Original Paper

Research on the Design of a Systematic Teaching Model Based on "Duifene" E-learning Platform: A Case Study of Macroeconomics

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Abstract

Driven by advances in digital and intelligent technologies, innovative teaching approaches have exerted profound impact on Lecture-Based Learning model. Such creative attempts have also been introduced into undergraduate Macroeconomics instruction. However, to date, these approaches have only targeted certain disciplinary characteristics of Macroeconomics and have failed to establish a comprehensive and systematic teaching model. This study starts with the accurate identification of major issues derived from student evaluation feedback on the conventional teaching model. Based upon these identified issues, four teaching modules integrating offline face-to-face instruction and online flexible learning are proposed to tackle the aforementioned problems. Subsequently, a complete implementation pathway for a systematic teaching model based on the "Duifene" e-learning platform is put forward. This systematic teaching model consists of a three-dimensional blended teaching and learning system, as well as a comprehensive learning and evaluation system. Finally, an evaluation of teaching effectiveness of designed systematic teaching model along with an analysis of the challenges encountered in practical implementation and corresponding potential countermeasures are proposed.

Keywords

Teaching Module Reform, Macroeconomics Instruction, Systematic Teaching Model, "Duifene" e-learning Platform

1. Introduction

With the advancement of digital and intelligent technologies, the emerging teaching methodologies involving Massive Open Online Courses (MOOCs), cloud classroom and blended online and offline

teaching model have posed a significant impact on traditional Lecture-Based Learning (LBL) method (Chunming Yang & Guorui Ren, 2023). As a compulsory course in international trade and economics at undergraduate level, Macroeconomics serves as a theoretical foundation and guiding role in cultivating students' economics literacy and analytical thinking. It becomes a cornerstone for students to understand the national economics operational principles and the associated macroeconomics policies.

However, the merit of this course is heavily impinged by the conventional Lecture-Based Learning (LBL) method (Jing Huang, 2025). It's hard to deny that the course itself is characterized by complexity, abstractness, reality and applicability, which poses challenges especially for newcomers with limited knowledge background. Meanwhile, as the teaching audience are post-2000s generations, the associated learning and cognitive characteristics have undergone significant changes. As a theoretical course, it contains significant portion of relatively abstract contents, which tends to suppress the learning motivation and enthusiasm of the students of post-2000s generations. Moreover, those students have grown up in the internet era, they are heavily relying on online resources, discussion forums, video platforms and even artificial intelligence (AI) to assist their learning process. Obviously, the tradition LBL method which is still surrounded with the teaching loop of "textbook + courseware + blackboard demonstrating" which may hardly stimulate their learning interest. In addition to that, the conventional LBL method hard to capture the individual differences among students especially when the class size becomes large (Yemin Ding & Hongfu Chen, 2025).

In response to problems as stated above, it is imperative to reform the teaching model of undergraduate-level Macroeconomics course. Based on the disciplinary characteristics of the course, Chinese scholars have put forward several practical approaches. It is believed that the Discussion-Based Learning (DBL) method should be integrated with the conventional LBL method to cultivate students' habit of focusing on real economic issues (Xianzhen Zhong & Dongsheng Sun, 2017). Moreover, as advocated by Chinese scholar Lili Huang (2022), the Project-Based Learning (PBL) method should be introduced into the course of Macroeconomics, and with appropriate guidance and support from the course instructor, students are able to master advanced learning skills. As addressed by Jinjin Wang (2025), the "5E" teaching model should be adopted to enable students gradually master the operational principles of Macroeconomics, and apply relevant theories to analyze the real-world economic phenomena. However, all the above-mentioned approaches only focus on certain disciplinary characteristics of the Macroeconomics course and fail to establish a comprehensive and systematic teaching model. Furthermore, although these studies involve varying degrees of e-learning platform application, none of them clearly define the respective roles of online teaching resources and offline classroom instruction.

Therefore, this study first draws on the teaching feedback from students, who enrolled in the course of Macroeconomics, over the past five years. The objective is to clearly identify the major problems that encountered by students throughout their learning process. On this basis, a systematic teaching model based on "Duifene" e-learning platform (a smart e-learning platform tailored for Chinese educators) is

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constructed. In line with the disciplinary features of Macroeconomics, this systematic teaching model involves targeted teaching modules to respond to the problems raised by students, and integrates online teaching resources with offline classroom instruction to form a single and comprehensive teaching system. Last but not least, this study evaluates the teaching effectiveness and emerging issues arising from practical implementation of proposed systematic teaching model, and the potential countermeasures will be discussed at the end of the study.

2. Identification of Major Issues from Student Evaluation Feedback

According to the talent cultivation program, the Macroeconomics course is designed for undergraduate Chinese students major in International Economics and Trade who are enrolled in the "Sino-US 2+2 Dual-Degree" Program. Students need to complete their first two years of study at Shanghai Dianji University, and have option to apply for transferring to the College of Business at the University of Northern Iowa, USA, for the remaining two years. As a fundamental major course as well as a high-demand talent-focused course, Macroeconomics is taught through English medium instruction.

However, due to the general English proficiency limitations of Chinese sophomore students, more than half of them consider this course to be highly challenging. Based on the teaching feedback collected from students' evaluation forms over the past five years, the following four (4) major issues have been repeatedly reported.

2.1 Difficulty in Constructing a Systematic Knowledge Framework

As a core disciplinary course, which integrates the economic theory as well as English language application, Macroeconomics has distinct characteristic of "scattered but highly interrelated knowledge points". The course straddles several core modules involving national economic accounting, aggregate demand and aggregate supply model, inflation, unemployment, monetary policy and fiscal policy. Every single module contains many subdivided knowledge points, these knowledge points seem to be independent, but in reality, they are highly correlated. For instance, any adjustments in the monetary policy are likely to impact the interest rates. As a result, it is likely to influence the aggregate demand, and ultimately leading to the change in unemployment rate. Therefore, students need to master each individual topic of the macroeconomics, moreover, they need to assemble all these knowledge points in the formation of the systematic knowledge framework. Moreover, the course is mainly delivered in English, and hence, all course contents demand students' capability of English listening and reading. Unfortunately, more than 80% of the students believe it is difficult to quickly understand the terminologies as well as theoretical definitions. As a result, it is very difficult for them to understand the terminologies and definitions, or even develop a systematic knowledge framework.

2.2 Challenges Posed by Student Heterogeneity and Deficient Differentiated Instruction

Students enrolled in the Macroeconomics course demonstrate substantial disparities in both English proficiency and foundational knowledge of Microeconomics—the prerequisite course for Macroeconomics. There are approximately 20% of the students have achieved an IELTS score of 6.0 or

higher at the time of taking the course, and roughly half of this subgroup possesses a strong academic background of Microeconomics. From past teaching experience, only these students are capable of quickly adapting to the pace of Macroeconomics course.

On contrary, students who possess either limited English proficiency or inadequate prior knowledge of microeconomics have a high chance of falling behind. Unfortunately, the traditional Lecture-Based Learning (LBL) method adopts a "one-size-fits-all" teaching model, which fails to provide any tailored support according to students' diverse learning backgrounds. As a consequence, high-achieving students lack sufficient challenge within course, while the struggling students become increasingly discouraged, further widening the academic achievement gap.

2.3 Traditional Teaching Model with Limited Interaction and Weak Practical Application

The English-based Macroeconomics course often relies on a one-way Lecture-Based Learning (LBL) method whereas the course instructor delivers the course contents and students passively receiving the information. In most occasions, the classroom teaching lacks effective interactions between instructor and students, and the teaching contents normally have limited exposure to practical applications. On one side, the instructor will try to deliver majority of the course contents by using English-based courseware and demonstrate the formula derivations on the blackboard. Seldomly, the instructor is likely to involve the case studies or the group discussion section within the classroom teaching. As a result, students will have very limited motivations to study the contents which is not relevant to their daily life.

On the other side, the entire course is disconnected from the real-world economic scenarios. As a result, majority of the students fail to apply the macroeconomic theories into the real applications. In summary, the traditional teaching model with very restricted interaction and limited practical application, it is believed that it impedes the development of students' professional competencies.

2.4 Inadequacies of Conventional Assessment in Evaluating Students Competence

The conventional assessment of Macroeconomics course primarily relies on the final examination. Such assessment method requires students to memorize various macroeconomic terminologies and theories as well as apply various abstractive macroeconomic models to tackle the theoretical problems, rather than evaluating students' ability to adopt the knowledge in economic reasoning, or even to analyze any real-world economic scenarios.

Majority of the examine formats are still based on the combination of true or false, multiple-choice, terminology explanation, short-answer and calculation questions. Such rigid exam evaluation system failed to assess students' ability effectively to explain real-world economic phenomena and to provide effective countermeasures to tackle existing challenges. As a consequence, the exam-oriented evaluation system only encourages students' passive learning skill rather than the active learning capability.

3. Teaching Module Design Aligned with Course Disciplinary Characteristics

In order to tackle the above four major issues repeatedly identified from the past year student evaluation feedback, this study proposes the following four teaching modules, which is believed to be perfectly cooperate with the disciplinary features of the undergraduate Macroeconomics course.

3.1 Teaching Module 1: Refinement of Teaching Resources and Teaching Methodology

The first teaching module is aiming to handle the difficulties encountered by students in constructing a systematic knowledge framework. The course of Macroeconomics has disciplinary features of piecewise concepts, numerous economic models, and relatively weak logical connections. Therefore, the first teaching module is designed to assist students on integrating this piecewise knowledge into a complete knowledge framework. The ultimate objective is to enhance their learning efficiency as well as develop the information processing and presentation skills, which can be utilized in the professional career.
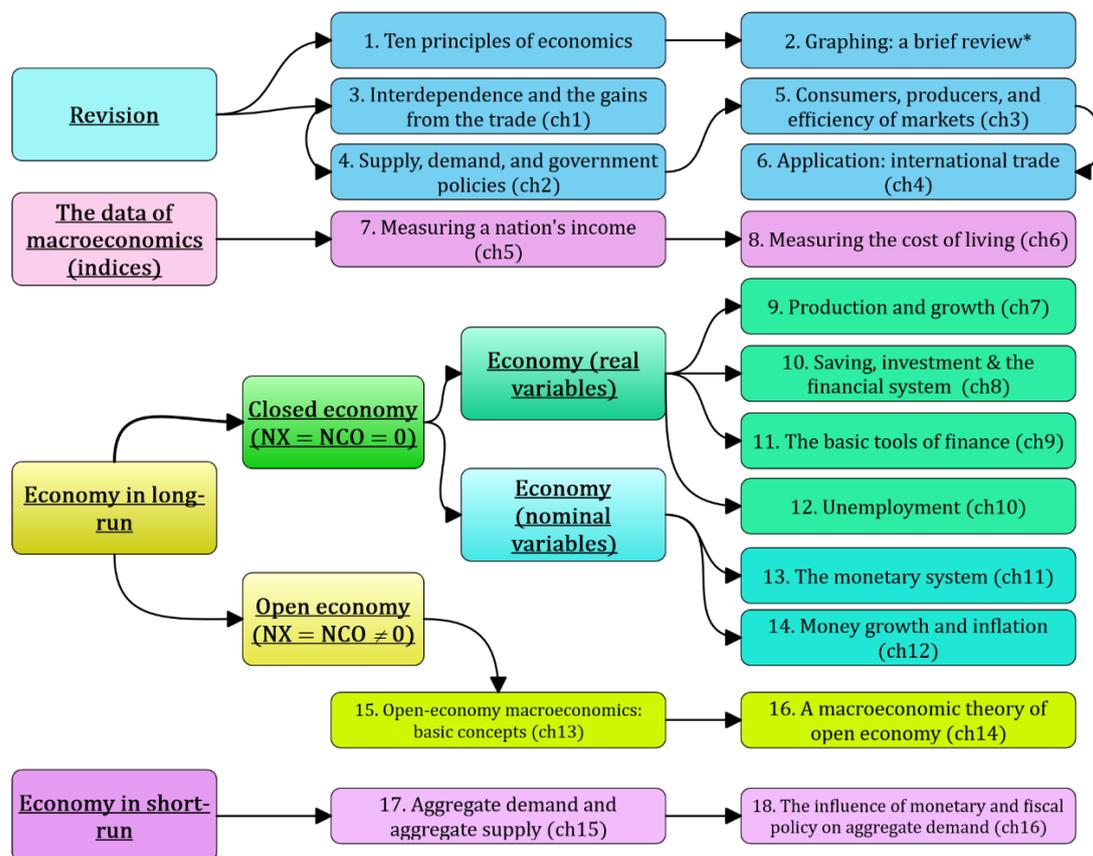

Figure 1. A Comprehensive Knowledge Framework of Undergraduate Macroeconomics

The designed module contains two individual components. The first component is lying on the design and development of the teaching resources. There are eighteen specially designed courseware corresponding to eighteen chapters. At the beginning of each courseware, the entire knowledge framework of Macroeconomics, as illustrated in Figure 1, is provided to help student in understanding

the course structure.

The second component integrates the offline lecture-based instruction as well as demonstrative teaching method. With the assistance of mind maps and writing in the blackboard in offline lectures, the piecewise knowledge can be integrated into the formation of a complete mind map, which significantly improves students' learning efficiency. For instance, when studying the concept of national accounting, students are initially demanded to memorize seven seemingly unrelated formulas, which is usually regarded as a very challenging task. However, with the assistance of the mind map provided by the course instructor, as shown in Figure 2, students can easily derive these formulas from the mind map without any difficulties. Moreover, it is believed that the derivation of these formulas is based on their understanding rather than memorizing, that is, how the capital flows across different economic sectors are clearly labelled in the mind map as described in Figure 2.
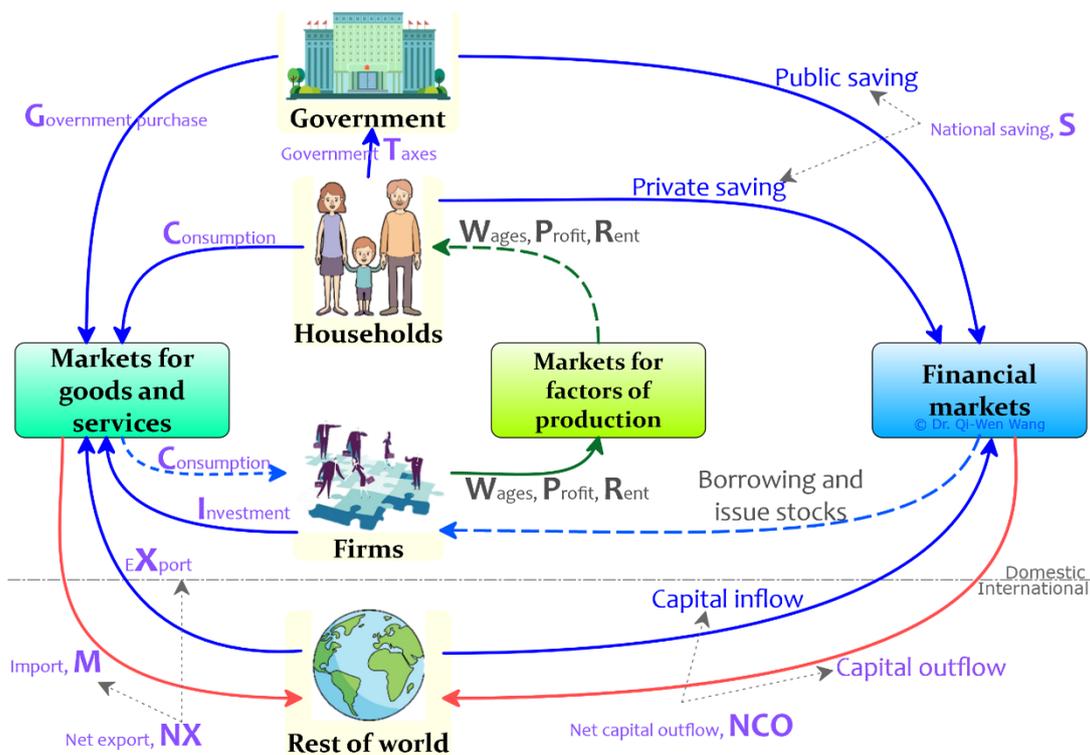

Figure 2. Mind Map of National Economic Accounting

3.2 Teaching Module 2: Development of Online Videos and Problem-based Student Project

The second teaching module aims to provide corresponding support for students with different level of knowledge backgrounds. For undergraduate students either with limited English proficiency or insufficient knowledge background of microeconomics, studying in an English-based teaching environment often presents students with the challenge of "language understanding" and "professional content absorption". Due to the deficiencies in English listening and reading skill, these students find it is difficult for them to extract the key information from the offline lectures. As a result, this portion of

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the students will demand course instructor to spend additional time and efforts on language-related explanations. By doing so, it significantly reduces the class engagement of high-performing students due to the lack of in-depth explanation towards professional content and sufficient theoretical challenge.

Therefore, this module also consists of two individual components, the first one focuses on the development of online instructional videos. There are 30 online instructional videos have been prepared and uploaded to the "Duifene" e-learning platform. These instructional videos are mainly designed for students with limited English skills or inadequate knowledge background of microeconomics. It is believed that these videos will assist these students to preview the course contents or pick up the missing information after attending the corresponding offline lectures. It is worth to note that there is a clear boundary between offline lectures and online instructional videos, that is, the offline lectures focus on systematically organizing the teaching contents and building up the knowledge framework for each chapter. The online instructional videos, on the other hand, is dedicated on explaining various English terminology, which is frequently employed in Macroeconomics, and introducing the entire derivation process of various macroeconomic models.

The second component is mainly designed for high-achieving students. These students will be appointed as student group leaders to carry out the student projects. It begins with an assessment to develop top-performing student's learning profile and the identification of the direction of the real-world economic scenarios which are closely associated with Macroeconomics course.   After that, high-quality reading resources closely related to the selected student project topic, including the research journals, cooperative reports as well as reference books, will be provided to these student group leaders via "Duifene" e-learning platform. The course instructor will provide a detailed instructional guide that clearly describes the objectives and the major problems need to be resolved for each topic. Students enrolled in different student groups should work independently and collaboratively with others to complete the project. They may also seek help from the course instructor, or they may share their intermediate findings via "Online Discussion Forum" module which is available on "Duifene" e-learning platform, and ultimately deliver a presentation during the offline class section.

3.3 Teaching Module 3: Construction of Online Exercises, Active/Passive Information Collecting and Tutoring System

The objective of the third teaching module is to tackle the insufficient interaction and weak practical application related to traditional teaching model. The implementation of this teaching module is to upload a large number of course related questions and associated explanations into the "Duifene" e-learning platform. By employing the "Online Exercise" functional module of "Duifene" e-learning platform, students are enabled to self-evaluate their learning progress towards each chapter of the Macroeconomics. Moreover, by referring to the explanations preloaded by the course instructor, students can gain a better understanding towards their knowledge gap. All these processes can be achieved digitally and automatically.

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After completing the revision tasks for each chapter, students are demanded to complete the corresponding online exercises. By doing these exercises within the time limits, they may clearly understand what is their learning problem towards different chapters. Meanwhile, by reading the detailed analytical explanations preloaded by the course instructor for incorrect answers can help students to have a consolidate understanding towards the course content. Moreover, students are allowed to repeat these online exercises prior to the deadline set by the course instructor, and the "Duifene" e-learning platform will record down how many times they have attempted the online exercises and the score for each attempt.

At the same time, the teaching team has realized "active interaction" and "passive interaction" loop with students with the assistance of "Duifene" e-learning platform, as illustrated in Figure 3.
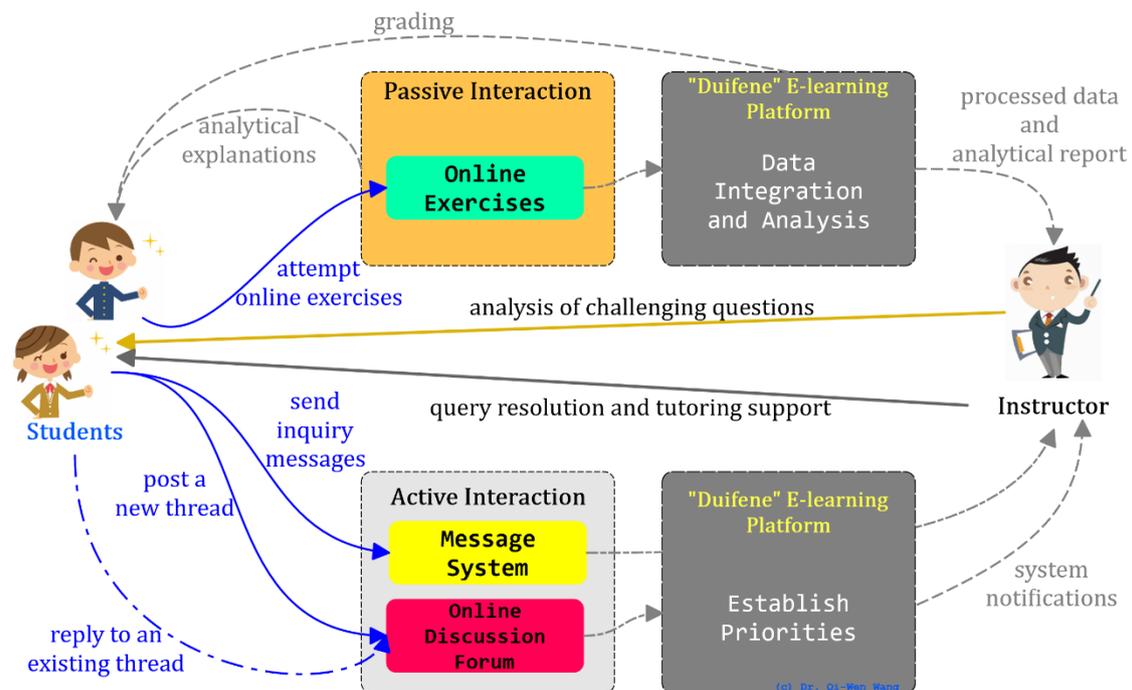

Figure 3. Active/Passive Information Collecting and Tutoring Mechanism

The "Active interaction", as indicated on bottom loop of Figure 3, refers to students' proactively question-raising via two channels of the "Duifene" e-learning platform: sending inquiry messages via "Message System" module, or posting a new thread in "Online Discussion Forum" module. The inquiry messages are automatically forwarded to the course instructor. On the other hand, thread posted on the forum may receive responses from high-performing students. Any thread remains unanswered after three business days will trigger an automatic system notification to the instructor. Ultimately, the instructor provides responses and tutoring support for all these inquiries.

The "Passive interaction", as specified in the top loop of Figure 3, refers to the "Duifene" e-learning platform collecting relevant information from students' online exercises. The embedded function of

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"Duifene" e-learning platform can collect data and generate an assessment report to inform students about their strength and weakness towards different topics in Macroeconomics. Such information is also accessible for the course instructor, by referring to such information, the instructor can refine and optimize the courseware of Macroeconomics, and therefore, improving the students' overall learning efficiencies.

3.4 Teaching Module 4: Assessment Reform for Continuous Tracking of Students' Learning Process

Unlike the conventional assessment method, which is highly relying on final examination, the proposed teaching module is designed to continuously monitor student's performance throughout the entire semester. As shown in Figure 4, the course assessment contains three major components, namely, online assignments (20% of the total score), student project (20% of the total score), and final examination (60% of the total score).
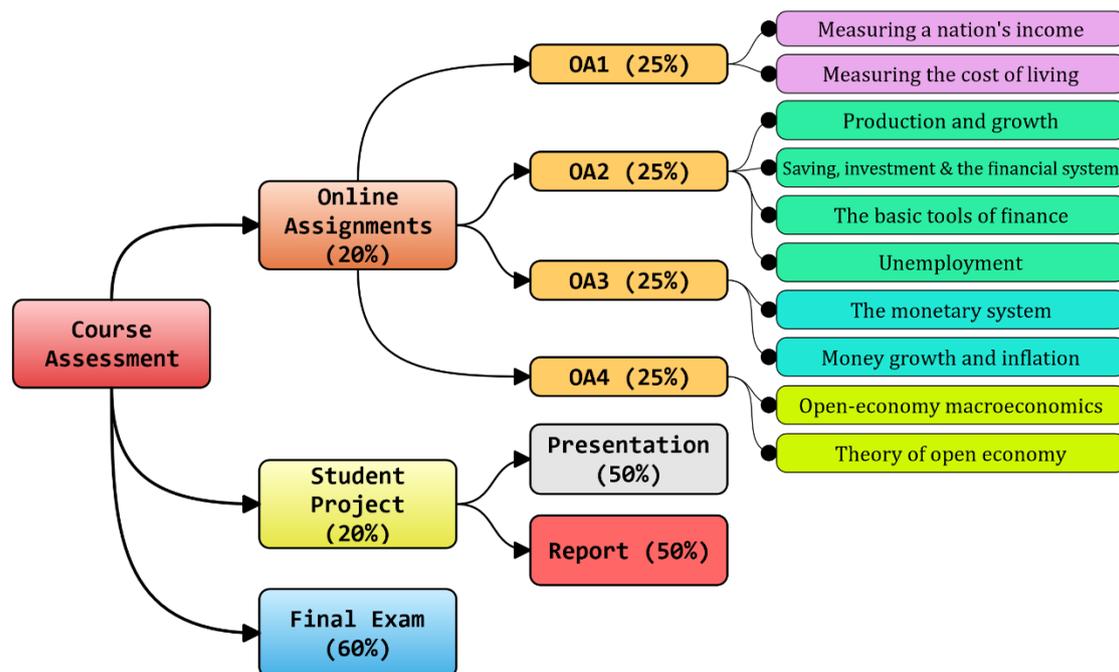

Figure 4. Design of Continuous Assessment System for Macroeconomics Course

As shown in Figure 4, there are totally four online assignments (OAs) throughout the entire semester, each OA covers different scope of Macroeconomics course. These OAs selectively include four basic question types: true/false, multiple-choice, conceptual response and calculation questions. And each OA contributes 5% of the total score. And it is worth to note, for the questions with an accuracy rate below 50% will be selectively involved by the course instructor in the final revision class prior to the final exam. Moreover, these questions will be included in the courseware for subsequent semester.

For the student project, the entire class will be divided into groups of no more than 8 students, and one of them is appointed as the group leader. Each group is led by a high-performing student who achieved the highest total scores of OA 1 and OA 2. The appointed group leaders have right to select any topic

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and corresponding time slot for presentation from a list provided by the course instructor. The remaining students (excluding the group leaders) can then voluntarily join any existing project groups. During their assigned time slot, groups are demanded to present their findings towards the topic and they are required to answer the questions raised from course instructor or other student groups (known as the audience).

The evaluation of project presentation is based upon five major criteria: learning attitude, the degree of completion, group participation, presentation quality, and slide design. The group presentation accounts for 10% of the total score, all group members will receive the same score provided by the course instructor. After the completion of presentation, each student (no matter the group leader or member) needs to submit a project report to the instructor. Such project report is employed to determine the individual contribution towards the student project. And this project report will account for another 10% of the total score. It is believed that such evaluation method not only access the performance of each individual but also how students are managed to work as a team.

4. Implementation of Systematic Teaching Model Based upon "Duifene" E-learning Platform

The implementation of systematic teaching model demands the course instructor to have a deep understanding towards the various functional modules embedded in "Duifene" e-learning platform. Section 4.1 aims to lay down the working principles of these functional modules from the students' as well as the course instructors' perspective. By integrating the offline classroom teaching and online platform application, Section 4.2 combines the advantages of offline class interaction and online flexible learning at different stages of the teaching and learning process. The objective is to promote the implementation of designed systematic teaching model.

4.1 Core Functional Modules of the "Duifene" E-learning Platform

The "Duifene" e-learning platform offers 20 functional modules to support a wide range of potential applications in online teaching and learning scenarios. However, in our design of systematic teaching model, there are only six core functional modules will be employed, namely, Course Resources, Online Exercises, Project, Group Allocation, Online Discussion Forum and Message System. As the working principle of Message System is very similar to that of E-mail. It is not be covered in the following explanation. For the remaining five functional modules, the student-end application and instructor-end application corresponding to each module will be described in Table 1.

Table 1. Student-end and Instructor-end Application of Functional Module in "Duifene"

Functional Module	Student-end Application	Instructor-end Application
Teaching Resources	1. Download the courseware materials. 2. Watch online instructional videos contents.	1. Upload the course materials and online instructional videos. 2. Track courseware download frequency and instructional video viewing progress.
Online Exercises	1. Complete online exercises and self-assess learning progress. 2. Review analytical explanation for incorrect answers. 3. Finish the phased online assignments.	1. Import the test banks with detailed analytical explanations into the platform. 2. Monitor students' mastery of knowledge across different topic areas. 3. Evaluate students' overall academic performance for the course.
Group Allocation	*Student leaders*: select topic and presentation time slot from the online list. *Other students*: join the project group led by various student leaders.	1. Provide a list of research topics, and define the objectives and key problems to be addressed for each topic. 2. Grant topic-selection permission to student leaders.
Project	1. Obtain the supporting materials related to the project topic. 2. Submit the project report on the presented topic.	1. Upload the reference materials and guidelines corresponding to each project topic. 2. Collect and grade the project reports via the platform.
Online Discussion Forum	1. Post a new thread on course-related topics, which may include inquiries about solutions or the initiation of open discussions. 2. Reply to an existing thread.	1. Provide professional guidance via replying to existing thread. 2. Award bonus marks for outstanding solutions or insightful contributions made by students.

4.2 Collaborative Integration of Offline Instruction and Online E-learning Platform

The proposed systematic teaching model establishes a three-dimensional blended teaching and learning system as well as a comprehensive learning and evaluation system, which integrates offline classroom instruction with an online e-learning platform.

4.2.1 Three-Dimensional Blended Teaching and Learning System

As illustrated in Figure 5, the three-dimensional blended teaching and learning system is composed of pre-class preparation, in-class interaction, and post-class revision stages.
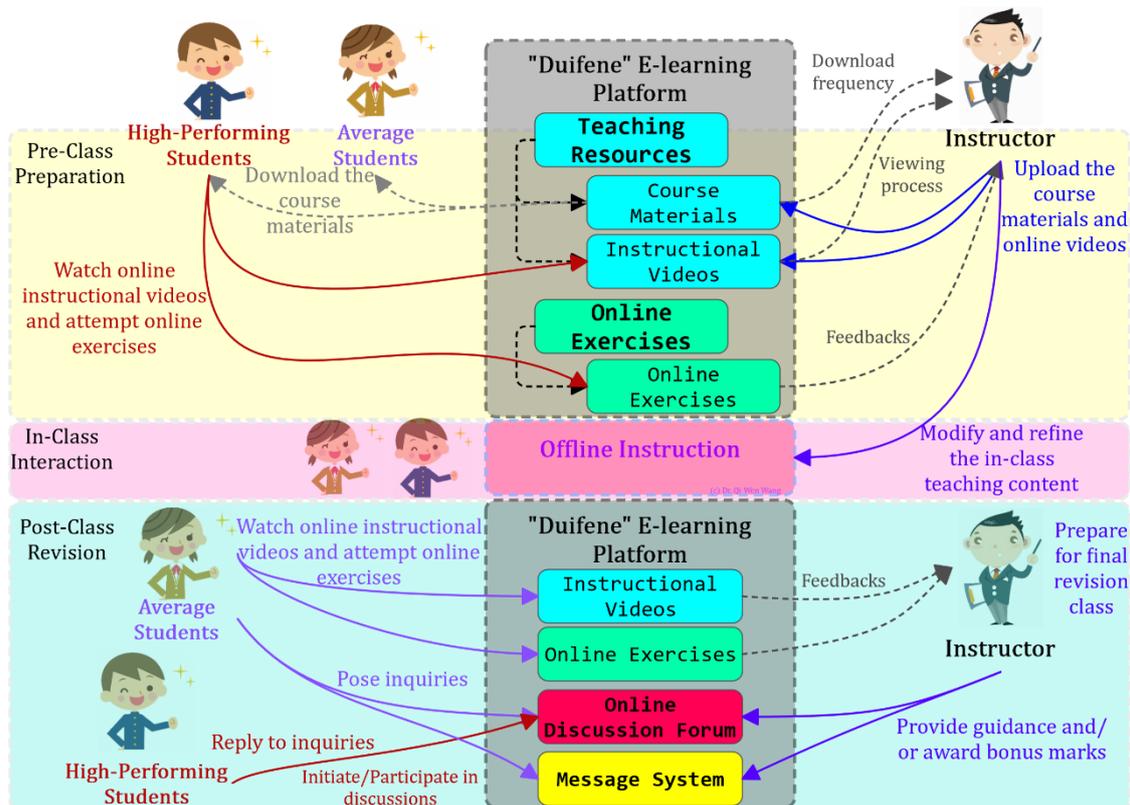

Figure 5. Three-dimensional Blended Teaching and Learning System

During the pre-class preparation stage, the teaching team uploads course material and pre-recorded instructional videos to the "Teaching Resources" module of the e-learning platform. Students are required to download the course relevant materials to their laptops or tablet computer before attending the corresponding lecture. The high-performing students are likely to watch the online instructional videos and complete the online exercises before the corresponding offline lecture. They are encouraged to bring questions arising from watching the online instructional videos or the incorrect answers from attempting the online exercises to the offline lecture session. At the same time, the instructor can easily monitor the download frequency of the course materials and students' instructional video viewing progress. In addition to that, based on the performance of the online exercises achieved by these students, instructor can easily identify students' strength and weakness of each chapter. By referring to such information, the course instructor can then adjust and optimize the in-class teaching courseware as well as the teaching strategies.

During the in-class interaction stage, the objective of course instructor is to demonstrate how to integrate fragmented knowledge into one complete knowledge framework. In addition to that, the

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students' weakness as identified from the pre-class online exercise will be reinforced via targeted case analyses and associated real-world examples. At the same time, the students who bring pre-prepared questions to class can significantly improving their learning efficiencies towards the course.

During the post-class revision stage, the average-achieving students may review the online instructional videos to minimize the knowledge gaps from offline lectures and complete the relevant online exercises. Using the automatic grading function of "Duifene" e-learning platform, they can conduct self-assessment to identify their own learning deficiencies. Moreover, they may refer to the detailed analytical explanations preloaded by the instructor for incorrect answers to achieve in-depth comprehension and consolidate their mastery of the course content. Meanwhile, the instructor can collect the feedback information from the "Duifene" e-learning platform. Such information can assist course instructor to refine and optimize their course materials for the final revision class as well as the courseware for subsequent semester.

If any students, especially average students, have any inquiries towards the course content, they have the option to post a new thread in the "Online Discussion Forum" module of the "Duifene" e-learning platform. At the same time, students, especially the high-performing students, are encouraged to reply these questions. By doing so, they can enhance their understanding towards the course and improve their academic writing skill. If a thread remains unanswered for three business days, the course instructor will then provide the professional guidance towards the topic. Meanwhile, the instructor should periodically review the answered threads and allocate bonus marks to the top contributors. Alternatively, students may also seek assistance from the course instructor by sending a message via "Message System" module. At any time throughout the course, students are encouraged to initiate or actively participate in discussions within the "Online Discussion Forum" module.

4.2.2 Comprehensive Learning and Evaluation System

As shown in Figure 6, the comprehensive learning and evaluation system, on the other hand, continuously monitors the academic performance of all students enrolled in the course of Macroeconomics.

For the online assignment section, the course instructor is likely to preload all online assignment questions and reference answers in the "Online Exercises" module of the "Duifene" e-learning platform. Students are demanded to complete all these four online assignments (OAs) before each deadline. The e-learning platform will automatically access these online assignments based on the reference answers, and deliver the final scores of students to the course instructor. The course instructor will pick the top 10% of students who excelled in the first and second online assignments (*i.e.*, those who have achieved the highest total scores). These students will be appointed as the group leaders for subsequent student project section.

Within the student project section, the instructor should first upload the project topics and specify the presentation time slot for each project in "Group Allocation" module of the "Duifene" e-learning platform. Moreover, the instructor will grant permissions to all appointed student leaders. The granted

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students have permission to pick project topics of their interest. And other students will join these existing student groups within the same module. After that, the course instructor will upload the reference materials and guidelines for each project topic in the "Project" module.
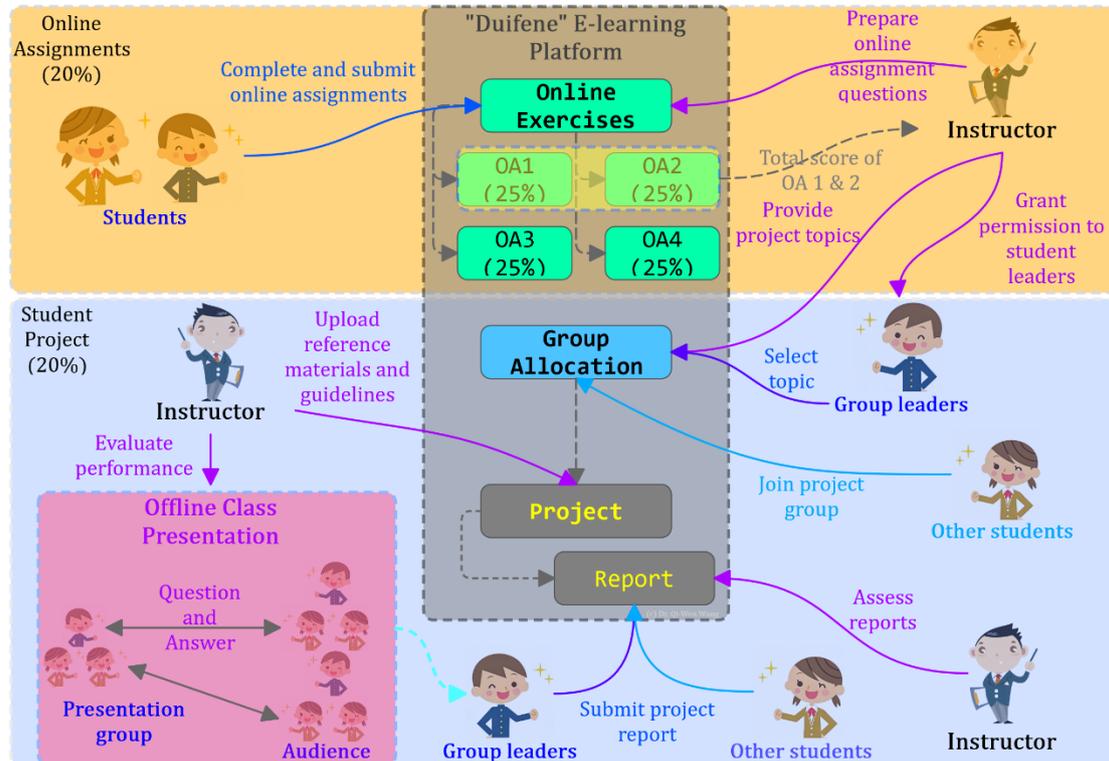

Figure 6. A Comprehensive Learning and Evaluation System

Accordingly, students may download the reference materials and guidelines to support their completion of presentation slides and prepare for the offline class presentation. Each group of presentation need to present their findings on the selected topic during the offline class session at the corresponding time slot to the audience (other student groups and instructor). Moreover, the presentation group need to answer any question raised by course instructor as well as other student groups.

The course instructor will then evaluate each group's performance based upon five criteria: learning attitude, level of completion, group participation, presentation quality, and the design of the slides. After the completion of the presentation, the group leader as well as the group members are required to modify their project report based upon the feedback from the course instructor. They need to submit the revised project report through "Project" module of the e-learning platform. The course instructor will evaluate students' performance of the group project based upon the quality of the project report.

5. Practical Reflection and Countermeasures of Proposed Systematic Teaching Model

5.1 Evaluation of Teaching Effectiveness

This study deliberately selected 124 undergraduate students who major in International Trade and

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Economics (Sino-US Program) at the Business School of Shanghai Dianji University as the study object. The control class comprised 62 students from the 2022 cohort, while the experimental class comprised 62 students from the 2023 cohort. The traditional teaching method is employed in control class. And the designed systematic teaching model was utilized in the experimental class. The study covers a total of 48 teaching hours in one semester.

As shown in Figure 7, the percentage of students in high-score group (those who achieved 80 marks or above) shows no obvious difference between control class (12.91%) and experimental class (12.9%). The major difference between these two sample classes is lying on the middle-score group (those who achieved between 60 and 79 marks), the experimental class accounts for 74.19% which is significantly higher than that of control class (56.45%). Finally, in the low-score group (those who achieved below 60 marks), the experimental class successfully lower down the weightage by 17.75% in contrast to the control class. The above data indicates one fact that the performance of the experimental class is uniformly better than that of the control class within the middle-score group as well as the low-score group.

In addition to that, by referring to the students' teaching feedback from experimental class, more than 80% of the students believed that their learning efficiencies are significantly improved by watching the online instructional videos, completing the online exercises, and reading the explanations provided by course instructors for each question of the online exercises. In addition, more than 70% of students reported the advantage of the online instructional videos is lying on its flexibility. They may obtain the instant assistance as long as they have connection to the internet. Moreover, more than 65% of the students believed that the online exercises with detailed question-by-question explanations is particularly useful in preparing the final exam.
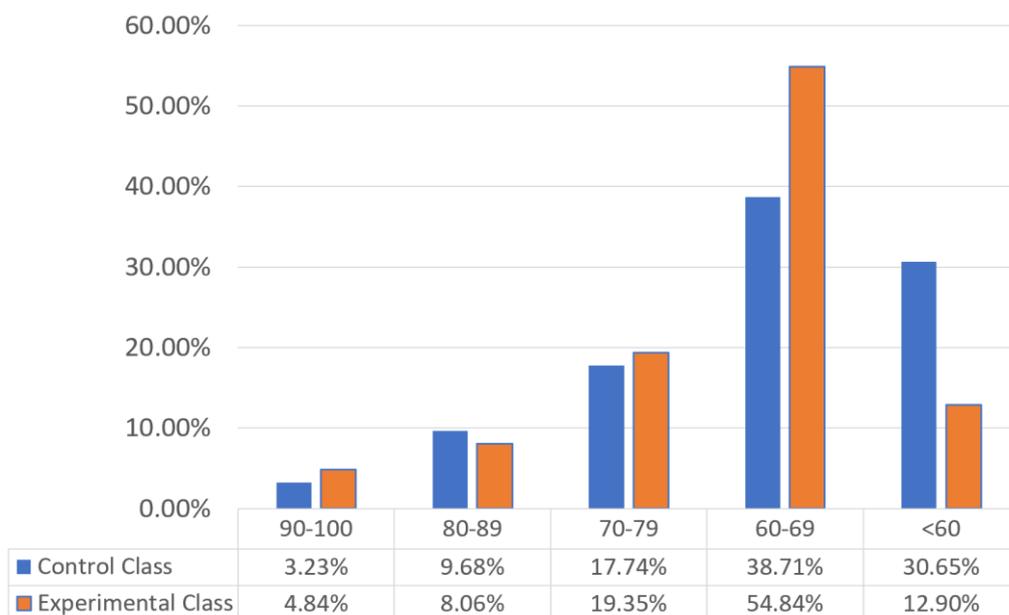

	90-100	80-89	70-79	60-69	<60
Control Class	3.23%	9.68%	17.74%	38.71%	30.65%
Experimental Class	4.84%	8.06%	19.35%	54.84%	12.90%

Figure 7. Final Exam Score Distribution (Control Class vs. Experimental Class)

5.2 Challenges in the Practical Implementation

In the practical implementation of the proposed systematic teaching model for Macroeconomics, the following two major challenges can be identified.

The first challenge is student's limited learning autonomy and low engagement in online learning. Students often lack self-directed learning ability, especially in pre-class preparation. According to the data generated by "Duifene" e-learning platform, only less than 10% of the students are likely to watch the online instructional videos before the corresponding offline lectures, and this situation becomes even worse in the latter half of the semester. In addition to that, less than 5% of the students complete the online exercises before the offline lecture sessions. As a result, it is believed that only a very small proportion of students can fully benefit from the advantage of ample online learning resources. This also explains why the high-score student group (those who achieved 80 marks or above) in the experimental class was nearly identical to that of the control class, as indicated in Figure 7.

According to the data extracted from the e-learning platform, more than half of the students begin to attempt these online exercises in the last two weeks before final examination. Owning to the problematic time management, fewer than 40% of these students are able to complete all online exercises in one attempt. The utilization of the "Online Discussion Forum" module of e-learning platform proved unsatisfactory. Average-performing students seldom initiate new threads to pose questions. They prefer to send inquiries directly to the instructor instead. Furthermore, even when high-performing students do create new discussion topics, the course instructor is the sole active respondent.

The second challenge is lying on the difficulty in effectively assessing student's comprehensive learning outcomes. Even the core working principle of the proposed systematic teaching model is lying on the online-offline blended teaching methodology. However, no matter the online assignment and the final examination are still belonging to the traditional assessment methods. They are aiming to testify students' memory of theoretical knowledge rather than their practical abilities or online learning performance such as online discussions or practical simulations. Indeed, assessing online learning outcomes is often difficult due to the lack of effective monitoring and evaluation devices. Some students may completely skip the online instructional videos, copy answer to online assignments, or participate in online discussions superficially to meet the course requirements, but course instructor has no effective way to identify such behavior.

In conclusion, without an effective assessment system, students lack motivation to actively participate in online and offline learning activities, and teachers cannot accurately understand students' learning progress and adjust teaching strategies accordingly, which ultimately affects the effectiveness of the proposed teaching model.

5.3 Potential Countermeasures

To address the first challenge, potential countermeasures should be proposed at different phases of the systematic teaching model. The best solution to enhance pre-class preparation is lying in the

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introduction of lightweight pre-lecture tasks. For instance, a simple in-class quiz section should be arranged by the course instructor. The scope of such in-class quiz should only include the teaching contents available in online instructional videos. The objective is the monitor student's online learning progress. The result of these quizzes should also reflected in the final score of the Macroeconomic course. Moreover, it the middle and late stages of the academic semester, the system notification should be repeatedly delivered to those who failed to complete the online instructional videos or online exercise on time.

Moreover, it is believed that the phased deadlines for online exercises should be established at the beginning of the semester, rather than leaving all deadlines on the end of the semester. It is believed that real-time learning progress reports and system notifications can assist students in developing reasonable time management skills. Furthermore, in order to fully activate the online discussion forum, the guided discussion topics and incentives for participation should be provided by the course instructor. All the above-mentioned strategies can significantly enhance the students' learning autonomy and improve their engagement towards the online learning.

To handle the problem of ineffective assessment of students' comprehensive learning outcomes, the core strategy is to establish a diversified, process-oriented comprehensive assessment system balances theoretical knowledge, practical abilities, and online learning performance, replacing the over-reliance on online assignments and final examination.

The first task is to replace the traditional objective-oriented online assignments with the scenario-based questions, case analyses, and/or group collaborative tasks to better evaluate the students' ability to apply theoretical knowledge and participate in interactive learning. The second task is that the learning portfolios should be introduced to document student's online learning records. By doing so, it is possible to capture students' learning process and developmental progress.

At the same time, it is believed that the course instructors' capability of designing and implementing intergraded assessment practices may also influence the effectiveness of the assessment system. Therefore, it is essential for instructors to regularly participate in teaching seminars and academic forums to exchange the assessment experiences with peers of the same discipline. In addition to that, instructor should form a closed-loop mechanism of "assessment – feedback – instructional adjustment" to continuously improve the overall teaching effectiveness.

Funding Project

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