learnt new things, gained more knowledge and skills on teaching argumentative writing and also identifying problems and providing solutions. These and the peer discussion in class have increased their confidence to teach writing Watching an authentic lesson online for problem-solving analysis exposes the pre-service teachers to the mechanics of teaching writing. The pre-service teachers believe that the problem-solution analysis task can help current and future teachers. The context is a writing class; hence the analysis focuses on elements of writing instruction.

Relevant for educators and future educators. Besides being interesting, the lecturer said that the module is relevant to the Methodology in Teaching Writing

course. She said that she learnt a lot from it and that it helps educators to reflect on their own teaching. Looking at the problems help her see what she should avoid in her teaching. The module is related and relevant to teaching writing. Seeing examples and learning from it can help the pre-service teachers become effective teachers. The lecturer said that the module is helpful, relevant and applicable to the course and the students are able to apply a lot of the contents covered in the module.

The pre-service teachers responded to a survey to evaluate the usability of the module. From the 4-point Likert scale survey the findings revealed that in terms of technical aspects most of the students agree that the module was easy to access, and they had no problems accessing the video, the resources are easy to access, the online video was easy to use, they had no problems viewing the video, the audio and text are clear, the visual quality is good for learning purposes, the duration of the video is suitable, and the structure of the video is easy to follow. They all agree that the module is user-friendly and the online platform where the video is available is suitable. The overall mean for technical aspects is (m=3.52, SD= .496). The open ended question in the survey reported similar finding that the module is user-friendly. Two pre-service teachers said that the module's strength is that it is clear and concise. The contents are clear and the pre-service teachers are briefed on the implementation of the module. The lecturer shared in the interview that the module is easy to access on the *openlearning* platform. She also said that the image and the audio of the video are clear. The four students interviewed shared similar findings in terms of technical aspects. They did not have any technical problems. It was easy to get on the *openlearning* platform and the video is easy to access. The image and audio of the video are clear with good resolutions. In the reflection, one pre-service teacher wrote that the procedure was convenient and there was no problem accessing the online

platform. However, having good internet connection is vital in accessing the video on the *openlearning* platform. From the survey, interviews and reflection, it can be concluded the OCBPS online platform suitable, easy to access and use, with clear audio and image. Hence, with good internet connection, users should not have any technical problems in using the OCBPS module.

Other strengths. The OCBPS module has other strengths in terms of clearly outlined objectives (m=3.41, SD .503), stages in the module are easy to follow (m=3.41, SD =.503), language used is clear and easily understood (m=3.64, SD .492), and the resources provided in the module are useful (m=3.50, SD .512).

Technical aspects. In terms of technical aspects of the OCBPS module, it is found that most of the pre-service teachers agree that the module was easy to access (m=3.55, SD= .596), and use (m=3.59, SD= .590). They had no problems accessing the video (m=3.59, SD= .590), and the resources (m=3.50, SD .598). They had no problems viewing the video (m=3.59, SD= .590). The audio is clear (m=3.55, SD .510) and so is the text (m=3.41, SD .503). They agree that the visual quality is good for learning purposes (m=3.50, SD .598). The duration of the video is suitable (m=3.27, SD.550), and the structure of the video is easy to follow (m=3.59, SD= .590). They all agree that the module is user-friendly (m=3.50, SD .598). The pre-service teachers mostly agree that the online platform where the video is available is suitable (m=3.64, SD= .492).

In the interview, the lecturer and the pre-service teachers said that it is easy to get on the *openlearning* online platform, as long as the internet is available and the capacity is not too slow. She said that the image and audio are clear. The pre-service teachers said that the OCBPS module is simple to use and easy to access.

Attitude towards the module. The lecturer's attitude towards the module is positive. The lecturer said that it's a new experience for her teaching the Online Case-based Problem-Solving for ESL Writing Instruction module. She has never used this

approach and said that it was interesting. She said that it's a new experience for the pre-service teachers because most of them did not study Form 6 and observing a Form 6 class is a new experience for both lecturer and students. She is happy to be part of the teaching team and she learnt a lot. She thinks there should be more videos available for the pre-service teachers to view and learn from other teachers. She said she will use the module again for the Methodology in Teaching Writing course.

The pre-service teachers interviewed also had a positive attitude towards the OCBPS module. They said it is a new experience for them. The module is helpful, relevant and applicable. The problem-solution analysis has benefitted the pre-service teachers and gives them some ideas and the confidence to teach in the future. They are grateful to be part of the module. The pre-service teachers in their reflection stated that they gained good exposure and new experience especially that the module integrates technology. The workshop is able to increase the pre-service teachers' motivation. From the pre-service teachers' reflections, it is found that they appreciate the opportunity of observing an actual lesson from a Malaysian school. The pre-service teachers said that the module is very helpful and they are grateful to have participated. One pre-service teacher said that she was glad that she joined the online case-based problem-solving classes because it was very helpful and beneficial for her. She could access many lesson plans shared on the platform. Another pre-service teacher said that it was his first time, yet it was insightful. It gave him useful knowledge and new information about the pedagogy of teaching writing and how to reflect on teaching through problem-solving. The module provided the pre-service teachers with a new and refreshing learning experience. They take on the role of a teacher in the lesson. It empowers them to think like a teacher and to present their analysis from a teacher's

point of view. One pre-service teacher wrote that the online case-based problem-solving module is brilliant.

Problems and challenges faced. The pre-service teachers were given the option to provide their honest feedback on whether they had any problems in using the module. From the analysis, it is found that most of the pre-service teachers did not have any problems in using the module. However, two participants highlighted that they faced problems. One participant said that "the online app crashes (iPhone/android too I think) but on laptop version is good' (P4). Another pre-service teacher said that he/she "had problems relating suggested problems to the literature/ resources' (P11). The analysis under this question found that the pre-service have a positive attitude towards using the module. One said that she is happy to use the module (P2). The module is really easy to access (P3). Everything is good and the guidelines were really helpful (P12). There are no major problems involved and the module went smooth (P18). When asked if there were any problems or challenges faced, during the implementation of the Online Case-Based Problem-Solving module, the lecturer suggested that more time should be allocated. Anyhow, she managed to get the pre-service teachers to complete the tasks and they did well. Due to time constraint, the lecturer said she had to rush through the slides. She suggested breaking down the slides to two classes or sessions. Due to the pre-determined weekly schedule, the lecturer had to complete the implementation to move on to the next topic scheduled in the Methodology in Teaching Writing course information. Two pre-service teacher interviewed suggested that the module is lengthened. One had no problem while one said it was challenging to find materials to support solutions.

Limitations of the module. The pre-service teachers were given the option to provide their honest feedback on the limitations of the module. From the open-ended

survey analysis, the pre-service teachers said that they would like to watch more videos of actual teaching. The pre-service teachers said that time were the main limitations of the implementation of the module. More time is needed for the implementation of the module to fully enjoy and learn. They would like more exposure to the problem-solving module. They think that more time will provide optimum outcome. They had limited time to complete the tasks. One pre-service teacher highlighted that those with slow internet capacity would have problems accessing the video

Since this is a prototype to investigate the effectiveness of the Online Case-Based Problem-Solving Module, the findings will determine if the module is to be expanded with more examples of authentic teaching scenario

Suggestions. Based on the 4-point Likert scale survey, it is found that the pre-service teachers suggested that there should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes (m= 3.59, SD= .503). They also agree that this module is suitable to be infused in the ESL writing course (m=3.55, SD= .510).

The pre-service teachers were given the option to provide their comments and suggestions. From the analysis, several themes emerged. The pre-service teachers suggested providing more than one video. One is not enough. They would like to watch a variety of teaching styles and have wider perspectives of authentic teaching scenarios. When asked if the lecturer thinks there should be more case-based learning videos of actual lessons online for problem-solution analysis and for teachers to view, she said yes, and suggested videos of different levels, locations, more scenarios of teachers teaching English, writing genres, approaches, and also to learn from the teachers' experiences and stories. She would like to watch more teaching videos in the future. When asked if there should be more authentic case scenarios on teaching ESL

writing in the Malaysian context available online for learning and problem solving purposes, the pre-service teachers in the interview affirmed that there should be more because it will be helpful for them to know the realities of teaching, and to make comparisons from the strengths and the weaknesses of the lessons.

When asked if the lecturer has any suggestions to improve this Online Case-based Problem-Solving Module, she said that module is good for her and that more time should be allocated to cover all the theories.

One pre-service teacher suggested that this module be made into a course, as teaching writing is not easy and a domain that needs more attention. The pre-service teachers suggested that the module be included in the writing course. When asked in the interview if the module is suitable to be integrated into the writing methodology course, all answers were positive. One pre-service teacher thinks that the module can be integrated not only in writing but also in every teaching skill including reading. Another said is in favour of including the case-based problem-solving module. It would be refreshing as compared to how he is normally taught in all the methodology courses which are theories first then microteaching. He suggested including more case-based problem-solving modules to provide more opportunities for problem-solving. From the interview, it is found that the pre-service teachers believe that the case-based learning method can bring prominent positive outcomes and should be implemented in education courses. It could assists in students' preparation at various levels.

The pre-service teachers suggested that the module be implemented with students from other universities as participants to share their views, and also students from various semesters. The module should be introduced to all the students who are going for practicum teaching.

Asked if the pre-service teachers think there should be more case-based learning videos of actual lessons online, all are favourable to the idea. They think that there should be more case-based learning videos on teaching other genres of writing besides the argumentative genre shown in this module. One pre-service teacher suggested that there should be more case-based learning videos for novice teachers. He suggested that the case-based problem-solving module be included in the syllabus. Another pre-service teacher added that after learning from this module, he believes that there should be more exposure to this type of module. Most of them are favourable to the prospect of having more problem-solving case-based videos online.

Since this is a prototype to investigate the effectiveness of the Online Case-Based Problem-Solving Module, the findings will determine if the module is to be expanded with more examples of authentic teaching scenario.

Conclusion

This chapter provides the findings for Phase 3: Implementation and Evaluation of the Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS). The objective is to evaluate the OCBPS module through exploratory implementation process. It is to discern the perspectives of the lecturer and pre-service teachers on the usability of the OCBPS module after its implementation. The findings generated from the pre-service teachers through surveys, interviews, and reflective essays are reported. The lecturer's opinion of the module derived from an interview is also reported. The evaluation on usability of the module covers the pre-service teachers' perception of their abilities and experience before and after the module is implemented, their level of satisfaction towards the lessons, their opinion of the problems embedded in the ESL writing lesson for problem-solution analysis, strengths

of the module, the technical aspects, their attitude towards the module, problems and challenges faced, limitations, and suggestions. The summary of findings, implications, recommendations and conclusion are presented in the next chapter.

Chapter 7 Conclusion And Recommendations

Introduction

This chapter concludes the study by providing a summary of the process undertaken in the development of an Online Case-Based Problem-Solving (OCBPS) Module for ESL Writing Instruction. In the first chapter, the problem statement that shows several issues in teacher education provides the rationale for the development of the OCBPS module. Research indicates that pre-service teachers lack problem solving skills (Choi & Yong, 2011), and are unable to apply pedagogical content knowledge to solve real-world problems (Choi & Yong, 2011; Mandl, Gruber & Renkle, 1996). In addition, pre-service teachers are not adequately prepared for the increased demands of teaching (Vaugn, Bos & Shuman, 1997), and find it a challenge to bridge theory to practice (Lee, 2004). Also, it is found that teacher education training is isolated from classroom issues prevalent today (Norshiha & Norsiah, 2011).

Since these problems have implications on teacher training, this study proposes the development of the OCBPS module to address the issues of enhancing problem solving skills, bridging theory and practice, application of pedagogical and content knowledge, and for pre-service teachers to be adequately prepared for their teaching profession.

The OCBPS module can be infused in a Teaching English as a Second Language (TESL) teacher education writing methodology course. The subject-matter in which the OCBPS module focuses on is Methodology in Teaching Writing in English as a Second Language (ESL). The pre-service teachers need to be prepared to teach writing effectively since ESL writing is a difficult skill to master for ESL students. Part of the training is to prepare pre-service teachers for problem-solving

practices related to ESL writing instruction. In addition, they need training on effective application of pedagogical and content knowledge. The development of the module takes into consideration the training above as a way to prepare pre-service teachers for the multifaceted issues of teaching.

Pre-service teachers need training on problem-solving practices of authentic and ill-structured problems related to writing instruction in secondary schools. Jonassen (2002) postulates that ill-structured problems are the kind found in everyday practices are difficult to solve due to the number of issues, functions and variables involved in the problem, and have many alternative solutions, multiple solution paths, and multiple criteria for evaluating solutions. Problem-solving requires a mental representation of the situation (Jonassen, 2002) or the problem space (Newell & Simon, 1972). Jonassen (2002) added that manipulation of the problem space in problem-solution analysis process engages conscious activity. Having this concept of problem in mind, this study adopts the case-based learning principles which have been found to be effective in teacher education courses to help teachers take appropriate measures in seeking solutions to complex real-world problems in teaching and learning (Jonassen, 1997; Choi & Lee, 2009, Koc, 2012; Chwee, 2013).

Case-based learning has been found to be effective in developing problem solving skills (Choi & Lee, 2009), bridging the gap in theory and practice (Koc, 2012), and applying pedagogical and content knowledge (Shulman, 1986; 1987). Choi & Lee (2009) states that despite the importance of developing students' ill-structured problem solving skills in higher education, many educators find it challenging to create such a learning environment, due to the lack of research-based information and suitable resources available for educators to use as a model to redesign their instructional methods to promote problem solving abilities. As such, Choi and Lee (2009)

recommend a need for more research on instructional design and implementation models for enhancing ill-structured problem solving skills in the higher education context to address these issues. It is essential to develop a case-based problem-solving module for filling a gap between higher education learning and real-world problem solving (Choi & Lee, 2009). This present research is carried out to fill the gap in bridging higher education learning and real-world problem solving.

In chapter 2, the theoretical foundations of this study, role of technology in fostering problem solving, the case method, case-based learning in teacher education, online case-based video instruction, principles and model for problem-solving through online case-based learning, strengths and challenges of case-based learning, rationale for developing a case-based learning module, and other literature specific to this study are reviewed and synthesized.

Case-based learning is framed by several theories that share similar philosophical principles. Teacher education has to prepare pre-service teachers who can attend to students learning problems through application of content and pedagogical knowledge (PCK) (Shulman, 1987). Another important dimension to teacher knowledge is knowledge of technology proposed by Koehler and Mishra (2009). The amalgamation of technological pedagogical content knowledge (TPACK) is important for teachers to provide effective instruction using technology. Other theories that underpin this study are those with constructivism principles, namely, social constructivism, situated cognition and anchored instruction.

The development of the case-based problem-solving module adopts the First Principles of Instruction proposed by Merril (2002). Merrill's (2002) instructional principles are used because they support the goal of developing the case-based problem-solving module. Choi and Lee's (2009) and Jonassen's (1997) case-based

learning models are reviewed and subsequently provided the sources in the development of the OCBPS Model for Case-Based Problem-Solving in this study.

In Chapter 3, the methodology of the study is discussed. This study adopts the developmental and design research (DDR), carried out in three phases, which are the needs analysis phase, the design and developmental phase, and the implementation and evaluation phase (Richey and Klein, 2005). The methodology of each phase is reported.

Chapter 4 reports the findings of Phase 1: Needs Analysis which is conducted to investigate the need for developing an online case-based problem-solving module for ESL writing instruction in the TESL program. Data from TESL undergraduates from Year 1 to Year 4 from two universities provide findings for pre-service teachers' perception of their problem-solving abilities, importance of problem-solving, acceptance of using an online case-based problem-solving module, and interests in viewing videos online.

Chapter 5 reports the findings and the processes undertaken to design and develop the Online Case-Based Problem-Solving Module for ESL Writing Instruction. The objective is to design and develop an OCBPS module based on the views of a panel of experts. The purpose of the design and developmental phase is to obtain the panel experts' views on the design of the OCBPS module through the Fuzzy Delphi Method. The FDM findings of case criteria, curriculum aspects, and media design are reported. In addition, findings of film expert's interview and the process of recording the ESL writing lesson in the context most preferred by panel experts are reported. The presentation of the module on the MOOC *openlearning* platform is also included. The description of the module, procedure for implementation, lesson plans, and an example of the slides used are appended (Appendix 18).

Chapter 6 reports the findings of Phase 3: Evaluation of the Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS). The objective is to evaluate the OCBPS module through exploratory implementation process. It is to discern the perspectives of the lecturer and pre-service teachers on the usability of the OCBPS module after its implementation. The findings generated from the pre-service teachers through surveys, interviews, and reflective essays are reported. The lecturer's opinion of the module derived from an interview is also reported. The evaluation on usability of the module covers the pre-service teachers' perception of their abilities and experience before and after the module is implemented, their level of satisfaction towards the lessons, their opinion of the problems embedded in the ESL writing lesson for problem-solution analysis, strengths of the module, the technical aspects, their attitude towards the module, problems and challenges faced, limitations, and suggestions. The summary of findings, implications, recommendations and conclusion are discussed in the next sections.

Summary of Findings

The summary of findings for Phase 1: Needs Analysis; Phase 2, Design and Development; and Phase 3: Evaluation are discussed below.

Phase 1: Needs Analysis Findings

The objective is to determine the perception of pre-service teachers on their level of problem solving skills; ascertain their perception of the importance of problem-solving skills; investigate the perspectives of pre-service teachers on their acceptance of using an online case-based problem-solving module; and find out the pre-service teachers' interests in viewing videos online. The purpose is to investigate

the needs for an Online Case-Based Problem-Solving Module for ESL Writing Instruction.

The data was collected in the TESL program among 121 TESL undergraduates in two universities. The survey was carried out using the Problem-Solving Inventory by Heppner and Peterson (1982) to determine the perception of TESL undergraduates' problem-solving abilities. In addition, a survey was carried out on the TESL undergraduates' or pre-service perception on the importance of problem-solving skills, their acceptance of case-based learning, and their interests in viewing videos online. The findings are presented in five sections: pre-service teachers' perception of their problem-solving abilities, perception on the importance of problem-solving skills, their acceptance of using an online case-based problem-solving module, and interests in viewing videos online.

The findings for perception on problem-solving abilities show that most pre-service teachers slightly agree to the items relating to Problem-Solving Confidence (PSC). This shows that most participants have a satisfactory perception of their PSC. The pre-service teachers reported having a moderate perception of Approach-Avoidance Style (AAS) in relation to their problem-solving ability. On their perception of Personal Control (PC), the pre-service teachers have a low to moderate perception for this factor.

The findings show that the pre-service teachers have a generally satisfactory perception of their problem-solving abilities; hence there is a need to improve their problem-solving abilities. They need to have higher perception of problem-solving abilities to approach and solve problems with confidence. In terms of factors relating to PSC, AAS and PC, there is a need to improve these skills so that pre-service teachers have a high perception of their abilities to solve problems. According to Zimmerman

and Campillo (2003, pp. 241-22), "having knowledge and skill does not produce high-quality problem-solving if people lack the self-assurance to use these personal resources." More practice is needed in their course because more practice leads to improvements in problem-solving skills, hence a higher perception of problem-solving abilities. When there is confidence and self-efficacy in problem-solving skills, there is indeed persistence and effort to solve problems (Zimmerman & Campillo, 2003). Research has indicated that an individual's perception and beliefs about his or her problem solving skills somewhat influences how a person deals with a problem (Heppner & Krauskopf, 1987), and his or her ability to solve problems (Heppner, Witty & Dixon, 2004).

The findings for perception on the importance of problem-solving skills show that the pre-service teachers percieve problem-solving to be important for everyone, important in higher education, in the TESL programme, in academic courses, for work, and for teachers. Overall, the pre-service teachers have a positive perception on the importance of problem-solving. The findings is parallel to Woline and VanDerZanden (2010) findings in which the participants in their study perceive problem-solving to be an important skill and they expressed concern with finding the best solution to the problems. In addition, finding the best solution in both academic and work environments is important and this indicates that students understand how problem-solving impacts the people they work for or people in an academic or work situations (Woline & VanDerZanden, 2010). The findings also reveal that the students think that there may not be as large a discrepancy between school-taught problem-solving skills and workplace application (Woline & VanDerZanden, 2010). This might be indicative of their ability to apply problem-solving skills they learn in college to problems they encounter in the workplace (Woline & VanDerZanden, 2010).

Problem solving is generally regarded as the most important cognitive activity in everyday and professional contexts (Jonassen, 2000). If they perceive problem-solving skills as important, they will be more positive towards enhancing this skill. The findings indicate that there is a need to develop an online case-based problem-solving module to enhance problem-solving practices and skills.

The findings for acceptance of case-based learning show that the pre-service teachers have an acceptance of case-based learning. This shows that the TESL undergraduates are open to the idea of learning through case-based learning, hence, the need to develop a case-based learning module for problem-solving purpose for ESL writing instruction. This findings share similar results on the rather high acceptance of case-based learning with examples of actual teaching with videos by pre-service teachers and their facilitators in a Swiss teacher education program (Krammer, Hugener, Frommelt, Auf der Mau, & Biaggi, 2015). Wismath, Orr, and Zhong (2014) suggest that students in their course believe that problem-solving skills can be learned and developed, but not in a traditional lecture-format class. The skill can best be accomplished in a "carefully structured active learning environment which facilitates the introduction, practice, and eventual deep understanding of problem solving as a process" (p.14). Case-based learning provides an active learning environment that supports problem-solving skills.

The findings indicate that most of the pre-service teachers have high interests in viewing online videos. Online learning platforms that support problem-solving need to engage learners in solving problems and to support the necessary attributed intellectual and collaborative activities (Jonassen, 2002). The findings show that there is a need to develop an online case-based problem-solving module to enhance

problem-solving skills through a more dynamic approach without relying solely on the traditional lecture-format.

Phase 2: Findings for Design and Development

In the design stage, the researcher obtains the views and consensus of panel experts through the Fuzzy Delphi Method. In the first stage, the researcher used the interview technique to interview members of panel experts. From the perspectives gathered from the interview, the researcher designed a questionnaire for the Fuzzy Delphi Method (FDM). Members of panel experts responded to the questionnaires to provide their views and consensus on the case-criteria, the curriculum aspects, and the media elements of the OCBPS Module. This section provides the summary of findings for the second phase of this research which is: What are the panel experts' views on the design of the online case-based problem-solving module?

From the FDM, it can be summarized that the recording of an authentic ESL writing lesson for the OCBPS Module for ESL Writing Instruction is to be done in a rural context. It is to be done in a Form Six class. A Lower Six class is chosen because the students have no major examination. The recording is to be done in a class with low proficiency students. The genre selected for the ESL writing instruction is argumentative essay based on experts' second preferred choice since the first choice descriptive genre is not in the Form Six syllabus. The result indicates that the recording of an authentic ESL writing lesson is to be done in a double period lesson. In the case of a Form Six class, each period is 60 minutes; hence the double period lesson is 120 minutes (2 hours). The teacher teaching the ESL writing lesson should be an experienced teacher who has more than ten (10) years teaching experience and has experience examining centralized examination such as PMR, PT3, SPM and or MUET.

The teacher who taught in this module has 14 years teaching experience at the time of the recording and has experience marking SPM and MUET examination papers.

Through the case method, students are given models of how to think about problems professionally (Kleinfield, 1990). Novice teachers often face problems teaching in rural schools. For example, Kleinfield's (1990) review found that those teaching in remote Alaskan villages with Yupik and Athabascan Indian populations have encountered problems that are unique and no curriculum materials were previously available to guide instruction. Cases were developed by local teachers, faculty and graduate students to provide the actual scenarios in such situations for analysis and learning purposes (Kleinfield, 1990). The cases developed in Alaska would be able to provide rich descriptions of the kind of problems prospective teachers might encounter in rural teaching or in small schools with ethnic minorities (Kleinfield, 1990). Often, such schools are inaccessible for practical teaching due to distance from universities. Case methods are especially valuable in rural education and can serve as models to examine situations from multiple perspectives, evaluate actions and reflect from other teachers' experiences (Kleinfield, 1990).

As for the curriculum aspects, the panel experts choice of the learning outcomes for the OCBPS module are to enable pre-service teachers to identify and analyse problems, propose and justify solutions, provide and receive feedback on solutions proposed, and reflect on the problem-solution process of ESL writing instruction; identify the strong points and the weak points in an actual teaching of ESL writing instruction, and to suggest ways to overcome the problems, with support from literature, and what they have learnt in their writing methodology course; apply content and pedagogical knowledge and principles to concrete situations through the problem-

solution analysis of ESL writing instruction; and attain analytical problem-solving skills related to ESL writing instruction.

Additional learning outcomes are included to meet the objectives of the problem-solving module, and the OCBPS Problem-Solving Stages. The other learning outcomes are constructed to enhance skills that pre-service teachers need pertinent to the statement of the problem of this research which are to develop pre-service teachers' problem-solving skills, enhance pedagogical content knowledge, and bridge theory and practice. The learning outcomes are parallel to the recommendation by Dewey (1938) for a more progressive approach in instructional goals in the form of cultivating individual experience, acquisition of skills in context not in isolation, relevant goals and making the most of present life, and acquaintance with a changing world. In progressive education, abstract concepts become concrete when they are learnt through application. Concepts and principles should be taught within a framework that provides meaningful learning experience. The attention to the organization of subject matter, and the guidance of educators within the principles of learning that are relevant, meaningful, experiential, and constructive should not be overlooked (Dewey, 1938).

The evaluation methods for the OCBPS module are writing a reflective essay, and presentation. The resources that should be shared in the module are articles on ESL writing instruction and methodology, bibliography and/or links to Web resources to find out more information about ESL writing instruction and methodology, books on ESL writing instruction and methodology, and textbook used in the writing methodology course. Approximately, nine hours is allocated for the implementation of the module regardless of the weeks or the frequency of the class.

As for the FDM results for media design, the most preferred online platform chosen by experts to showcase the OCBPS module is the Massive Online Open Course

(MOOCs) or the *openlearning* platform. The most preferred media elements of the module are graphics and images; text and audio narration.

The panel experts' most preferred way to present the video for pre-service teachers' viewing and problem-solving practices is by breaking the video into several short clips/videos. Hence, the video is presented in three short clips under the headings Introduction; Mechanics of Writing; and Conclusion. The students may watch the video in one full sequence or watch it in three short clips. The recommended time of the whole video and the length of each video clip depend on the duration of the writing lesson and the time taken to teach each of the heading above.

The findings above are important in developing a case. The problem of developing a suitable case stems from the fact that a good case material is sometimes difficult to find. Teaching a case can pose a problem when instructors are not sure how to go about teaching a case with fear that discussion will turn to superficial exchange of personal opinions (Kleinfield, 1990). To prevent this, Kleinfield (1990) suggested that "faculty must think through what they are trying to accomplish, what issues the case illuminates, what theoretical concepts it illustrates, and what understanding the case can develop" (p.3).

In adopting the use of video cases as an approach to develop pedagogical problem solving skills in pre-service teachers, it is often difficult to place each one of the pre-service teachers in an exemplary classroom for this purpose hence using videos to show cases from real world scenario may provide an alternative measure for training in problem solving skills (Kale & Whitehouse, 2012). According to Kale and Whitehouse (2012), careful scaffolding is needed to foster cognition and metacognition in the pre-service teachers' development of instructional strategies for ill-structured problem solving. Challenges found in Henson, Kennet, and Kennedy

(2003) study are managing classroom activities, and providing cases that address current issues in a specific professional field. In addition, "identifying suitable cases to meet the needs of the students across the wide variety of industries increases the difficulties in using case studies effectively" (Henson, Kennet & Kennedy, 2003, p. 250). Hence, consulting the panel experts to derive data on case criteria, curriculum aspects, and media design of the module through FDM is vital to develop a suitable, relevant and meaningful online case-based learning module to develop problem-solving skills and other significant effective learning practices.

Phase 3: Findings for Evaluation

The objective of this phase is to evaluate the module by discerning the perspectives of the lecturer and pre-service teachers on the usability of the Online Case-Based Problem-Solving Module for ESL Writing Instruction (OCBPS). The implementation of the module was done involving one Teaching English as a Second Language lecturer and 22 pre-service teachers.

The evaluation on usability of the module covers the pre-service teachers' perception of their abilities and experience before and after the module is implemented, their level of satisfaction towards the lessons, their opinion of the problems embedded in the ESL writing lesson for problem-solution analysis, strengths of the module, the technical aspects, their attitude towards the module, problems and challenges faced, limitations, and suggestions.

The findings of pre-service teachers' perception of their abilities and experience before and after the module is implemented show that after the implementation of the module, the pre-service teachers perceive their ability to discuss concepts of pedagogical content knowledge, problems, contents in argumentative essays, pedagogy of teaching writing, and pedagogy in teaching argumentative writing

improved. The findings also show improved results in the pre-service teachers experience in observing a writing lesson online and engaging in problem-solution analysis, and writing reflections on problem-solution analysis and pedagogy and contents of ESL writing instruction. A Wilcoxon Signed Rank Test revealed a statistically significant increase in the level of agreement of the students on the implementation of the new module. The median score on the level of agreement increased from entrance survey to exit survey. It is recommended that pre-service teachers build their knowledge and experiences from authentic sources so that they can solve real-life problems, and be better prepared to guide their future students (Kocyigit & Zembat, 2013). Harrington (1995) found that using dilemma-based cases in teacher education programs help pre-service teachers deliberate on tentative solutions and actions, whilst providing training on how to analyse evidence-based resources in seeking solutions.

Evaluation of the pre-service teachers' level of satisfaction of the OCBPS module revealed that they are satisfied with the class, the activities done, the resources provided, the team work, the feedback, the evaluation given, and overall implementation of the OCBPS module. The overall mean indicates a satisfaction towards the implementation of the module. This finding is similar to Choi and Yang's (2011) study of case-based learning with Special Education teacher education students who were satisfied from the presentation of authentic situations through video. The findings also found that presenting authentic situations through video to be more effective than presenting it through text in that the former promotes more significant learning outcomes, higher comprehension scores, and was able to enhance learners' satisfaction and empathy (Choi & Yang, 2011).

Evaluation of the pre-service teachers' perception of the problems identified in the ESL writing lesson revealed agreement toward the quality of the problems. The findings show that the pre-service teachers perceive the problems to be apparent, critical, relevant, and open-ended to explore solutions. It is also complex enough for a collaborative effort to seek for solutions. Furthermore, the pre-service teachers agree that the nature of the problems requires the application of theories and approaches to the problem-solution analysis. They agree that the problems have the ability to engage their interest and motivate them to probe for deeper understanding of concepts and approaches learnt in the course. The pre-service teachers agree that the problems require them to engage in higher order thinking processes. The problems require them to use critical thinking skills and higher order thinking skills like, application, analysis, evaluation and synthesis and connect the new knowledge to the framework of understanding that they are building, based on the concepts in the course. According to Jonassen (2002), problem-solving practices should provide ill-structured problems that are complex, dynamic, domain specific, engaging and has the ability to achieve the intended outcomes. Constructivist learning environment can foster the application of tacit knowledge to real-world problem-solving (Jonassen, Davison, Colins, Cambell & Haag, 1995).

The evaluation of usability survey found that there are many strengths of the OCBPS module. It was found that the strength of the module is it develops critical problem-solving skills. From the t-test analysis, it was found that there is a significant difference in the scores for pre and post reflections indicating improved problem-solving skills. The pre-service teachers' reflections also revealed that the OCBPS module develops problem-solving skills. According to Merseth (1996), using cases in teacher education is beneficial because of first, "the ability of cases to help develop

problem solving and decision-making skills"; second, "the ability of cases to increase awareness of multiple perspectives and other educational settings"; third, "the ability of cases to enhance beliefs about personal authority and efficacy"; and fourth, "the ability of cases to form habits of reflection" (p. 731). Research has shown that online video cases can support problem solving skills (Choi, 2007; Choi & Johnson, 2007; Henson, et al, 2003; Pierce, 2002).

The strength of the OCBPS module is that it prepares the pre-service teachers for teaching in a more effective and interesting way. It prepares the pre-service teachers for their mock teaching, practical teaching, and the teaching profession. Quek and Wang (2010) explained that case-based learning has been found to help beginning teachers develop expertise and professionalism that experts usually gain through the accumulation of experiences. The situated learning experience and inquiry gained through case discussion have potentially contributed towards building the personal knowledge of novice teachers (Quek & Wang, 2010). Pedagogical design of the environment allows for active learning and co-construction of knowledge among learners (Quek & Wang, 2010).

The OCBPS module also develops pedagogical content knowledge. The module emphasizes on the importance of pedagogical content knowledge and how these two are important for a holistic learning experience. The pre-service teachers said that they were able to apply PCK in the problem-solution task and they will apply PCK in their teaching. From the t-test analysis for PCK, it was found that there is a significant difference in the scores for pre and post reflections showing improved pedagogical content knowledge. The pre-service teachers agree that teachers should be equipped with pedagogical content knowledge for effective instruction. The case-based problem-solving module taught them that pedagogical and content knowledge

in combination is important for teachers to apply in their instruction. this is parallel to results from several studies that found case-based learning develops engagement in multiple analysis of problems and justification of solutions (Choi & Lee, 2013; Pierce, 2002; Merseth, 1999; Harrington, 1995); reasoning clearly and logically (Pierce, 2002).

From the survey, the pre-service teachers agree that the strength of the module is in its ability to develop higher order thinking skills. The pre-service teachers in the interview said that the module helps with higher order thinking skills**.** The case-based problem-solving module helps students develop higher order thinking skills, such as analytical skills in the problem-solution analysis task. They also develop critical thinking skills when proposing solutions. The module challenged the pre-service teachers to be more critical in terms of thinking and handling problems and applying solutions. It also trains them on the application of theories and methods that they would use in the future as teachers. According to Pierce (2002), undergraduate students can acquire several important skills with multiple exposures to case-based structured conflict environment such as analytical, problem solving and decision making skills. "Students' analytical skills are enhanced through reasoning clearly and logically and then presenting and defending those perspectives to their peers" (p. 739). Other studies show similar findings that case-based learning helps with enhancement of critical thinking (Choi & Lee, 2013; Merseth, 1999), and reasoning clearly and logically (Pierce, 2002).

The module is also able to bridge theory and practice. From the t-test analysis, it was found that there is a significant difference in the scores for pre and post reflections indicating improved application of theory and practice in the reflection. The OCBPS module has helped the pre-service teachers to have a frame of reference of the

theories and approaches they have learnt. Being prepared to use the theories and approaches can guide the pre-service teachers during practicum and as future teacher. This finding is similar to the finding by Koc (2012) that the use of case-based learning in the early childhood courses was effective in promoting theory-practice connections. Other researchers found that case-based learning develops application of theories to the learning process (Choi & Lee, 2013; Koc, 2012; Henson, Kennett & Kennedy, 2003; Merseth, 1999). The use of case-based learning with videos has a promising potential of establishing the essential connection between theory and practice (Blomberg et al., 2013).Teacher knowledge is context-specific, non-stagnant, and evolving (Clark & Lampert, 1986), thus it should be learned in context rather than in complex abstraction (Ozkan, 2001). One way of learning in-context is through case observations rather than from textbooks. Constructivism supports pre-service teachers' acquisition of teacher knowledge because of its principles of combining theory and praxis (Ozkan, 2001). The finding is supported by the principles of constructivism.

The pre-service teachers and lecturer reported that the OCBPS module is authentic, relevant, applicable, useful, and suitable to the target audience. The lecturer said that the strengths of the module are that it is not available before this. It is based on real classroom teaching which makes it relevant. The module being online makes the process easier since the pre-service teachers did not have to go to schools which can be difficult and time-consuming. The online case-based problem-solving module is very helpful to learn problem-solving and also to know about the real teaching situation in school in a more convenient and less time-consuming way. It is related and relevant to teaching writing. Seeing examples and learning from it can help the pre-service teachers become effective teachers.

The findings supports the theory of situated learning which supports online case-based learning because it gives pre-service teachers the opportunity to observe a practitioner engage in the relevant domain culture of teaching in a classroom (Brown, Collins & Duguid (1989). They observe an authentic practice to expose them to the use of a domain's activity, concept, culture and tools to help them wrestle with problems of their future world. This engagement in problem solving activity of an authentic situation can be deeply informative and meaningful in a way that textbook examples and declarative explanations are not. Learning is situated in realistic problems, providing a platform for students to experience the same professional dilemmas facing teachers in actual classroom instruction. Authentic tasks allow students to work on real-life problems and encourage them to think critically to find solutions, collaborate with peers, revisit their ideas, and find the best solutions (Kocyigit & Zembat, 2013).

The evaluation of usability found that the strength of the OCBPS module is it promotes collaborative learning and communication. In the reflection, the pre-service teachers said that the student-centred approach in the module is interesting and helps the pre-service teachers develop their skills and train them to be responsible and independent of their learning. This is parallel to the findings that case-based learning develops effective learning practices such as collaborative and communication skills (Henson et al, 2003; Pierce, 2002). Henson et al (2003) found case studies to be effective in marketing programs. Case-based learning has helped students become more capable at problem solving, applying theories to problem-solving, develop communication and interpersonal skills.

The constructivist learning approach engages learners in the process of constructing knowledge and making meaning of ideas and concepts through reasoning

and reflecting. The underlying principle of constructivism is working with peers, teachers as well as related tools and resources to support the learning process. In the constructivist approach, authentic and collaborative learning will provide a more meaningful learning experience (Jonassen, Peck, & Wilsom, 1999). Collaborative learning derives from constructivist principles employing engaged learning activities in groups working on authentically based inquiries to improve communication skills, problem solving and creative thinking skills, as well as cooperation in students (Robinson, Molenda & Rezabek, 2008). Most real world problems require analysis from multiple viewpoints and opportunity to consider more than one solution. Collaboration and combinations of viewpoints provide the creation of different perspectives and solution (Glasgow, 1997).

The OCBPS module makes use of up-to-date approach integrating technology**.** The pre-service teachers reflected that the online case-based problem-solving module is an up-to-date approach in learning with technological affordance that helps them with the problem-solution analysis such as the rewind and fast forward features which enable them to view and review specific parts. They can access the module anytime and anywhere. The module being online helps the students to work at their own time and pace to complete tasks, and then engage in discussion in class. It trained them to be more autonomous. The Internet and the World Wide Web have made it flexible in terms of time and space for any work and learning to take place. Computers are not merely tools as "their expanding capabilities and interactivity now provide students with learning environments with complex, comprehensive capabilities to access and manipulate information. Computers, interactive multimedia, and communication devices have a profound effect on curriculum and instruction" (Parkay, et al, 2010, p.53).

The OCBPS module is interesting and engaging. It is interesting to analyse the problems as it involves a real case. The pre-service teachers said that the module is interesting and applicable to the teaching profession. Analysis of the reflective essays found that the pre-service found the module to be authentic, interesting, challenging, engaging and beneficial. The online case-based problem-solving module is interesting, challenging and engaging due to its authentic nature that involves students in meaningful learning relevant to their profession. A study by Choi (2007) found that problem-based video instruction was preferred by students because it made learning more interesting and enjoyable. This aligns with the theory of anchored instruction that underpins this study. Anchored instruction is a technology supported learning approach which values complex problem-solving around an anchor which can be a story or real situations that relates to the students' learning domain (CTGV, 1990). The goal of anchored instruction is to create interesting, realistic contexts that encourage active construction of knowledge by learners.

It is found that the module promotes active reflection amongst students. The preservice teachers reflected that the module provides them with the opportunity to reflect on what to improve on to be well-prepared. It taught them that teachers should always seek ways to improve themselves, be open to new challenges and seek ways to let students to experience learning. Research has indicated that novice teachers often teach the way they were taught in school. From the module, the pre-service teachers are able to reflect on the way they were taught. Viewing the online case-based video helped the pre-service teachers reflect on how to teach writing, taking into considerations the students' needs, as well as classroom management. It helps the pre-service teachers with pedagogical applications. The case-based problem-solving module provided the pre-service teachers the opportunity to search relevant literature

and read numerous researches done on code-mixing and code-switching in L2 instruction. The activities and discussions done during the workshop have changed their perspectives on this issue. In order to be more prepared for the teaching profession, pre-service teachers need to reflect on other teachers' experiences before they experience teaching themselves. Video cases can supplement field experiences through observation, analysis, and reflection of actual teaching situations (Kale & Whitehouse, 2012).

From the evaluation, it is found that the strength of the OCBPS module is that it provides relevant and helpful resources. The materials posted on the *openlearning* platform are relevant and helpful in the problem-solution process. The pre-service teachers interviewed revealed that the module has useful, relevant and helpful resources posted online and those shared during the module implementation. One of the requirements of the task in the module is to support solution presented with support, hence the need to review literature to provide support. Supporting the solutions with proof and justification made the solutions more valid and applicable. Choi and Lee (2012) have been advocating the use of case-based learning to train pre-service teachers develop the abilities for solving ill-structured problems. Their research on online case-based learning in teacher education classroom management courses have helped pre-service teachers develop skills in using multiple analysis of problems and solutions, justification, critical thinking, application of theories and resources in the process of finding solutions to ill-structured problems in classroom management.

The OCBPS module is said to develop life-long learning. As future teachers, the module helped them realize the value of life-long learning and being able to apply knowledge to real life, instead of learning solely for examinations. With the current

technological advancement, curriculum and instruction should aim to develop within students' self-directed learning skills, with the desire to continue self-directed life-long learning (Parkay, et al, 2010) that can be useful in their career sustenance and progression.

The OCBPS module is also found to develop knowledge, skills and confidence in teaching writing. They learn a lot about teaching writing and the importance of being equipped with the knowledge and skills that teaching writing demands. They learnt new things, gained more knowledge and skills on teaching argumentative writing and also identifying problems and providing solutions. These and the peer discussion in class have increased their confidence to teach writing. The pre-service teachers believe that the problem-solution analysis task can help current and future teachers. Students feel motivated by a supportive environment and their self- confidence is enhanced by the repetitive opportunities to identify, analyse, and debate critical issues (Pierce, 2002). The learning experience becomes a personal asset because the undergraduate students have acquired the ability to take on future tasks and the ability to effectively tackle complex problems and make decisions (Pierce, 2002). "Students are able to manage time, think independently, work cooperatively, make oral presentations, effectively advocate their personal views, see all sides of important issues, and appreciate the value of alternative perspectives" (Pierce, 2002, p. 740).

The pre-service teachers responded to a survey to evaluate the usability of the module in terms of technical aspects. Most of the pre-service teachers agree that the module was easy to access, and they had no problems accessing the video, the resources are easy to access, the online video was easy to use, they had no problems viewing the video, the audio and text are clear, the visual quality is good for learning purposes, the duration of the video is suitable, and the structure of the video is easy to

follow. They all agree that the module is user-friendly and the online platform where the video is available is suitable. The lecturer shared in the interview that the module is easy to access on the *openlearning* platform. She also said that the image and the audio of the video are clear. From the survey, interviews and reflection, it can be concluded the OCBPS online platform is suitable, easy to access and use, with clear audio and image. Hence, with good internet connection, users should not have any technical problems in using the OCBPS module.

The OCBPS module has other strengths in terms of clearly outlined objectives, stages in the module are easy to follow, language used is clear and easily understood, and the resources provided in the module are useful.

The lecturer's attitude towards the module is positive. The lecturer said that it's a new experience for her teaching the Online Case-based Problem-Solving for ESL Writing Instruction module. She has never used this approach and said that it was interesting. She said that it's a new experience for the pre-service teachers because most of them did not study Form 6 and observing a Form 6 class is a new experience for both lecturer and students. She is happy to be part of the teaching team and she learnt a lot. She thinks there should be more videos available for the pre-service teachers to view and learn from other teachers. She said she will use the module again for the Methodology in Teaching Writing course.

The pre-service teachers interviewed also had a positive attitude towards the OCBPS module. They said it is a new experience for them. The module is helpful, relevant and applicable. The problem-solution analysis has benefitted the pre-service teachers and gives them some ideas and the confidence to teach in the future. They are grateful to be part of the module. The pre-service teachers in their reflection stated that they gained good exposure and new experience especially that the module integrates

technology. The module is able to increase the pre-service teachers' motivation. From the pre-service teachers' reflections, it is found that they appreciate the opportunity of observing an actual lesson from a Malaysian school. The pre-service teachers said that the module is very helpful and they are grateful to have participated. The module provided the pre-service teachers with a new and refreshing learning experience. They take on the role of a teacher in the lesson. It empowers them to think like a teacher and to present their analysis from a teacher's point of view. One pre-service teacher wrote that the online case-based problem-solving module is brilliant.

The findings on attitudes towards the OCBPS module is similar to those revealed by the experimental group of 35 pre-service teachers who viewed video presentations of their practicum teaching in public schools and taking part in the process of analysing and discussing arising issues and problems and collaboratively proposing solutions to be positive (Kocygit & Zembat, 2013). The pre-service teachers had positive attitudes towards the course. They developed problem-solving skills, participated actively, were careful and showed interest in the course as they evaluated themselves and their peers. They felt challenged and motivated because the tasks were authentic, and gained permanent knowledge while having fun (Kocygit & Zembat, 2013).

The pre-service teachers were given the option to provide their honest feedback on whether they had any problems in using the module. From the analysis, it is found that most of the pre-service teachers did not have any problems in using the module. However, two participants highlighted that they faced problems. One participant said that the online iPhone/android app crashes but on laptop version is good. Another pre-service teacher said that he/she had problems relating suggested problems to the literature/ resources. When asked if there were any problems or challenges faced,

during the implementation of the Online Case-Based Problem-Solving module, the lecturer suggested that more time should be allocated. Two pre-service teacher interviewed suggested that the module is lengthened.

The pre-service teachers also provide their feedback on the limitations of the module. The pre-service teachers said that they would like to watch more videos of actual teaching. The pre-service teachers said that time were the main limitations of the implementation of the module. One pre-service teacher highlighted that those with slow internet capacity would have problems accessing the video.

The pre-service teachers suggested that there should be more authentic case scenarios on ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes. They also agree that this module is suitable to be infused in the ESL writing course. They would like to watch a variety of teaching styles and have wider perspectives of authentic teaching scenarios. When asked if the lecturer thinks there should be more case-based learning videos of actual lessons online for problem-solution analysis and for teachers to view, she said yes, and suggested videos of different levels, locations, more scenarios of teachers teaching English, writing genres, approaches, and also to learn from the teachers' experiences and stories. When asked if there should be more authentic case scenarios on teaching ESL writing in the Malaysian context available online for learning and problem solving purposes, the pre-service teachers in the interview affirmed that there should be more because it will be helpful for them to know the realities of teaching, and to make comparisons form the strengths and the weaknesses of the lessons.

When asked if the lecturer has any suggestions to improve this Online Case-based Problem-Solving Module, she said that module is good for her and that more time should be allocated to cover all the theories. The pre-service teachers suggested

that this module be made into a course, as teaching writing is not easy and a domain that needs more attention. The pre-service teachers suggested that the module be included in the writing methodology course. From the interview, it is found that the pre-service teachers believe that the case-based learning method can bring prominent positive outcomes and should be implemented in education courses. It could assists in students' preparation at various levels. The pre-service teachers suggested that the module be implemented with students from other universities as participants to share their views, and also students from various semesters. The module should be introduced to all the students who are going for practicum teaching.

Since this is a prototype to investigate the effectiveness of the OCBPS module, the findings determine if the module is to be expanded with more examples of authentic teaching scenario and improvements done to minimise the constraints posed by the initial implementation in this study.

Implications of the Study

There are two main implications in this study; theoretical and practical implications. In the development of a new module, considerations should be given to the theories, principles and models that support the rationale for developing a specific module. There are many learning and cognitive theories and adopting those that are relevant to the current education scenario is important in the development of any module. This study has highlighted some of the theories that are significant to the case-based learning pedagogy.

The practical implications are discussed as to how the processes undertaken can provide guidance and framework as to the steps and initiatives needed to integrate meaningful, relevant, authentic and constructive approaches and pedagogies into the

curriculum or even to design new and transformative curriculum to meet the demands of the current situation, stakeholder needs, institutional needs, educators, students' and the demands of the current global needs specific to education conditions.

The theoretical and practical needs are discussed in the following sections.

Theoretical Implications and Recommendations. The findings are being supported by the theories and principles that underpin this study. The development of the OCBPS module synthesizes from several theories such as Pedagogical Content Knowledge (Shulman, 1986; 1987), Technological Pedagogical Content Knowledge (Koehler and Mishra, 2009), Constructivism (Dewey, 1938; Driscoll, 1999), Social Constructivism (Vygotsky, 1978), Situated Cognition (Brown, Collins & Duguid, 1989) and Anchored Instruction (Bransford & CTGV, 1990). These learning, cognitive and instructional theories have great potential to provide references on how people think, learn and gain knowledge, skills, and holistic growth.

Those who wish to develop a module can gain some insights from this study as to the importance of seeking reference base and guidelines from well-entrenched theories in the development of any modules. There has never been any OCBPS Module for ESL Writing Instruction developed with a combination of these theories as a reference base and rationale for its development. This study adds to the repertoire of knowledge on how significant theories can be leveraged on and innovated in the development of an OCBPS module for ESL writing instruction.

It is important to revisit the principles of teacher knowledge to ensure the relevance of the curriculum specifically in teacher education curriculum reviews. Shulman suggested that the domain of teacher knowledge should be a combination of pedagogical content knowledge (1986; 1987). In this century, the importance of technological knowledge revisits the initial domain suggested by Shulman.

Technological Pedagogical Content Knowledge by Koehler and Mishra (2009) provides a significant foundation for teacher knowledge in the 21st century. From the implementation of this OCBPS module, it is found from the problem-solution analysis that knowledge of educational psychology and teacher's personality emerge as important domains that need attention. Psychological factors and teacher's personality pay an integral part in effective instructional practices. While having technological pedagogical content knowledge has been proven to be significant teacher knowledge, psychological and personality factors should not be overlooked.

Case based learning supports the five principles of constructivism suggested by Driscoll (2005). The five principles are (1) embedding learning in complex, realistic, and relevant environments, (2) providing for social negotiation as an integral part of learning, (3) supporting multiple perspectives and the use of multiple modes of representation, (4) encouraging ownership in learning, and (5) nurturing self-awareness of the knowledge construction process. Other instructional strategies derived from Driscoll's principles that support case-based learning are situated cognition, and anchored instruction (Robinson, Molenda & Rezabek, 2008).

In the design and development of the OCBPS module, these theories in combination provided the source of reference. There have never been any modules integrating these theories in combination ever designed and developed. The findings of the evaluation phase are supported by these theories and have proven that the principles and foundations of these theories are consistent with the findings of this study. The combination of theories for the OCBPS module can be used as a guide to design and develop new modules. Hence, it is recommended that in the design and development of any new pedagogical or instructional modules or models, getting a source of references from existing theories and current, evolving theories is essential.

This study adopted Merill's first principles: (1) learning is promoted when learners are engaged in solving real-world problems; (2) Learning is promoted when existing knowledge is activated as a foundation for new knowledge; (3) Learning is promoted when new knowledge is demonstrated to the learner; (4) Learning is promoted when new knowledge is applied by the learner; (5) Learning is promoted when new knowledge is integrated into the learner's world. Problem solving through online case-based learning can adopt Merill's first principles because the main aim of the instruction is to engage learners in solving real-world problems.

The models proposed by Choi and Lee (2009) and Jonassen (1997) for case-based learning serve as a guide in the development of the OCBPS Model in this study consisting of seven stages in the instructional process, which are: (1) Identification of problems; (2) Analysis and brainstorming ideas for possible solutions; (3) Reviewing the literature for evidence-based support; (4) Deliberating on solution proposed and providing justification; (5) Presenting solutions; (6) Feedback on solutions (7) Reflecting on solutions.

The theories, principles and models in this study add to the repertoire of knowledge on the analysis, design, development, implementation and evaluation of the OCBPS Module for ESL Writing Instruction. It is recommended that future design and developmental research connects new and evolving theories, principles and models to make instruction more innovative.

Practical implications and recommendations. This study can provide the framework and guidelines on the processes undertaken for the design and development of a case-based learning module for problem-solving in teacher education through Design and Developmental Research. In designing and developing any module to address arising, current and pertinent issues, analysis of needs are required to

determine the need for the specific module to be developed. In addition, experts input, views and perspectives are significant to the design and developmental phase of the module to ensure that the module has reliability, and credibility based on valid data. The implementation and evaluation phase determines the usability and effectiveness of a new module. With these processes in mind, new module can be developed to present practical solutions to practical problems. The OCBPS module provided innovative and practical solutions on the need to enhance teacher knowledge and vital skills in pre-service teachers. This aligns with the government's aspirations to prepare teachers and students for skills needed in the 21st century, such as problem-solving skills, and to raise the standards of education toward international standards (MOHE, 20015). It is recommended that more models and modules be developed in innovative ways for human capital development.

The following sections provide the discussion on practical implications and recommendations specifically for the Ministry of Education (MOE), Ministry of Higher Education (MOHE), teacher education institutions, teacher educators and pre-service teachers.

Practical Implications and Recommendations for MOE and MOHE. The Malaysian Education Blueprint (2015-2025) aspires for the citizens of Malaysia to have access to quality education and human capital development (MOE, 2015). This is also the aspiration of Vision 2020. The MOE and MOHE are stepping up initiatives to fulfil the aspirations and visions of improving the quality of education, the quality of teachers and students. The mastery of the English Language is important to be able to be literate and gain access to materials of various disciplines which are mainly in English. This can help with the progress of the country.

This study has the aspirations of the government in mind in the development of the OCBPS module. The findings from the evaluation phase show much strength in the module in addressing issues inflicting the current situation in schools and teacher education institutions. MOE can continue to step up its measures for professional development and reflective practices of teachers. This OCBPS module has the potential to provide a platform for professional development and reflective practices through analysis of actual teaching of ESL writing instruction that is accessible online. More modules adopting similar principles can be developed as an effort to produce quality English teachers who are better prepared to help students, especially those with low proficiency in rural contexts to gain proficiency in English.

Practical implications and recommendations for teacher educators. It is recommended that there are collaborative efforts amongst educators in schools and teacher education institutions and higher learning institutions, with support from MOE and MOHE, to share a platform to discuss the alignment of theory and praxis. This is to reduce the mismatch of the aspects being taught in teacher education courses and those that are inherently needed in the workplace. The National Education Philosophy and Teacher Education Philosophy need to be translated in the teacher education curriculum. The development of the OCBPS module is part of an initiative to provide a platform for collaborative efforts among school educators and teacher education educators providing the potential for networking professionally.

Glasgow (1997, p. xvii) suggest that looking at the real world for guidance and inspiration can create more relevant educational environments and this should be considered when reforming, restructuring and fine-tuning education. Problem-solving are the requirements of life, hence classroom activities should reflect a greater connection to the conditions found in students' outside experience (Glasgow, 1997, p.

xxi). According to Glasgow (1997) the problems must come from the industry and the types of problems "must be a reflection of contemporary situation or a creative juxtaposition of contemporary understanding and past understanding" (p. 58).

The networking amongst English teachers and TESL lecturers can help with the training of future English teachers to be more prepared for the profession through relevant instructional and curricular inputs. It is also to enable future teachers to be trained for the various contextual and situational factors that make teaching of English more challenging and help them be more prepared. The findings from the evaluation phase of this study show that modules like the OCBPS for ESL instruction has the potential to prepare future English teachers for the problems they are likely to face in their profession, especially in the rural contexts amongst low proficiency learners, and how to tackle and address such problems professionally.

There are challenges involved. Getting teachers to be recorded for best practices, problem-solution analysis, reflective practices and practical improvements are difficult. Many are not willing to be recorded while teaching and this is one of the challenges of the case-based learning module. With understanding that the case-based learning approach has a potential for teachers' and future teachers 'growth and professional development, more teaching and learning examples can be leveraged on. It is recommended that more modules that provide opportunities for the sharing of practices be developed for the alignment of the curriculum towards professional practice and preparation, and to be trained with the analysis of well-reasoned solutions to practical and contextual problems.

It is also recommended that the OCBPS Module for ESL Writing Instruction be integrated in the TESL Writing Methodology Course, and Practicum Workshops. The case-based learning module can be designed to prepare future English teachers to

teach other skills such as reading, grammar, listening, speaking and literature. The OCBPS module may be adopted in other teacher education courses as being suggested in the evaluation phase of this study.

Practical implications and recommendations for pre-service teachers. This OCBPS module is developed to prepare pre-service teachers for teaching, development of problem-solving skills, pedagogical content knowledge, and to bridge theory and practice. The findings of this study in the evaluation of the module shows that the module has many strengths such as, it develops problem-solving skills, pedagogical content knowledge, collaborative learning and communication, higher order thinking skills, bridge theory and practice, and preparation for teaching. It also develops life-long learning, and reflective practices, gives confidence in teaching ESL writing, interesting and applicable to the teaching profession. It is useful relevant, helpful, and encourages the reading of relevant material for support on problem-solution analysis. It encourages pre-service teachers to be autonomous. These are the skills needed in pre-service teachers.

It is recommended that pre-service teachers use modules that upgrade their skills, knowledge and competency. They should engage in professional discussions and development, and continue learning even when they have become teachers. This ensures that they are updated with current trends and issues, approaches, methodology, and innovative ideas and practices that will help them become teachers of expected quality. Pre-service teachers can use their gadgets for learning purposes, and leverage on technology for learning and professional growth. Pre-service teachers can benefit from the OCBPS module. The OCBPS module in this study is available online and can be used to analyse best practices, engage in problem-solution analysis, and reflective

processes. It can help pre-service teachers for preparation of practicum and the teaching profession as indicated in the findings.

Contribution to the Field of Knowledge

In teacher education, preparing future teachers with skills that they can use in the future is crucial. There is a need to produce teachers who are intelligent with the ability to apply pedagogical and content knowledge effectively, and adopt critical problem solving skills when faced with real-world challenges so that they can make wise and informed decisions. This study is significant in that it provides information on the potential of case-based learning in teacher education programs for developing problem solving skills, enhancing pedagogical content knowledge, bridging theory and practice gap, developing of higher order thinking skills, and in the process preparing pre-service teachers for teaching.

This study involves the process of collecting data from panel experts, teacher educators and pre-service teachers on the need, design, development and evaluation of the OCBPS module. The study provides data on how to develop an online case-based problem-solving module and the processes involved. These data may help potential developers and designers of modules, teacher educators and teacher education programs in developing case-based learning modules, and to integrate them in the curriculum. Hence, this study provides a framework for teacher educators, policy makers, teachers, researchers, MOE, MOHE, and those interested in developing instructional online case-based modules for improving content and pedagogical problem solving skills, and other skills essential for educators.

Teacher educators and prospective teachers from teacher education institutes, public and private higher learning institutions may find the perspectives gathered on

problem solving through OCBPS module useful in carrying out their academic responsibilities through the lenses of this study. The problem-solution analysis is appended (Appendix 19).

The OCBPS module provides an online case of a real teaching scenario for analysis of problems, issues and solution generating processes in ESL writing instruction amongst pre-service teachers. It provides a resource in the form of an online video case for easy retrieval and accessibility for instructional purposes in the TESL writing methodology course. In the constructivist learning approach success in instruction using technology is measured in terms of "knowledge that is deeply understood, experienced, and able to be applied to real world problems as opposed to less authentic or embedded measures of learning, such as objective tests" (Januszewski & Molenda, 2008, p. 6). Robinson, Molenda and Rezabek (2008) contend that educational technology through various formats can facilitate learning within the concept that emphasizes the understanding that learners control and own learning. With this rationale, case-based learning is important in the current study using instructional technology in its implementation. It caters to current trends of taching, learning and innovation through MOOC. This is the novelty of this research because the case is customized and contectualized based on experts'input and is available on MOHE's official learning platform, MOOC.

This study provides a prototype of an authentic case online for engaging pre-service teachers in problem-solving practices, specifically ESL writing instruction. There is no such study done thus far, hence, this study contributes to the field of knowledge on the development of an Online Case-Based Problem-Solving Module for ESL Writing Instruction integrating Merrill's First Principles of Instruction, Case-

Based Problem-Solving Models, theories that enhance teacher knowledge such as PCK and TPACK, progressive theories of Constructivism, and the Case Method.

Further Research

This study designs and develops a module for the TESL teacher education program specifically the TESL writing methodology course. It is recommended that further studies be carried out in other disciplines, and other methodology in TESL courses such as reading, grammar, literature, English for Specific Purposes, and others. It may even be adapted to other disciplines, such as mathematics education, science education, leadership and management, sports education, childhood education, art education, counselling, education psychology and other teacher education disciplines.

The pre-service teachers suggested that there should be more authentic case scenarios of ESL writing instruction in the Malaysian contexts available online for learning and problem-solving purposes. They would like to watch a variety of teaching styles and have wider perspectives of authentic teaching scenarios. It is recommended that further research is done using cases of different levels, locations, novice English teachers vs experienced, different writing genres, and also to learn from the teachers' experiences, stories, and best practices.

This research may be replicated to design and develop instructional and pedagogical modules to develop other 21st century skills integrating instructional principles, models and theories suited and relevant for the current millennial generation is recommended for further research.

Conclusion

It is vital for pre-service teachers to be trained to have problem solving skills that are specific to their job domain. Part of the training for TESL pre-service teachers involves teaching writing skills in the writing methodology course. Writing is a difficult skill to teach and it is important for the TESL program to fully prepare future English teachers who are able to meet the demands and ill-structured problems of teaching writing. The online case based problem-solving module in this study can be integrated in the TESL writing methodology course as a way for pre-service teachers to have exposure to the authentic ill-structured problems in ESL writing instruction. This study analyses, designs, develops, implements and evaluates an Online Case-Based Problem-Solving Module in ESL Writing Instruction through the DDR method.

The literature provides information on how online case-based learning has been used in teacher education in various programs and courses. It provides knowledge on how others have used this method in various ways, for multiple purposes, and in different education programs. This study explores the potential of online case-based learning for problem-solving in the discipline that has never been researched on, which is the TESL writing methodology.

In this study, constructivism serves as the main theory with its principles influencing other theories like social constructivism, situated learning and anchored instruction. PCK and TPACK provide the theoretical foundations of teacher knowledge. These theories provide a framework for the development of an online case-based problem solving module for pre-service teachers' preparation for their profession. Pre-service teachers will face problems that need to be attended to and exposing them to problem-solving practices will give them the skills and experience to apply strategies for solving real classroom problems. Case-based learning provides

opportunity for thinking strategically and critically about ways to solve ill-structured problems applying tacit knowledge of theories and approaches learnt.

This study adopted Merill's first principles of instruction, and the models proposed by Choi and Lee (2009) and Jonassen (1997) for case-based learning to develop a new OCBPS Model for Case-Based Problem-Solving in this study. Learning and cognitive theories, theories of teacher knowledge, problem-solving principles, and case-based learning models are synthesized to develop an OCBPS Module for ESL Writing Instruction. It is the first of its kind using these theories, models and principles to guide its inquiry.

The principles and models for online case-based learning are important to serve as a backbone for the development of the module using the same method and principles. It supports the instructional processes because of the shared goals that the module aims to achieve which is to enhance problem-solving skills among pre-service teachers. It explores models and principles that support problem-solving practices and constructivism with approaches such as the use of authentic case scenario, collaborative learning, self-directed and meaningful learning with the focus on student-centred learning instead of the traditional method of instruction.

The importance of technology for instruction cannot be taken for granted as the literature has indicated, and the development of case-based learning videos on online platforms show how this approach is gaining recognition. This approach has been researched in other areas and contexts but not for ESL writing methodology in the Malaysian contexts. The development of the module in this study explores the potential of technology as a tool to enhance learning in the 21st century and to add to the repertoire of knowledge on using an online case-based learning module in the TESL writing methodology teacher education program. The rationale for using this

approach in the TESL writing methodology course show the importance of preparing future English teachers who are able to face problems with critical and creative efforts of seeking solutions to address the multi-faceted dimensions of ESL writing

Evidence of online case-based learning for problem-solving in Teaching English as a Second Language (TESL) teacher education program specifically in the ESL writing methodology class has not been done before. This study fills the gap by developing an OCBPS Module for ESL Writing Instruction. The OCBPS module serves as a prototype for engaging pre-service teachers in problem-solving practices. Asked if the pre-service teachers and lecturer think there should be more case-based learning videos of actual lessons online, all are favourable to the idea. They think that there should be more case-based learning videos on teaching other genres of writing besides the argumentative genre shown in this module. Most of them are favourable to the prospect of having more problem-solving case-based videos online. The OCBPS module is available online and can be accessed anywhere and anytime. In addition, students can rewind, fast forward and pause to a specific part to engage in problem-solution analysis. This OCBPS module is unique and is not yet available in the TESL writing methodology course in TESL teacher education.

The setting up of case libraries for storage of cases and easy retrieval when needed for learning purposes is needed (He, Yuan & Yang, 2013). Case libraries have been developed to facilitate teaching in many disciplines especially amongst academicians. Creating a case library has been proven to be a convenient option in providing students and faculty with case-based resources that support teaching and learning (He, Yuan & Yang, 2013). So far there has not been any case library developed to provide resources for the domain of TESL writing methodology in teacher education. This study initiates future efforts of creating an online case library

comprising many case scenarios that interested parties can use for instructional purposes in the afore mentioned domain.

The Online Case-Based Problem-Solving Module for ESL Writing Instruction has never been developed before. It is developed to address issues pertaining to teacher-education that have received prominent attention. It also addresses the lack of research on the case-based learning pedagogy in an ESL writing methodology course. The development of this module is to address the lack of problem-solving skills in Malaysian students and the need to enhance this skill as proposed in the Malaysian Education Blueprint (2015-2015). At a macro level, the OCBPS module is a significant contribution to stakeholders. At a micro level, it is significant to teacher educators, pre-service teachers, policy makers, teachers, researchers, and those interested in developing instructional online case-based modules for improving pedagogical and content problem solving skills and in the process link theory and practice. This study shows the potential that case-based learning has in developing problem-solving skills, pedagogical content knowledge, bridge theory and practice, preparation for teaching, and in enhancing other skills that are essential in teacher education in producing teachers with 21st century skills. This study provides the implications that more studies of this nature is needed to provide more platforms for the training of vital skills, and knowledge growth in various domains of teacher education.

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