

**PERCEPTIONS OF COLLEGE STUDENTS'
ACADEMIC MOTIVATION AND HIGHER
ORDER THINKING SKILLS IN
THE CONTEXT OF OUTCOME-BASED
EDUCATION WITHIN HYBRID LEARNING IN
CHINA**

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THE CONTEXT OF OUTCOME-BASED
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CHINA**

by

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As my PhD journey draws to a close, lots of emotions come to my mind. I experienced joy, hesitation, helplessness, slowly into the state of steady progress until the moment writing of acknowledgement part, still marvelled at the time flies. I slowly changed in the whole process, gradually into the best.

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LIST OF ABBREVIATIONS

ABET	Accreditation Council for Engineering and Technology Education
ACM	Academic Motivation
AMT	Academic Motivation Theory
AM	Amotivation
AMS	Academic Motivation Scale
AVE	Average Variance Extracted
BFH	Blended, Flipped and Hybrid Learning
BL	Blended Learning
BPNT	Basic Psychological Needs Theory
CET	Cognitive Evaluation Theory
COT	Causality Orientations Theory
CITC	Corrected Items-Total Correlation
CNKI	China National Knowledge Infrastructure
CQI	Continuous Quality Improvement
CR	Composite Reliability
CTT	Cognitive Taxonomy Theory
DVs	Dependent Variables
EFL	English as a Foreign Language
EM	External Motivation
F2F	Face to Face
FCA	Fundamental Computer Application
GCT	Goal Contents Theory
HEIs	Higher Education Institutions
HL	Hybrid Learning
HOTs	Higher Order Thinking Skills
IM	Intrinsic Motivation
IVs	Independent Variables
KMO	Kaiser-Meyer-Olkin
LOTs	Lower Order Thinking Skills
MS	Microsoft
NHC	National Health Commission of the People's Republic of China

OBE	Outcome-based Education
OECD	Organization for Economic Cooperation and Development
OIT	Organismic Integration Theory
PISA	Programme for International Student Assessment
RMT	Relationship Motivation Theory
SC	Student-Centered
SDT	Self-Determination Theory
SML	Students' Motivation Level
TCM	Traditional Chinese Medicine
TEFL	Teaching English as a foreign language
VIF	Variance Inflation Factor
WOS	Web of Science

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**PERSEPSI MOTIVASI AKADEMIK DAN KEMAHIRAN BERFIKIR ARAS
TINGGI PELAJAR KOLEJ DALAM KONTEKS PENDIDIKAN
BERASASKAN HASIL DALAM PEMBELAJARAN HIBRID DI CHINA**

ABSTRAK

Motivasi akademik dan kemahiran pemikiran aras tinggi adalah dua mekanisme atau enjin yang boleh mendorong proses pembelajaran bagi pelajar-pelajar kolej di China yang menjalani persekitaran pengajaran hibrid. Namun, bacaan literatur menunjukkan kurang pendekatan yang boleh disesuaikan untuk diaplikasikan dengan strategi pengajaran bagi menentukan persepsi dan hubungan motivasi akademik dan kemahiran pemikiran aras tinggi. Selain itu, Pembelajaran Berasaskan Hasil (OBE) menjadi asas teori yang jitu bagi kajian ini. Kajian ini bertujuan untuk mengkaji persepsi pelajar terhadap kurikulum pembelajaran hibrid, motivasi akademik, dan kemahiran pemikiran aras tinggi mengikut model pembelajaran hibrid berasaskan OBE. Kajian ini juga mengkaji hubungan motivasi akademik pelajar (motivasi intrinsik, motivasi luaran, dan amotivasi) dan kemahiran pemikiran aras tinggi (menganalisis, menilai, mencipta, menyelesaikan masalah dan pemikiran kritis) dalam intervensi pengajaran. Kajian ini mengadaptasikan kaedah campuran bagi mendapatkan penjelasan secara berurutan dengan menggunakan tiga survei dan temu bual kumpulan berfokus. Penyelidikan ini melibatkan 150 pelajar ijazah pertama dari lapan jurusan yang berbeza di sebuah universiti dipilih secara persampelan berstrata. Seterusnya, temu bual lanjut dijalankan dengan 10 pelajar daripada sampel yang sama. Analisis data kuantitatif dijalankan menggunakan SPSS, dengan menganalisis faktor eksploratori, analisis deskriptif, dan analisis regresi linear berganda. Analisis tematik digunakan untuk mengategorikan, menilai, dan

menjelaskan maklum balas daripada sampel kumpulan berfokus. Dapatan penyelidikan menunjukkan bahawa pelajar mempunyai persepsi yang kuat terhadap pembelajaran hibrid berasaskan OBE dan persepsi sederhana terhadap motivasi akademik dan kemahiran pemikiran aras tinggi. Keputusan daripada regresi linear berganda menunjukkan kesan yang signifikan terhadap tiga elemen motivasi akademik dan lima faktor kemahiran pemikiran aras tinggi. Daripada pengujian juga, didapati 25 daripada 30 hipotesis yang dicadangkan dalam kajian ini didapati disokong. Selain itu, dapatan daripada temu bual kumpulan berfokus sangat bersesuaian dengan hasil yang dijangka daripada analisis regresi linear. Oleh itu, kajian ini menyediakan satu garis panduan untuk institusi pengajian tinggi China dalam menggunakan kaedah pengajaran hibrid untuk meningkatkan tahap motivasi akademik dan kemahiran pemikiran aras tinggi pelajar melalui penubuhan persekitaran pembelajaran interaktif yang bersesuaian.

**PERCEPTIONS OF COLLEGE STUDENTS' ACADEMIC MOTIVATION
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OUTCOME-BASED EDUCATION WITHIN HYBRID LEARNING IN
CHINA**

ABSTRACT

Academic motivation and higher order thinking skills are the dual engines driving the learning process of college students in China which is undergoing a period of hybrid teaching environment. Yet, it lacks a reliable approach to apply instructional strategies to determine the perception and relationship of academic motivation and higher order thinking skills. In addition, outcome based education (OBE) provides a strong theoretical foundation for this study. This study intends to examine students' perceptions of a hybrid learning curriculum, academic motivation, and higher order thinking skills following an OBE-based hybrid learning model. This study also investigates the relationship of students' academic motivation (intrinsic motivation, external motivation and amotivation) and higher order thinking skills (analyzing, evaluating, creating, problem solving and critical thinking) within the teaching intervention. This study analyzed the adoption of an explanatory sequential mixed approach using three surveys and focus group interviews. The research selected 150 undergraduate students from eight different majors at a selected University by using stratified sampling. Subsequently, follow-up interviews were carried out with 10 students from the similar sample. Quantitative data analysis was conducted using SPSS, employing exploratory factor analysis, descriptive analysis, and multiple linear regression analysis. Thematic analysis was used to categorize, assess, and explain the feedback from focus group members. The research indicated

that students had a strong perception of OBE-based hybrid learning and a moderate perception of academic motivation and higher-order thinking skills. The results of multiple linear regression analysis indicated significant reciprocal effects between the three elements of academic motivation - intrinsic motivation, extrinsic motivation, and amotivation, and the five elements of higher-order thinking skills, which are analyzing, evaluating, creating, problem-solving, and critical thinking. After testing, 25 of the 30 hypotheses proposed in this study were found to be supported. Furthermore, the findings from focus group interviews corresponded precisely to the expected results of the linear regression analysis. Consequently, this study suggested guidelines for Chinese higher education institutions on employing hybrid teaching methods to enhance the level of students' academic motivation and higher order thinking skills through the establishment of appropriate interactive learning environments.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Academic motivation (ACM) can be called one of the most essential concepts in educational psychology. Many studies have shown that ACM is related to various outcomes. ACM can be highlighted the importance of education (Mahendika et al., 2023; Miao et al., 2020; Natalya & Purwanto, 2018; B. Zhang et al., 2016). Students' ACM is crucial in the teaching and learning process as it helps enhance learning ability and advance higher education. In learning activities, learners' enthusiasm is directly proportional to their achievements (Kong, 2021). Thus, ACM is an essential requirement for students to accomplish their goals.

It is worth mentioning that ACM occupies a significant position in the whole learning activities for students to master knowledge and skills. The basic principles of Academic Motivation Theory (AMT) are that an individual's needs and desires influence the direction of their behaviour (Cody et al., 2021; Litalien et al., 2017). As the driving force behind actions, ACM is instigated by emotions and achievement-related goals. Relating students' performance on achieving outcomes, thinking skills are particularly indispensable in the 21st-century learning environment, such as higher-order thinking skills (HOTs), that is emphasized by higher education institutions (HEIs) (Suanto et al., 2023; Wee et al., 2020). Meanwhile, as a prerequisite for success in the 21st century, globalization, technological development, international competition, and the transnational environment have increased the urgency of the demand for HOT skills among students (Sukatiman et al., 2020; Yeung, 2015).

Higher order thinking skills including critical thinking, creative thinking, and ACM are very beneficial to the entire learning process. Some experts argue that enhancing students' learning outcomes requires the establishment of two key components: HOTS and ACM (Mahendika et al., 2023; Suanto et al., 2023). According to Mansoor and Arezoo (2014), students' ACM is seen as a prerequisite for critical thinking skills and abilities by Baglio (2022), which indicates that the role of ACM in HOTS cannot be ignored. It follows that unmotivated people are less likely to exhibit HOTS.

Furthermore, some research indicates a reversed link between ACM and HOTS. Difficult or challenging tasks, especially those that emphasize HOTS, may motivate students more than simple tasks that can be solved rote by pre-determined algorithms (Tise et al., 2019; Turner, 1995). It is worth noting that HOTS such as critical thinking, creative thinking, reflective thinking, dialogic/dialectic thinking, decision-making, problem-solving, and emotional intelligence form the hallmark of outcome-based education (OBE). They form the glue to effectively harness all the components of the OBE approach to learning (Chabeli, 2006). Thus, integrating OBE framework into the teaching process to study the effects of ACM and HOTS, will have positive impacts on the teaching process, and achieve a win-win situation of improving ACM and HOTS.

OBE is firmly established in HEIs. It has been carried out in many countries over the years, such as the USA, Canada, Australia, New Zealand, South Africa, Malaysia, and China alike (Berlach & Mcnaught, 2007; Chowdhury et al., 2018; Espiritu & Budhrani, 2015; Oriah et al., 2012; Zhao et al., 2020). OBE is an educational concept focused on students' learning outcomes. The objective of course

design and implementation are to attain students' learning outcomes by the conclusion of the educational process.

One of the lead authorities of OBE, William Spady (1994), defined the outcomes of OBE as "clear demonstrations of learning," also he explained that the outcomes were not just the things students believe, feel, remember, know, or understand. However, rather outputs were what students could do with what they knew and understood (Espiritu & Budhrani, 2015). According to Spady, OBE refers to a model of education that focuses and organizes teaching activities around the key outcomes that all students can achieve at the end of a learning period. This means starting an educational exercise with a clear vision of the learning outcome students can expect and then designing the curriculum, organizing teaching, and conducting evaluations to ensure this learning outcome are achieved.

Yang (2020) indicated that OBE highlighted four questions: "What are we allowing outcomes we want students to achieve? Why should we allow students to achieve such learning results? How can we effectively help students achieve these learning outcomes? How do we know that students have achieved these results?" As can be seen from the literature, the emphasis on achievement lies not in the course scores of students but in the actual ability of students after the learning process. OBE is a student-centered, outcome-oriented learning paradigm that values learning outcomes. Therefore, OBE is a learning paradigm that expects all students to be successful (Castillo & Castillo, 2014; Jadhav et al., 2020; Zamir et al., 2022). At the same time, OBE also undertakes a series of learning responsibilities. By assessing students' learning outcomes, this attribute will encourage schools to maintain focus on student learning and provide oversight in HEIs.

From the Third Plenary Session of the 18th Central Committee of the Communist Party of China, the concept of OBE was strengthened, and a plan was put forward. “The Outline of the National Plan for Medium - and Long-Term Education Reform and Development (2010-2020)” of the Ministry of Education, PRC (2020). This document sets out an essential task for the reform and development of higher education, which states that Chinese educators should continue to optimize and reform the system and methods of higher education, redesign the levels of disciplines, promote the integration of multiple disciplines, and cultivate application-oriented, innovative, skilled, and resourceful talents (Li, 2022; Li & Wang, 2021; Wang, 2014).

Table 1.1 List of Documents of Relevant Requirements and Regulations for the Training of Applied Talents in China (2015- 2020)

Institutions of Announcement	Documents of relevant requirements and regulations for the training of applied talents in China
NDRC & MEPRC & MFPRC (2015)	Guidelines on guiding some local ordinary undergraduate universities to transform into applied universities
CPGPRC (2017)	The 13 th five-year plan for the development of education
MEPRC (2017)	Some opinions on the deepening integration of industry and education
MEPRC (2018)	Opinions on accelerating the construction of high-level undergraduate education and comprehensively improving the ability of talent cultivation
CPGPRC (2019)	Implementing plan for the national pilot project of integration of industry and education

From 2015 to 2020, China also clarified relevant requirements and regulations for application-oriented talent training through different forms of documents. The institutions' announcement of copies of Relevant requirements and rules for the talents in China are listed in Table 1.1. The abbreviations of the National Department and Reform Commission, Ministry of Education of the People's Republic of China,

Ministry of Finance of the People's Republic of China, and Central People's Government of the People's Republic of China are NDRC, MEPRC, MFPRC, and CPGPRC respectively.

The documents listed in Table 1.1 highlighted the importance of integrating education with industry in the training of applied talents. This integration often necessitated the use of various online learning models, which provided the flexibility and adaptability needed to meet both industry requirements and students' individual learning needs. Moreover, as technology advanced, online learning became a crucial component of education, recognized by these policies for its role in enhancing students' abilities. The emphasis on combining theory with practice in these documents aligned well with the capabilities offered by online learning models, such as OBE-based learning and simulations, which allowed students to apply their knowledge in real-world contexts.

The above documents showed that students' ability development was often inseparable from different online learning models. The first study on synchronous hybrid learning which was found dates from 2003 and was a qualitative case study aimed at observing the quantity and quality of human interaction between the instructor, the on-site students, and the distant students in a blended learning course (Raes et al., 2020). In 2004, Professor He put forward the concept of hybrid learning for the first time in China. He believes that hybrid learning is separated from blended model that combines the advantages of traditional F2F teaching and remote learning, which can give full play to the leading role of teachers in teaching (Ji & He, 2004). In addition, it can stimulate students' active learning and rich creativity as the main body, so as to achieve better teaching effect. However, due to the immaturity of hardware

and software technology, hybrid learning develops slowly (Bülow, 2022). Since 2014, the concept of "Internet + education" has emerged in China (Güzer & Caner, 2014), then in the year of 2016, new online platforms have emerged one after another, such as Chaoxing, Rain Classroom, Cloud Classroom, etc., which offers multiple options for the construction of hybrid learning model in China.

Hybrid learning has gained global popularity in education field during COVID-19 (Bülow, 2022; Detienne et al., 2020). Likewise, most universities and colleges have to choose hybrid learning during the COVID-19 pandemic situation in China (Chang & Fang, 2020; Zhao et al., 2020). The benefits of hybrid learning are self-evident. When turning to this learning mode, educational institutions should incorporate various transformative methods based on models and theories (Parlakkılıç, 2014) into hybrid learning to enhance students' abilities. However, given that synchronous hybrid learning is relatively new, there are few studies that have investigated its use and effectiveness (Bülow, 2022).

Additionally, ACM of students can be increased when implementing a hybrid learning program. Students in HEIs might be more motivated by being able to enrol in such hybrid courses, and they would get used to a more independent style of study (Bowyer & Chambers, 2017). Meanwhile, the existing studies (Bülow, 2022; Szeto, 2014; White et al., 2010) provide evidence for the notion that hybrid delivery options have little to less negative impact on student learning because it results in similar learning outcomes, such as test scores (White et al., 2010), ACM, needs satisfaction, and perceived success.

1.2 Research Background

In China, OBE was first implemented in 2016, and by 2019, it was also being utilized in project application at the university level (North China University of Science and Technology, 2019a), including teacher training, framework guidance, university-level projects, and construction so that it can be better applied in teaching, to better serve students from different levels and majors. Premalatha (2019) stated that there is lack single specified teaching style or evaluation method for OBE. However, classes, opportunities, and various forms of assessment help students achieve the desired outcomes. Following Spady's theory of instruction, Espiritu and Budhrani (2015) constructed a visual representation that well explained the elements and factors as well as the sequencing of a good process of OBE construction. The steps of the OBE course design are presented in Figure 1.1. In order to design effectively an outcomes-based education program, one must first understand what students are going to do after graduation so that they can be more purposeful in their teaching activities. Then, curriculum design needs to define clear learning outcomes, project outputs, and content that is only relevant to achieving outcomes and outputs. In this way, students can feel real working with clients on projects that address real (or near real) needs in the workplace. This type of learning method has been used in medicine, engineering, economic, and other disciplines to promote learning from real-world environments.



Figure 1.1 Framework for Implementing OBE Construction

This OBE instruction is an approach that focuses on students' real outputs, which tightly correspond to the students' fundamental need for their professional knowledge and target job or work setting. In 2015, De La Salle University in Manila (DLSU), all academic departments are transitioning to an integrated OBE curriculum. Whereas in 2014, the Psychology Department held a workshop entitled "OBE: A New Paradigm for Learning and Assessment" to train teachers in OBE framework and principles. In order to implement effectively the OBE experience at the curriculum level, Espiritu and Budhrani conducted a model to encourage students to become self-engaged and self-learners in the OBE classroom. It is imperative that teachers begin the process of developing curricula by considering the "end" or "goal" which is the desired careers that students will pursue. Therefore, this framework starts with the *REAL NEED*, which sets the stage for the need analysis, then, the phase *REAL OUTPUT* ends of, and students will finally achieve the project output and meet the first phase, *REAL NEED*. Espiritu and Budhrani highlighted the difference between outcomes and outputs, which take an essential place in the whole framework. Outcomes refer to the practical application of students' knowledge and understanding. Outputs refer to tangible and concrete things that students produce, serving as evidence of the intended outcomes. Outputs serve as a method for evaluating outcomes, and within the context of OBE, it is also generated because of student projects. Therefore, the second is the *CLEAR CONTENT* phase, which consists of the concepts and processes of new materials. The third phase is *INTERRELATED OUTCOMES* which represent the tasks that students can finish. These four steps fully explain the role of OBE in the whole teaching process.

Meanwhile, according to related research, OBE can positively effect students' HOTs and ACM levels (Bhat et al., 2020; Chabeli, 2006; Duo et al., 2020; Zhou &

Zhang, 2021). In the 21st-century learning environment, higher-order thinking skills (HOTS) are emphasized by HEIs (Wee et al., 2020). As a key role for success in the 21st century, globalization, technological development, international competition, and the international environment have increased the urgency of the demand for HOT skills among students (Sukatiman et al., 2020; Yeung, 2015). Also, Zhou and Zhang (2021) and Duo et al., (2020) stated that the OBE teaching concept is focused on stimulating students' ACM, making passive learning active learning, and integrating traditional classroom teaching and online learning mode success.

The emergence of three crucial Chinese strategies—"One Belt and One Road," "Made in China 2025," and "Internet"—has been facilitated by the rapid advancement of information technology. These strategies put forward new requirements and challenges to the talent cultivation mode for Chinese universities (Zhao et al., 2020). Take North China University of Science and Technology in Hebei Province as an example, it offers a wide array of academic fields spanning across nine distinct categories, including science, engineering, humanities, medical, economic, management, law, education, and arts. Engineering and medical serve as the foundational pillars of the institution.

Since launching online teaching, the university has been striving to explore the optimal teaching mode and provide students with good teaching services. The university always used to conduct blended learning. After the three years of coexisting with the COVID-19 outbreak, local problems result in teaching and learning asynchronously are becoming more and more obvious, such as one instructor leads 180 students in three computer rooms at the same time when taking Fundamental of Computer Application (FCA) courses. In the meantime, students and teachers have to

stay in the local area until after a negative nucleic acid test (North China University of Science and Technology, 2022). This situation leads to the changing of teaching mode from blended to hybrid learning, thus, the instructor and students are in different places when taking a class synchronously. In a hybrid environment, instructors and students can share classroom activities in different places simultaneously to reach a better realization of students' learning progress.

The hybrid learning procedure in this study adapted from two model: 3 in 1 hybrid environment model (Hapke et al., 2021) and 3+3 blending learning (Zhao et al., 2020) , both of which serve as valuable references. Zhao et al. (2020) introduced a "3+3" blended learning practice model and integrated it with OBE framework to evaluate academic performance, student conduct, and teaching outcomes pre, during, and post class. This study serves as a reference for hybrid learning. The 3 in 1 paradigm (Hapke et al., 2021) comprises technology, content, and evaluation, which thoroughly explores behavioural engagement, emotional engagement, and cognitive engagement in a hybrid context.

Teachers are given the option to make use of the current teaching scenario that is made available by the Chaoxing digital platform in order to gain access to a variety of data concerning the pre-class preparation of all of their students. During the course of the learning process, for instance, the platform can be used to acquire information regarding the frequency of problem-solving efforts, the number of courseware downloads, the length of time spent in the classroom, and the patterns of classroom involvement. At the same time, it is able to utilize test results, formative assessments, and summative assessments in order to evaluate the progression of students' learning

through the utilization of digital monitoring tools. As the underlying framework for the implementation of hybrid learning, the platform serves as the infrastructure.

1.3 Problem Statement

ACM is tied closely to student learning achievement and is often considered one of the main factors that keep students learning. Students with high ACM showed more exploratory learning behaviours to get HOTS (Cody et al., 2021; Filgona et al., 2020; Li & Keller, 2018). Some essential life skills that must be mastered by students in the 21st century include the ability to think critically, problem-solving, creative, and innovative. To date, these skills are an indispensable underlying potential for learners to succeed in global challenges (Friyatmi et al., 2020). One of the HOTS that should be trained for them as a provision to face the work world is the ability to higher order thinking skills (Yusuf et al., 2021). According to Ferrer et al., (2022), especially in the age of online learning, ACM and HOTS of the 21st-century learners are required for their flexible learning opportunities.

Online learning prevail these days and it can delivery students in different learning environments (Phanphech et al., 2022). As the education sector shifts towards asynchronous online learning, the relationship between student ACM and HOTS has garnered widespread attention. In this context, several key issues have emerged, prompting a deeper exploration of their interconnections.

Firstly, low academic motivation is experienced by students in asynchronous learning environments. Research indicates that asynchronous learning often lacks necessary interaction and collaboration elements, leading students to feel isolated and unsupported (Libre, 2021). This decline in academic motivation not only affects students' attitudes toward learning but may also limit their development of higher

order thinking skills. Patwardhan and Yadav (2022) noted that students in online courses typically exhibit lower motivation and engagement compared to those in face-to-face courses, a disparity that not only impacts academic performance and thinking abilities but may also lead to decreased retention rates.

The challenges faced by asynchronous online learning, especially the lack of course engagement and ACM caused by distance between teacher and students, and many learners "drop out" without immediate interaction and feedback, make researchers rethink the interactive process of online learning and teaching (Libre, 2021; Patwardhan & Yadav, 2022). Stefan (2008) argued that although asynchronously environment provide more time for students to comprehend the message, make it not possible to monitor students' reaction and lead to less committed and motivated in learning process. This situation leads to students' low ACM. Moreover, previous findings indicate educators must consider ACM for students to interact in online setting (Libre, 2021; Stefan, 2008; Watts, 2016). In this way, students can enhance their ACM level in a positive learning environment, thus improving their HOTS.

Secondly, HOTS are essential for students' success in complex situations (Lu et al., 2021; Yusuf et al., 2021); however, students often struggle to effectively apply these skills in asynchronous learning environments. The lack of immediate feedback and interaction may result in poor performance in critical thinking, creativity, and problem-solving abilities, may also cause them to lose interest in learning (Lu et al., 2021), as a lack of confidence and a sense of capability can reduce their engagement in learning activities. Therefore, enhancing students' HOTS becomes an urgent challenge for educators.

Moreover, existing teaching strategies often fail to adequately address students' needs for ACM and HOTS in asynchronous learning environments. The lack of in-depth understanding of the relationship between ACM and HOTS makes it difficult for educators to develop effective interventions to support student learning (Cody et al., 2021; Filgona et al., 2020; Li & Keller, 2018). Thus, researching the relationship between ACM and HOTS can provide educators with more targeted teaching strategies to meet the diverse needs of students.

However, in the year 2021, the author randomly tests the level of HOTS of sophomore after taking FCA asynchronous online courses, using *Critical Thinking Questionnaire (CThQ)* adopted by Kobylarek et al., (2022). An observation has conducted to test students' HOTS. The survey result demonstrated most of students stay in the LOTS stage. According to the observation, lecturers found that asynchronous learning classes rarely require students to make class actions, which leads to their sleepiness and low ACM level in learning process.

To address these issues, a combination of OBE and hybrid learning model is considered an effective solution. OBE emphasizes student-centered learning, focusing on students' learning outcomes and skill development by stimulating their intrinsic motivation through clear learning objectives and assessment standards (Zhou, 2019; Zhou & Zhang, 2021). Moreover, many OBE implemented courses empirical studies showed that students have a positive view of the OBE approaches and perceive as well as high level thinking skill achieved in the courses (Castillo, 2014; Chabeli, 2006; Jadhav et al., 2020; Zamir et al., 2022). Furthermore, HOTS such as critical thinking, problem-solving, and decision-making form the hallmark of OBE. They form the glue to effectively harness all the components of the OBE approach to learning (Chabeli,

2006). Zhou (2019) reviewed that OBE broke the traditional teaching mode, which domain the teacher-centred knowledge input model, emphasized teachers' and students' interaction and cooperative learning, and then positively effect students' ACM.

Hybrid learning integrates the benefits of face-to-face instruction with online learning, creating a flexible learning environment that enables students to engage in synchronous learning experiences while balancing self-directed study and teacher support (Ferrer et al., 2022; Lee et al., 2020). Moreover, ACM level of students can be increased when implementing a hybrid learning program (Bowyer & Chambers, 2017). Students in HEIs might be more motivated by being able to enrol in such hybrid courses, and they would get used to a more independent style of study. Therefore, this model has the potential to enhance students' academic motivation and higher order thinking skills by promoting interaction, providing immediate feedback, and improving learning support.

Specifically, the combination of OBE and hybrid learning can effectively address the challenges between ACM and HOTs. Firstly, OBE emphasizes student-centered learning, focusing on students' learning outcomes and skill development, and stimulating their intrinsic motivation through clear learning objectives and assessment standards. This outcome-oriented teaching approach enhances students' sense of responsibility and engagement in learning, thereby improving their academic motivation. Secondly, the hybrid learning model combines the advantages of face-to-face instruction with online learning, providing a flexible learning environment that allows students to learn according to their own learning styles and pace. This flexibility not only enhances students' learning experiences but also fosters their

ability for self-directed learning, further increasing their academic motivation. Additionally, the interaction and feedback mechanisms inherent in hybrid learning can effectively promote student engagement and understanding (Ferrer et al., 2022; Lee et al., 2020). Interactive formats such as group discussions and online forums can stimulate students' thinking and enhance their HOTS. Although previous research has shown that OBE and hybrid learning each have a positive impact on enhancing students' ACM and HOTS, the combination of these two approaches to address educational challenges remains a worthy area of exploration more effectively. Therefore, OBE-based hybrid learning model proposed in this study to further enhance students' learning outcomes based on this foundation, providing educators with an effective teaching strategy to meet the diverse needs of students in learning environments.

Finally, especially in the aftermath of the COVID-19 pandemic, the rapid development of online education has led to significant changes in the educational landscape. The challenges and opportunities students face in this new environment require in-depth research to provide guidance for future educational practices. Dissecting the relationship between ACM and HOTS can help us better understand the impact of these changes on students' learning experiences.

These issues prompt the researcher to investigate the relationship between ACM and HOTS and the goal of this study is to explore the effectiveness the OBE-based hybrid learning in improving the relationship between ACM and HOTS in synchronous online learning, contributing to the enhancement of student learning outcomes in higher education. Establishing students' perceptions in an OBE-based hybrid learning environment is a crucial first step in this research, as it lays the

foundation for further exploration of the relationship between ACM and HOTs within this context. Hence, in this study, there is a need to investigate the students' perceptions of OBE-based hybrid learning and whether OBE-based hybrid learning triggers active ACM, which is necessary for learning to occur, and whether the drivers of HOTs are elements of OBE-based hybrid learning. Moreover, existing studies have not thoroughly explored the influence of OBE-based hybrid learning on the specific elements of student ACM and their HOTs. In addition, the relationship between ACM level and students' HOTs level toward OBE in hybrid learning will be conducted.

1.4 Research Objectives

This study aims to investigate the students' perception in an OBE-based hybrid learning environment, and perception of students' ACM and HOTs level toward OBE in hybrid learning courses. In addition, the relationship between students' ACM and HOTs toward OBE in hybrid learning was conducted. Therefore, this study intends to achieve the following objectives:

1. To investigate the students' perception of OBE-based hybrid learning.
2. To investigate the students' ACM level (intrinsic motivation, extrinsic motivation and amotivation) toward OBE in hybrid learning.
3. To investigate the students' HOTs level (analyzing, evaluating, creating, problem solving and critical thinking) toward OBE in hybrid learning.
4. The relationship between ACM level and students' HOTs level toward OBE in hybrid learning.

1.5 Research Questions

The researcher proposed the following questions in response to the above research objectives:

1. What are the students' perceptions of OBE-based hybrid learning?
2. What are the students' ACM level toward OBE in hybrid learning?
3. What are the students' HOTs level toward OBE in hybrid learning?
4. What is the relationship between ACM level and students' HOTs level toward OBE in hybrid learning?
 - (i) Do ACM level variables (intrinsic motivation, external motivation, amotivation) have positive or negative impact on Analyzing?
 - (ii) Do ACM level variables (intrinsic motivation, external motivation, amotivation) have positive or negative impact on Evaluating?
 - (iii) Do ACM level variables (intrinsic motivation, external motivation, amotivation) have positive or negative impact on Creating?
 - (iv) Do ACM level variables (intrinsic motivation, external motivation, amotivation) have positive or negative impact on Problem solving?
 - (v) Do ACM level variables (intrinsic motivation, external motivation, amotivation) have positive or negative impact on Critical Thinking?
 - (vi) Do HOTs level variables (analyzing, evaluating, creating, problem solving, and critical thinking) have positive impact on Intrinsic Motivation?

(vii) Do HOTS level variables (analyzing, evaluating, creating, problem solving, and critical thinking) have positive impact on External Motivation?

(viii) Do HOTS level variables (analyzing, evaluating, creating, problem solving, and critical thinking) have negative impact on Amotivation?

1.6 Research Hypotheses

The level of significance, α used for this study was 0.05. The hypotheses of this study that correspond to the research questions stated are as follows:

H₁: ACM level variables (Intrinsic Motivation, External Motivation, Amotivation) have positive or negative impact on Analyzing

H_{1a}: Intrinsic Motivation has positive impacts on Analyzing

H_{1b}: External Motivation has positive impacts on Analyzing

H_{1c}: Amotivation has negative impacts on Analyzing

H₂: ACM level variables (Intrinsic Motivation, External Motivation, Amotivation) have positive or negative impact on Evaluating

H_{2a}: Intrinsic motivation has positive impacts on Evaluating

H_{2b}: External motivation has positive impacts on Evaluating

H_{2c}: Amotivation has negative impacts on Evaluating

H₃: ACM level variables (Intrinsic Motivation, External Motivation, Amotivation) have positive or negative impact on Creating

H_{3a}: Intrinsic motivation has positive impacts on Creating

H_{3b}: External motivation has positive impacts on Creating

H_{3c}: Amotivation has negative impacts on Creating

H₄: ACM level variables (Intrinsic Motivation, External Motivation, Amotivation) have positive or negative impact on Problem Solving

H_{4a}: Intrinsic motivation has positive impacts on Problem Solving

H_{4b}: External motivation has positive impacts on Problem Solving

H_{4c}: Amotivation has negative impacts on Problem Solving

H₅: ACM level variables (Intrinsic Motivation, External Motivation, Amotivation) have positive or negative impact on Critical Thinking

H_{5a}: Intrinsic motivation has positive impacts on Critical Thinking

H_{5b}: External motivation has positive impacts on Critical Thinking

H_{5c}: Amotivation has negative impacts on Critical Thinking

H₆: HOTs level variables (Analyzing, Evaluating, Creating, Problem Solving, and Critical Thinking) have positive impact on Intrinsic Motivation

H_{6a}: Analyzing has positive impacts on Intrinsic Motivation

H_{6b}: Evaluating has positive impacts on Intrinsic Motivation

H_{6c}: Creating has positive impacts on Intrinsic Motivation

H_{6d}: Problem solving has positive impacts on Intrinsic Motivation

H_{6c}: Critical thinking has positive impacts on Intrinsic Motivation

H₇: HOTS level variables (Analyzing, Evaluating, Creating, Problem Solving, and Critical Thinking) have positive impact on External Motivation

H_{7a}: Analyzing has positive impacts on External Motivation

H_{7b}: Evaluating has positive impacts on External Motivation

H_{7c}: Creating has positive impacts on External Motivation

H_{7d}: Problem solving has positive impacts on External Motivation

H_{7e}: Critical thinking has positive impacts on External Motivation

H₈: HOTS level variables (Analyzing, Evaluating, Creating, Problem Solving, and Critical Thinking) have negative impact on Amotivation

H_{8a}: Analyzing has negative impacts on Amotivation

H_{8b}: Evaluating has negative impacts on Amotivation

H_{8c}: Creating has negative impacts on Amotivation

H_{8d}: Problem solving has negative impacts on Amotivation

H_{8e}: Critical thinking has negative impacts on Amotivation

1.7 Theoretical Framework

Constructivism concept of learning has its historical roots in the writings and have proposed by Bruner (1961), Dewey (1929), Piaget (1980) and Vygotsky (1962). Constructivism learning theory believes that "situation, groupings, bridge, questions,

exhibit and reflection" are the five elements of the learning environment. The acquisition of knowledge is when learners use the help of others in a certain situation, use the necessary learning materials, and learn based on their knowledge. It comes from the active construction of experience, emphasizing learners' meaningful structure of knowledge. A conceptual understanding of the theory, and the essential characteristics of the constructivism learning environment were discussed (Cano-Fullido & Olusegun, 2015; George, 1991; Jia, 2010; Koohang et al., 2009). Therefore, the Constructivism Learning Theory of Piaget can be considered the basis of the OBE, defined as "modelling focuses on learner-centered paradigm" by Koohang et al., (2009).

Furthermore, the OBE is an instructional paradigm centered on students' expected learning outcomes, reverse design of training objectives, curriculum system, and teaching activities, and paying attention to the effective achievement of students' training objectives and course completion requirements through the evaluation of learning outcomes. Following Spady's theory of instruction, Espiritu and Budhrani (2015) constructed a visual representation that explained the elements and factors and the sequencing of an exemplary process of OBE construction. The steps of the OBE course design an outcomes-based education program; one must first understand what students will do after graduation to be more purposeful in their teaching activities. Then, curriculum design needs to define clear learning outcomes, project outputs, and content that is only relevant to achieving results and outputs. In this way, students can feel real working with clients on projects that address real (or near real) needs in the workplace.

Spady (1994) defines OBE as engaging all students in the teaching process, being student-centered, designing and organizing instructional activities, and achieving success at the end of the learning process. This definition emphasizes that we must first clearly understand students' abilities before graduation or after studying this course, and then carry out course design, actual teaching, and after-class evaluation purposefully to ensure that the course is implemented smoothly, and students can achieve the set goals. The main basis of OBE is to produce output rather than input. The learning process is student-centered rather than teacher- or lecture-based, as in traditional methods. In designing the curriculum, learning outcomes are emphasised and pre-determined, i.e., what students can expect from teaching after graduation so that they have the necessary skills and competencies before entering the workplace? Then through curriculum design, the development of program and course outcomes, instruction, delivery models and appropriate assessment methods are set back. In order to continuously encourage learners to take the initiative to learn and discover new knowledge and experience during the learning process, thereby enhancing their understanding of the subject content, this step can be done through online or technical support.

Besides, China's education certification system has made positive and remarkable progress in recent years, and more and more universities recognizing quality improvement practices, such as "Student-Centered" (SC), "Continuous Quality Improvement" (CQI), and "OBE" (Yang, 2020). OBE has been widely used in HEIs in China, especially during the COVID-19 pandemic, where hybrid teaching is prevalent. OBE has injected new vitality into learning models in the context of COVID-19.

In addition, many studies have shown that in the teaching and learning process, ACM is related to various outcomes, and ACM can be highlighted the importance of education (Natalya & Purwanto, 2018; Robert et al., 1992; B. Zhang et al., 2016). Factors affecting students' performance such as ACM plays an irreplaceable role in developing the channel of learning ability and can push higher education forward. In learning activities, learners' enthusiasm is directly proportional to their achievements (Kong, 2021). Therefore, ACM is a vital promoter for students to achieve their goals.

In light of this, ACM occupies a significant position in the whole learning activities for students to master knowledge and skills. The basic principles of Academic Motivation Theory (AMT) which proposed by Ryan and Deci are that an individual's needs and desires influence the direction of their behavior. As the driving force behind actions, ACM is instigated by emotions and achievement-related goals. The AMT is based on self-determination theory (SDT) which is suitable for understanding a range of personal reasons, including the nature of academic motivational behavior (Cody et al., 2021). SDT suggests that people are motivated to change and grow by three innate psychological needs- autonomy, competence, and relatedness. AMT proposes four forms of motivation: extrinsic, intrinsic, physiological, and achievement motivation, driven by the need for success or the attainment of excellence.

Furthermore, discussions in higher education about students' learning skills to the Cognitive Taxonomy are a bridge that can provide a way of thinking to understand the concepts and characteristics of students' HOTs. Many kinds of CT in the former research, and the most popular one is Bloom's cognitive taxonomy well discussed. The main difference between Bloom's taxonomy of cognition and its revised version

(Anderson & Krathwohl 2001) is that the revised taxonomy contains two dimensions: knowledge and cognitive processes. Learners are divided into four types, the first is factual knowledge, including knowledge of symbols, signs, symbols, names of people and historical events; the second is the mastering of related concepts, models and theories; last, knowledge of content related to methods; the fourth involves metacognition.

Likewise, the dimension of the cognitive process consists of six levels, and the last three level mark a HOTS: (1) Analyzing-C4, refers to the ability to decompose information into more specific parts and find the connection between each part of information and the overall information, including the ability to distinguish, organize and connect; (2) Evaluating-C5, including the ability to judge things (justification) standards, also includes the ability to test and review; (3) Creating-C6, refers to the combination of different elements to form a new unity or the existing elements are recombined to form a new structure, including the process of generation, planning and production.

Salmon and Jennifer (1987) pointed out that some skills in HOTS can be assessed, including (1) problem-solving ability, and (2) decision-making ability. However, Susan (2010) assessed HOTS into three categories, namely: (1) the ability to transfer between concepts, which occurs in unfamiliar situations, and the ability to connect with others can serve as HOTS in the form of knowledge; (2) critical-thinking skills, which are the logical ability to understand problems, reflective thinking skills, argumentation skills, and can concentrate on making a decision or doing something; (3) problem-solving ability, that is, the ability to find new ways to deal with problems, or to find unusual solutions, and to be able to define problems creatively.