INTERNATIONAL INNOVATION COMPETITION

INNOCOM III 2022

e-PROCEEDING

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INNOCOM III 2022

Bandar Baru Nilai,
Negeri Sembilan.

ID NO.: P228

INTEGRATED INNOVATION AND STRATEGIES FOR TEACHING AND LEARNING IN INDUSTRIAL REVOLUTION ERA 4.0: BUILDING EFFECTIVE BLENDED LEARNING FOR MACROECONOMICS LEARNERS

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Abstrak
The teaching landscape is rapidly changing, and the technological rise of the 21st-century and widespread integration of those technologies into our society, combined with access to the internet has integrally changed teaching in just a few years. The technological advances of the world have brought many changes in the world of education. The development of information and communication technology in the era of Industrial Revolution 4.0 has had a significant impact not only on the development of the country but also on the world of education today. Today's university lecturers face difficulty in and of themselves because of this. Numerous subjects must be able to adapt and improve themselves in line with the advancement of industry 4.0. Macroeconomics is one of the less popular courses among students since it requires them to grasp concepts, theories, and statistical and mathematical principles. The failure of students to master basic statistical and mathematical skills including the skill of interpreting graphs also makes it difficult for students to understand the relationship between economic concepts and related data. In that case, the interactive method is seen as an alternative to the solution to this problem and traditional methods are no longer suitable to be applied in the learning process in the 21st century. This has inspired us to use blended learning and outcome-based education to improve students' capacity for Industrial Age 4.0 adaptation. The two semesters final examination results of September 2019/2020 for non-blended cohorts' students and September 2020/2021 for blended cohorts' students were used for data analysis. All students (899) of the respective semester were involved in this study. The outcome indicated that the implementation and application of a blended learning approach supported by technology e-learning indicate better grade point achievement for macroeconomics students in terms of academic performance in comparison to the conventional teaching-learning approach.

Keywords: Blended learning, outcome-based education, innovation and teaching and learning.

1. Introduction

The teaching landscape is rapidly changing, and the technological rise of the 21st-century and widespread integration of those technologies into our society, combined with access to the internet has integrally changed teaching in just a few years. The technological advances of the world have brought many changes in the world of education. The development of information and communication technology in the era of Industrial Revolution 4.0 has had a significant impact not only on the development of the country but also on the world of education today (Taib et al. 2020). This development has brought about a new transformation in the world of education. Today's world of education is no longer conventional but is out of the box and reaching far ahead and surrounded by an environment that is more geared towards information and communication technology and has changed the way people learn (Mokalu et al., 2022).

The process of teaching and learning nowadays is no longer limited to the classroom but can happen anywhere and at any time. Self-learning becomes one of the learnings that students are interested in at the university. Thus, the education system has undergone another evolution in educational technology when mobile learning (Mobile Learning) or m-learning was introduced to improve the level of teaching and learning processes. m-learning is a new concept implemented in the learning process and it emphasizes the ability to facilitate the learning process without being tied to the physical location of the learning process. Ahmad et al., (2018) m-learning is a way to make learning a subject more interesting and effective.

Macroeconomics is one of the less popular courses among students since it requires them to grasp concepts, theories, and statistical and mathematical principles. The macroeconomic course has six specific objectives, including (1) understanding basic economic concepts and principles; (2) connecting basic economic concepts and principles with daily life; (3) identifying and caring about current economic problems and issues; (4) fostering and developing interest and curiosity towards economic phenomena; and (5) using the knowledge and skills learned to serve as a prudent, reasonable, and responsible consumer, producer, and member of society. Failure to understand concepts in economics is among the main causes of student failure following economic learning (Yin, 2008). The failure of students to master basic statistical and mathematical skills including the skill of interpreting graphs also makes it difficult for students to understand the relationship between economic concepts and related data.

In that case, the interactive method is seen as an alternative to the solution to this problem. Abdul Rahman (2017) stated that traditional methods are no longer suitable to be applied in the learning process in the 21st century. This is because, learning patterns need to be done actively to increase the motivation of students in learning especially for courses related to numbers (Koleini, 2016). This is supported by Farozi (2016), students are unable to understand the learning content of quantitative courses such as economics, mathematics, physics, and statistics through the traditional approach because the courses require students to provide a high level of concentration to understand the learning content of the course.

This finding is supported by Sulaiman's study (2017), the delivery of the learning process using traditional methods will result in easily sleepy students and the learning atmosphere becoming bleak. This will lead to a decrease in the level of motivation of the student. Therefore, instructors need to use a variety of creative and innovative approaches in improving students' understanding (Mohamed Rosly, 2017). To ensure that the materials and activities are creative and interactive, game-based learning was applied in the teaching process such as Puzzle, Quizlet, Educaplay, and Quizizz. Games are becoming a new form of interactive content that plays an academic role in collaborative learning (Hung et al 2015).

2. Problem Statement

The macroeconomics course is a core course that is compulsory for all students who are pursuing a Bachelor's Degree program at the Faculty of Entrepreneurship and Business (FKP). This course involves concepts, and theories and requires mastering mathematical and statistical skills. Students who take this course are students. Students taking this course are students with a Bachelor of Entrepreneurship, Bachelor of Commerce, Bachelor of Retail, Bachelor of Islamic Banking and Finance, and Bachelor of Logistics and Distribution Business. Among the issues faced by the students who took this course were that students failed to demonstrate an understanding of concepts and theories and failed to apply macroeconomic theories and concepts in proposing solutions to current economic issues. Students also noted the macroeconomics course is very difficult because it involves theory and the use of mathematics and statistics.

In the current era of Industrial Revolution 4.0, universities must adapt to the development of technology, one of which is to create a conducive and enjoyable learning process. Lecturers play an important role in terms of developing innovations, ideas, or ideas for the use of technology in learning. Wana, (2011) and Yusop et al, (2011) state that the advantages of learning with technology can create an effective learning climate for students who are slow to learn, stimulate students in doing training, and be able to adjust the speed of learning can match the abilities of students. The use of technology as a medium of learning can provide different learning experiences to students and lecturers. Conventional learning focused on classroom learning alone cannot fully promote the development of student's knowledge. Therefore, self-learning through the use of appropriate technology in the process of Teaching and Learning (P&P) is a necessity for students nowadays.

3. Product Innovation

3.1 Project or innovation objectives

The main issues of this project are to pique learners' interest in learning macroeconomics through blended learning. This online teaching was conducted during the lockdown of Covid-19. Before the pandemic, this course was made face to face. When the lecture was done physically, the lecturer could interact with the students and able to communicate and explain in detail, and even for example may show how to sketch economic curves

physically. But with online teaching, a typically recorded video lecture and explaining the content of a chapter for one or two hours will bore the students. Therefore, in this blended learning, a concept of the micro-credential approach was adapted to engage macroeconomics learners with interactive teaching and learning.

3.2   Novelty

1.   This project adopted the Blending with Pedagogical Purpose Mode by Picciano (2017). This model is relevant to blended learning, where we utilize multiple technology and media, as well as support students socially and emotionally.
2.   This project integrated innovation and strategies with web tools 2.0 for teaching and learning macroeconomics.
3.   Blended Learning Provides More Interactive Educational Experience for Macroeconomics students.
4.   The multimedia application in the teaching process and learning in this project has created more effective and entertaining learning for macroeconomics students.

3.3   Creativity

As a result of the digital era and propensity toward digital transformation, educators must include computer technology in both learning and teaching. With the integration of pedagogy and technology into course design, the Pedagogical Proposal Model is one of the models that covered pedagogical objectives and activities, as well as online tools for instructors to employ. The model also provides several ways that different students might mix goals, activities, and methods. The model includes six fundamental educational goals and methods for accomplishing them.

Based on this model, every week students will be provided a series of videos for lectures, and for the selected topics, online lectures will be conducted via google meet, zoom, google classroom, and Microsoft team. Once the students watched the entire video or follow the lecture, they were given a task to complete. The learning material is uploaded in the UMK Learning Management System (LMS) known as UMK eCampus using the latest version of Moodle platform 3.11. This version of Moodle comes with a variety of

plugins that are capable of accepting web applications from outside to be planted directly on the platform creatively, innovatively, and effectively. E-campus was used to document their submission and act as an interaction medium for instructors and learning through chat boxes and forums. Minimal use of WhatApps was also incorporated into the discussion session. Regarding the evaluation, the student is required to submit their assignment through the e-learning system for the best recording. Each time students complete watching the video and do a learning activity and submit an assignment, the system will automatically capture the student attendance for that week.

3.4   Innovativeness

The conventional teaching approach has to be redesigned; this is a more important advancement. Students were interested in the subject matter, and teachers had plenty of time to design the lesson before beginning the session, whether it was synchronous or asynchronous. This course allowed students to internalize and make sense of the knowledge they received in addition to the range of relevant items on the e-campus online platform.

There were divisions based on the course's CLOs for this 14-week curriculum (macroeconomics). Starting to divide subjects into categories and plan lessons for each week. Before the video lectures, all course content, activities, and assessment were created using web tool 2.0. The instructional videos were chosen to last 5 to 15 minutes each. This is in line with the micro-credential theory, which holds that pupils will be able to focus best on shorter videos.

This project is to ensure that students for the macroeconomy course can achieve all course learning outcomes (CLOs) utilizing blended learning by using a more engaging and effective web tool. Therefore, careful arrangement in the course planning towards blended learning is made in detail in ensuring that the student's learning time (SLT) can be fulfilled. The selection of the appropriate web tool is also a point of weight. For synchronous, online lecture delivery via google meet, zoom, google classroom, and Microsoft team. For asynchronous delivery with the use of video recordings, teaching recordings, animated videos and for evaluation such as quizzes and tests using applications in UMK e-learning, google form, quizzes, Kahoot, puzzle, and flashcard. The findings from the analysis of student achievement made for each course learning outcome showed that student achievement was better as well as the findings from the course assessment showed that students could better understand the course content.

3.5   Applicability

This project of blended learning or OBE has been proven able to produce students to become creative and active in self-learning. The active and creative learning process is continued in synchronous discussions through the forum, google meet. The potential for students' skills is seen to have developed through the assessment of the courses given, where students can understand well the economic problems in case studies, can solve the

problem by proposing appropriate solutions and policies, able to make a good presentation of case studies, students can understand macroeconomic theories and concepts well through achievements measured through quizzes and tests, and students can report on current issues of the global economy.

To achieve the objectives of this study, the two semesters' final examination results of September 2019/2020 for non-OBE cohorts' students and September 2020/2021 for OBE cohorts' students were used for data analysis. All students (899) of the respective semester were involved in this study. Comparison of students' academic performance as shown in Table student's academic performance in terms of grade point average, the findings revealed that blended learning students score higher than non-blended learning students. There is a significant difference in the mean grade point average between blended learning and non-blended learning students with a p-value of 0.001 and mean grade points of 3.2 and 2.3 respectively.

	N	Mean	Standard deviation	p-value
Non-Blended cohort	459	3.2	0.5393	0.0001
Blended cohort	440	2.3	0.4400	0.0008

Table 1

The findings suggest that the students following the blended structure and technology e-learning support are more active learners as opposed to a student who is following the conventional structure. Besides that, evident by students' self-learning assessment results on their learning experiences using the entrance-exit survey form which showed the average alignment level score of course outcomes is above 4.5.

In conclusion, the implementation and application of a blended learning approach supported by technology e-learning indicates better grade point average achievement in terms of academic performance in comparison to the conventional teaching-learning approach.

3.6   Impact

1. Engage in active and fun learning in macroeconomics subject towards 4.0 IR education.
2. Diversity teaching tools and improve teaching quality
3. The blended learning approach began to be implemented in the September semester of the 2020/2021 session. Around 500 students took this course each semester. With the implementation of this approach, students are seen to be able to better understand theories and concepts in macroeconomics. In addition, students can discuss concepts and use appropriate tools/policies to solve a problem or macroeconomic issue for a given case study. Through this course, students can also report on current

macroeconomic issues globally CLO3. Where the analysis of student achievement shows that students' achievement is better after the implementation of a blended learning approach.

	September 2019/2020	**September 2020/2021**
CLO1	1.17	3.07
CLO2	2.63	3.12
CLO3	3.15	3.41

(Note: CLO1: Discuss issues related to macroeconomic concepts and theories; CLO 2: Apply relevant concepts and tools to address macroeconomic problems; CLO 3: Discuss macroeconomic current issues and challenges in the context of macroeconomic problems)
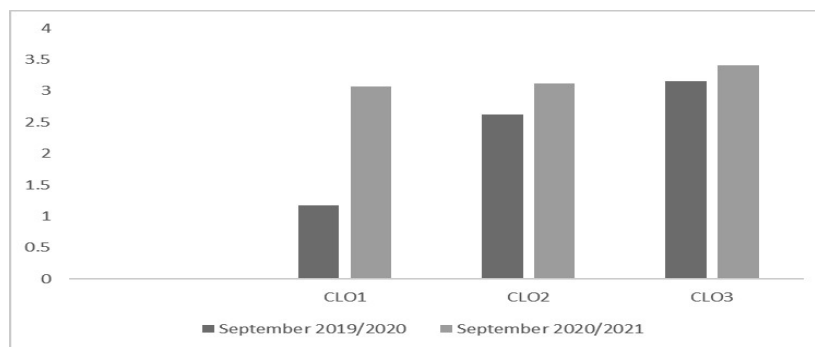
3.7   Relevance to government policy

1.   Global online learning is a shift in the Malaysian Higher Education Development Plan for the years 2015–2025. One of the accomplishment objectives for this transition is blended learning.
2.   The future of learning online for the system Malaysian higher education is centralized to global quality standards, increased access as well as equity which ensures the group who have less chance of getting Take advantage of it. The ministry plans to make online learning and blended learning the cornerstone of the curriculum to provide access to this knowledge.
3.   Offer access to SDG 4 in quality education with alternate Blended Study helps meet both present and future educational demands by combining technology used with concurrent conventional learning also SDG8 in decent work opportunities and economic development
4.   Towards Industry Revolution 4.0. Analytics integrated with the platform Learning Management System (LMS) to add value to learning specifically the profile of engagement and progress information-based students.
5.   Enhance value-based Students and Educators. In the 21st century students and educators take advantage of technology. The latest ICT in enhancing effectiveness Learning. Students and educators can cross physical boundaries to inter interpret on the global stage

4. Research Methodology

The two semesters' final examination results of September 2019/2020 for non-blended cohorts' students and September 2020/2021 for blended cohorts' students were used for data analysis. All students (899) of the respective semester were involved in this study. Analysis based using mean, standard deviation, and p-value were employed to make a comparison of students' academic performance.

5. Finding and discussing the project or innovation

In conclusion, the implementation and application of a blended learning approach supported by technology e-learning indicate better grade point average achievement for macroeconomics students in terms of academic performance in comparison to the conventional teaching-learning approach.

5.1 Commercialization potential

The content of this blended macroeconomic course can be used as a course that can be offered on a micro-credential basis at the faculty. Preparation of structured content by lecturers, where each chapter contains content such as videos, activities, and even assessments. This is in line with the procedure for preparing the course on a micro-credential basis. Therefore, this course has the potential to be offered or commercialized as a micro-credential course. Relevant and support the initiative of APEL-M by the Malaysian Qualification Assurance (2021) where academia can replicate the Micro-credential modules.

5.2 Publication

Nordin, N.H., Nordin, N.N., & Nordin, N.I (2021). The Successful Factors of Online Learning   For Malaysia Higher Education Students: Smart PLS-SEM Analysis. Conference   Presentation, 9th International Seminar of Entrepreneurship, Business and Technology   26-27 September, 2021, Universiti Malaysia Kelantan.

Nordin, N.H., Nordin, N.N., & Nordin, N.I. (2022). The Successful Factors of Online Learning   For Malaysia Higher Education Students: Smart PLS-SEM Analysis Lectures Notes in   Networks and System (LNNS). Springer. Index by Scopus, INSPEC, WTI Frankfurt eG, zbMath, Scimago).

5.3 Achievement

Blended Achievement, Makroekonomi, AFT1093, Semester February 2021/2022, Universiti   Malaysia Kelantan

Blended Achievement. Makroekonomi, AFT1093, Semester September 2021/2022, Universiti Malaysia Kelantan

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