Journal of Creative Practices in Language Learning and Teaching (CPLT)
Special Volume 11, Number 3, 2023

Enhancing Students' Academic Motivation and Higher-Order Thinking Skills Through OBE-Based Hybrid Learning Model

Irwan Mahazir bin Ismail*
irwan_mahazir@usm.my
Center for Instructional Technology and Multimedia
Universiti Sains Malaysia, Penang, Malaysia

Zheng Zheng
zhengzheng@student.usm.my
Center for Instructional Technology and Multimedia
Universiti Sains Malaysia, Penang, Malaysia

Wang Hanxu
wanghanxu@student.usm.my
Center for Instructional Technology and Multimedia
Universiti Sains Malaysia, Penang, Malaysia

Azwin Arif Abdul Rahim
ariftesl@ump.edu.my
Centre for Modern Languages
Universiti Malaysia Pahang, Malaysia

Corresponding author*

Received: 24 May 2023
Accepted: 10 June 2023
Published: 15 December 2023

ABSTRACT
Exam-oriented education in China results in the fact that with too much reliance on traditional teaching methods, students have less need for critical or creative thinking when rote memorization has penetrated the whole course. This study analyzes the delivery mode of Fundamental Computer Application hybrid learning courses using outcome-based education (OBE) instructions. It also explores the relationship between elements of OBE instructions and students' academic motivation and higher-order thinking skills (HOTs) under the hybrid OBE-based curriculum at Jitang College, North China University of Science and Technology. Using stratified sampling, twenty of the college's 150 first-grade students became the respondents for the survey. These undergraduates registered for hybrid lectures that are mandatory for them for one semester. Three instruments were adapted, and Cronbach's α value of the hybrid learning questionnaire, students' motivation level questionnaire and level of students' HOTs questionnaire indicated good reliability for the study. The data showed the students' high agreement with the hybrid courses, and the four elements in the OBE instruction have significant relevance to the student's motivation and HOTs levels. Besides, all the OBE-based hybrid learning elements (real need, clear content, interrelated outcomes and actual output)

https://10.24191/cplt.v11i3.25104

reported a significant positive correlation with students' academic motivation and HOTs levels. The results promote positive changes in conducting high-quality FCA hybrid courses and the potentialities of the hybrid OBE-based learning model on students' motivation and HOTs levels.

Keywords: Outcome-based education; Hybrid learning; Academic motivation; Higher-order thinking skills

INTRODUCTION

The Chinese government continued to push for reforms in the education curriculum, reflecting widespread concern about the drawbacks of exam-oriented education (Chen & Zou, 2018; Dello-Iacovo, 2009; Li, 2021). The exam-oriented education has led to the realization of somewhat low learning motivation and lower-order thinking among the students. To transform teaching and learning at the university and align it with the principles of outcome-based education (OBE) concepts in higher education in China (Zhao et al., 2019), the Jitang College, North China University of Science and Technology (JCNCST) has begun to use the OBE paradigm in its teaching and learning process.

According to Spady (1982), outcome-based education refers to a model of education that focuses and organizes teaching activities around key outcomes achievable by the students at the end of a learning period. The educational exercise starts with a clear vision of the learning outcome and then designing the curriculum, organizing teaching, and conducting evaluations to ensure the achievement of the learning outcome. Premalatha (2019) stated that OBE has no specific teaching style or evaluation method. However, classes, opportunities, and various assessment forms are designed to help students achieve their desired goals. Based on Spady's theory of instruction, Espiritu and Budhrani (2015) then constructed a visual representation to explain OBE's major elements in project-based learning and their connection to depict an exemplary process of OBE course design (Figure 1).

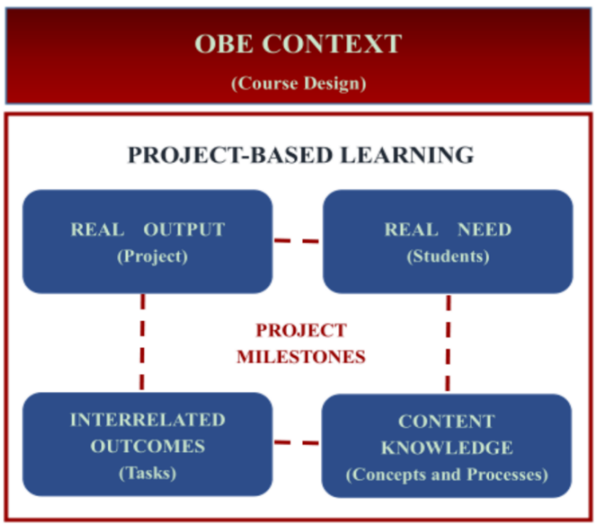

Figure 1: Framework for Implementing OBE Course

Note. This framework is adapted from Spady (1982) and illustrated by Espiritu, J. L., and Budhrani, K. (2015) in "Implementing an Outcome-Based Education (OBE) Framework in the Teaching of Industrial Psychology in *DLSU Research Congress.*

https://10.24191/cplt.v11i3.25104

Furthermore, HOTs skills such as critical thinking, problem-solving, and decision-making are the hallmark of OBE. Each skill is interconnected to effectively harness all the components of the OBE approach to learning (Chabeli, 2006; Gurukkal, 2020). Zhou and Zhang (2021) and Duo et al. (2020) also identified the OBE teaching concept as commendable in stimulating students' motivation, transforming passive learning into engaging, and integrating traditional classroom teaching and online learning modes.

On the other hand, the benefits of hybrid learning are self-evident. Hybrid instructional learning models have a mixture of face-to-face classrooms and frameworks of e-learning (Mettis & Väljataga, 2021; Pavlidou et al., 2021). When turning to this learning mode, educational institutions should incorporate various transformative methods using relevant models and theories (Parlakkılıç, 2014) in turning into hybrid learning to enhance students' abilities.

In China, due to geographical differences, online learning has become the most critical education measure in response to the country's epidemic prevention known as "stay out of school and stay in school." The move means staying away from school and not being suspended. Hence, students and teachers had to diverge from the life they were used to and adapt to online learning or teaching (Xiao & Li, 2020).

At JCNCST, since the launch of online teaching, the institution has explored the optimal teaching mode to provide students with the best teaching services. During the three years coexisting with the COVID-19 outbreak, teachers and students were incessantly controlled and prohibited from going out to adhere to the government's epidemic prevention and control measures. In addition, the teaching mode changed from blended to hybrid so that the teachers and students can simultaneously share classroom activities in different places and for the teachers to monitor the student's learning progress. Therefore, in finding out the responses to the OBE-based hybrid learning model, all the elements of OBE, i.e. real need, explicit content, interrelated outcome, and actual output (Figure 1).

At present, OBE-based hybrid learning is adopted as the teaching mode, especially when the need for a mixture of teaching methods is prevalent, combined with the COVID-19 epidemic prevention measures, specifically in China. Also, the transformation of adopting an OBE-based hybrid learning model is to address students' lack of motivation and HOTs. Therefore, the study aims to analyze the hybrid teaching and learning process conducted in an outcome-based course. In addition, it is necessary to investigate whether hybrid learning elements promote academic motivation and HOTs, which are vital in China's education reform. The investigation also intends to find the connection between the variables and students' higher-order thinking in terms of analyzing, evaluating, creating, problem-solving, and critical thinking skills.

LITERATURE REVIEW

Constructive Learning Theory

Constructivism is a theory based on observation and scientific study about how people learn. Constructivist learning theory is developed based on the ideas and views of Piaget, Kohlberg, and Vygotsky (Erbil, 2020; Kristjánsson & Egeth, 2020; Zajda et al., 2021). After continuous development and improvement, constructivism theory is rich in content. The core of the approach is student-centred, focusing on students' initiative in knowledge exploration and paying more attention to students' active meaning construction of the knowledge they have learned. The approach contrasts traditional teaching, highlighting the teachers' central role as the 'protagonist' teaching style. Secondly, it is student-centred and emphasizes 'learning',

https://10.24191/cplt.v11i3.25104

which makes students the focus of learning, whereas, with teachers as the centre, the emphasis is on 'teaching.' Hence, in adapting the theory, there is a switch in the teachers' role, guiding students to learn through their teaching (Erbil, 2020; Kristjánsson & Egeth, 2020).

Academic Motivation

The motive comes from the Latin word "movere." American scholars Ausubel and Robinson (1966) defined academic motivation as an internal driving force in cognition, subsidiary drive, and self-improvement. It is principally described in the four directions of biology, external appendages, individual cognitive needs, and the joint action of individual mental needs and external appendages (Cody et al., 2021; Vallerand et al., 1992). Academic motivation mainly refers to the interaction and coordination between students' internal learning desires and external stimuli in learning activities to trigger and maintain learning activities. The notion indicates that the higher an individual's academic motivation, the better their persistence and enthusiasm (Natalya & Purwanto, 2018). Academic motivation can drive individual behaviours to engage and maintain learning to achieve clear goals (Kwon & Lee, 2017; Rafiola et al., 2020; Senkbeil & Ihme, 2017). The study uses the academic motivation concepts scale by Cody et al. (2021), namely intrinsic motivation, external motivation, and amotivation, to determine the students in this study's academic motivation levels.

Higher-Order Thinking Skills

Different from critical thinking, problem-solving, and other review forms, higher-order thinking skills, from the pedagogy perspective, are represented by a cognitive process. In 1956, Bloom and his team published their work entitled Classification of Educational Objectives: Cognitive Domains. Bloom divides learning levels in the cognitive domain into six groups. The domains are Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (Arlianty et al., 2018; Krathwohl & Anderson, 2010; Urgo et al., 2019). Later, Anderson and Krathwohl's two-dimensional taxonomy was developed to enhance the definition and articulation of learning goals and the activities and assessments that align with those goals (Urgo et al., 2019). It has a two-dimensional taxonomy, which includes a cognitive process dimension and a knowledge type dimension. The mental process dimension contains six levels of increasing complexity. The dimensions are remembering, understanding, applying, analyzing, evaluating, and creating (Magas et al., 2017). This study adapted Bloom's and Krathwohl and Anderson's Two-Dimensional Taxonomy to measure the students' level of HOTs. The levels comprise higher orders of the two taxonomies, i.e., analyzing, evaluating, creating, problem-solving and critical thinking skills.

METHODOLOGY

Research Design

The research investigates the delivery of hybrid learning, students' motivation level toward hybrid learning courses, and students' HOTs level. A quantitative approach is used so that the researchers can pre-establish hypotheses, determine various causal variables, and then use some tested tools to measure and analyze the selected variables to verify the researchers' assumptions (Creswell, 2002). For instance, for someone who wants to make coffee, the first step is to measure the amount of water and coffee grounds (Rutberg & Bouikidis, 2018). This precise measurement determines the amount of coffee and the strength of the brew. In this quantitative research analogy, the keyword is the measure. Hence, the three variables investigated in this study (hybrid teaching and learning, academic motivation, and HOTs) are quantitatively analyzed to determine their mean scores and correlations.

https://10.24191/cplt.v11i3.25104

Research Instruments

Three questionnaires were adapted and piloted to obtain valid and reliable quantitative data for the study. The instruments are the hybrid learning questionnaire (26 items), the student's motivation level questionnaire (28 items) and the students' HOTs level questionnaire (27 items). A five-point Likert scale measures the respondents' agreement towards the questionnaire items. The five-point Likert-type measurement scale ranges from 1 (Strongly Disagree), 2 (Disagree), 3 (No Opinion), 4 (Agree), and 5 (Strongly Agree). The respondents' agreements (mean scores) determine the inclination levels adapted from Landell (1997), as shown in Table 1.

Table 1
The Mean Score Ranges to Determine the Respondents' Inclination Towards the Hybrid Lectures (OBE-based Hybrid Learning)

Mean Score	Inclination Level
1.00-2.40	Low
2.42-3.80	Moderate
3.81-5.00	High

Notes. The inclination level based on the mean score is adapted from Landell, K. (1997). Management by menu. London: Wilay and Sms Inc.

The three questionnaires were also tested for their reliability and validity using SPSS software as the adapted instrument for the study. A generally accepted alpha value of 0.7 indicates acceptable reliability, and 0.8 or higher means good reliability (Shrestha, 2021; Ekolu & Quainoo, 2019). The results of the tests for the three questionnaires, factors and items are shown in Tables 2 and 3.

Table 2
Values of Average Variance Extracted (AVE) and Composite Reliability (CR) for the Convergent Validity of the Three Instruments

Factors		AVE	CR
Hybrid Learning	Real Need	0.469	0.810
	Clear Content	0.478	0.863
	Interrelated outcomes	0.668	0.922
	Real output	0.629	0.931
Students' Motivation Level	Intrinsic Motivation (IM)	0.772	0.919
	Extrinsic Motivation (EM)	0.612	0.845
	Amotivation (AMOT)	0.761	0.925
Students' HOTs Level	Analyzing	0.389	0.713
	Evaluating	0.656	0.883
	Creating	0.412	0.805
	Problem-Solving	0.766	0.958
	Critical Thinking	0.805	0.961

Note. Factors from the three adapted instruments' generally proved their reliability and validity in measuring the three investigated variables, i.e. hybrid learning, academic motivation and HOTs level.

https://10.24191/cplt.v11i3.25104

Table 3
Reliability Test for the Three Instruments and Each Factor

Factor	Cronbach's α value	No. of Item
Hybrid Learning	0.965	26
- Real Need	0.821	5
- Clear Content	0.885	7
- Interrelated Outcomes	0.920	6
- Real Output	0.931	8
Students' Motivation Level	0.982	28
- Intrinsic Motivation	0.916	12
- Extrinsic Motivation	0.904	12
- Amotivation	0.881	4
Students' HOTs Level	0.971	27
- Analyzing	0.777	4
- Evaluating	0.879	4
- Creating	0.855	6
- Problem-Solving	0.957	7
- Critical Thinking	0.966	6

Note. The Alpha values for the overall each of the three instruments and each item in the three instruments are generally reliable to collect the intended data for the study.

Research Procedure

From 150 first-grade JCNCST students, twenty were selected using stratified sampling to be the respondents for the study survey. The respondents were JCNCST registered undergraduate students and enrolled on the Fundamental of Computer Application (FCA) hybrid lectures, a mandatory program for the first semester students. The respondents were randomly selected from two courses (FA180001 and FA190032) with hybrid lectures. Before the three questionnaires developed for the study were distributed to the respondents, the students had a 15 to 20-minute explanation about the research, including the objectives, problems to be solved, and, more importantly, the concepts of OBE and hybrid learning. Figure 2 illustrates the hybrid learning model for the study. Hybrid teaching and learning are measured through the lectures conducted in the selected courses, in which the lecturer, as a content specialist, engages directly with learners while managing their learning.

https://10.24191/cplt.v11i3.25104

Technologies		Chaoxing app Mindmap app Icourse163	Chaoxing app Tencent meeting (remote device) Rain classroom app	Chaoxing app Icourse163 Camstudio
Content	**Modes**	asynchronous	F2F+remote synchronous	asynchronous
	Artifacts	Lecture recording, Short videos, Guided notes, Chat/discussion, PowerPoint slides, Mind map		
Assessments		Result-oriented guidance	Group presentation Comments on tasks Quizzes	Homework Personal interview Exams
Drives		Before class	In class	After class
		Clear Content	***Organize***	***Assessment***

Figure 2: Hybrid Learning Model of the Research

In addition, the researchers gathered the students' Wechat accounts for quicker questionnaire distribution purposes. Finally, the student's activities on the *Chaoxing* application were recorded to ensure their involvement in the hybrid lectures.

FINDINGS

What is the JCNCST students' perceived agreement towards OBE-based hybrid learning (lectures)?

The students are strongly inclined towards the hybrid lectures conducted in the OBE-based teaching and learning process of the selected courses. Table 4 presents the students' inclination towards the OBE-based hybrid lectures based on the four OBE elements' mean scores. The students' perceived mean scores towards the OBE elements range from 4.238 to 4.471. All four items obtained high levels.

Table 4
Levels of Inclination Towards OBE-based Hybrid Lectures based on the Four OBE Elements' Mean Scores

	N	Max.	Min.	Mean	Std.Dev.	Level
Real Output	20	5	3	4.45	0.558	High
Interrelated Outcomes	20	5	3	4.283	0.651	High
Clear Content	20	5	3	4.471	0.551	High
Real Need	20	5	3	4.380	0.550	High

What is JCNCST students' academic motivation level learning through OBE-based hybrid lectures?

Table 5 shows the mean scores of the student's motivation level in the OBE-based hybrid learning. The perceived means for the motivation level factors range from 3.750 to 3.979, giving an overall mean of 3.920 for the academic motivation level. According to Landell (1997), these values indicate high agreement towards the students' academic motivation level. The students had high academic motivation when learning in OBE-based hybrid courses.

https://10.24191/cplt.v11i3.25104

Table 5
Levels of Academic Motivation towards OBE-based Hybrid Learning Courses based on the Three Motivation Elements

	N	Max.	Min.	Mean	Std.Dev.	Level
Intrinsic Motivation	20	5	1	3.979	0.910	High
Extrinsic Motivation	20	5	2.5	3.925	1.033	High
Amotivation	20	5	1	3.750	1.100	Moderate

Do the OBE-based hybrid learning elements significantly promote the students' academic motivation?

Pearson correlation measures the strength and direction of a linear relationship between two variables (Benesty et al., 2008; Good, 2009). In this study, the correlation coefficient between OBE-based hybrid learning and the student's academic motivation is statistically significant if the probability is lower than the conventional 5% ($P<0.05$). Table 6 demonstrates the correlation results of the OBE-based hybrid learning elements and the student's academic motivation. All the OBE-based hybrid learning elements (real need, clear content, interrelated outcome, real output) reported a significant positive correlation to Students' Motivation Levels, at p =.000. The data show that the OBE-based hybrid lectures cause the students to be highly motivated to learn which is similar to Zhou and Zhang's (2021) findings.

Table 6
The Correlation of OBE-based Hybrid Learning to JCNCST Students' Academic Motivation Level

	N	Max.	Min.	Mean	Std.Dev.
Real Output	1 (0.000***)	0.989 (0.000***)	0.788 (0.000***)	0.716 (0.000***)	0.634 (0.003***)
Interrelated Outcomes	0.989 (0.000***)	1 (0.000***)	0.79 (0.000***)	0.728 (0.000***)	0.647 (0.002***)
Clear Content	0.788 (0.000***)	0.79 (0.000***)	1 (0.000***)	0.942 (0.000***)	0.857 (0.000***)
Real Need	0.716 (0.000***)	0.728 (0.000***)	0.942 (0.000***)	1 (0.000***)	0.782 (0.000***)
SML	0.634 (0.003***)	0.647 (0.002***)	0.857 (0.000***)	0.782 (0.000***)	1 (0.000***)

What is the perceived level of JCNCST Students' HOTs for Outcome-based Education hybrid learning?

Table 7 exhibits *JCNCST* students' HOTs level learning in the OBE-based hybrid learning. The students' perceived means for the HOTs level factors range from 3.712 to 4.333, giving an overall mean of 4.04 for the HOTs Level. According to Landell (1997), the value shows high agreement of the students' HOTs level towards OBE-based hybrid courses.

https://10.24191/cplt.v11i3.25104

Table 7
JCNCST Students' HOTs Level Learning in OBE-based Hybrid Courses

	N	Max.	Min.	Mean	Std.Dev.	Level
Analyzing	20	5	2.500	3.712	0.816	High
Evaluating	20	5	3.000	4.188	0.720	High
Creating	20	5	2.667	3.842	0.812	High
Problem-Solving	20	5	2.429	4.143	0.884	High
Critical Thinking	20	5	2.833	4.333	0.791	High
Total	20	5	2.685	4.04	0.800	High

What is the perceived level of Students' HOTs for Outcome-Based Education elements of hybrid learning in higher education in JCNCST?

The correlation between OBE-based hybrid learning elements and JCNCST students' HOTs level is presented in Table 8. All the OBE-based hybrid learning elements, namely real need, clear content, interrelated outcome, and real output, reported a significant positive correlation to the students' HOTs level (p =.035 for real need, at p =.049 for clear content, at p =.004 for an interrelated outcome, at p =.007 for real output). These data prove that the OBE-based hybrid learning courses are well presented and significantly relevant to the students' HOTs skills.

Table 8
The Correlations of OBE-based Hybrid Learning Elements to JCNCST Students' HOTs Level

	N	Max.	Min.	Mean	Std.Dev.
Real Output	1 (0.000***)	0.989 (0.000***)	0.788 (0.000***)	0.716 (0.000***)	0.474 (0.035**)
Interrelated Outcomes	0.989 (0.000***)	1 (0.000***)	0.79 (0.000***)	0.728 (0.000***)	0.446 (0.049**)
Clear Content	0.788 (0.000***)	0.79 (0.000***)	1 (0.000***)	0.942 (0.000***)	0.608 (0.004***)
Real Need	0.716 (0.000***)	0.728 (0.000***)	0.942 (0.000***)	1 (0.000***)	0.584 (0.007***)
SML	0.474 (0.035**)	0.446 (0.049**)	0.608 (0.004***)	0.584 (0.007***)	1 (0.000***)

DISCUSSION

In line with China's vigorous move towards OBE instruction in HEIs in recent years, the study stemmed from the prevalent reality of the country's tertiary-level students' lack of drive in learning and low-order thinking due to exam-oriented education. Subsequently, there was an emergence of hybrid teaching instructed by the Chinese government's policies during the COVID-19 pandemic. In this study, the OBE-based hybrid learning model could solve the students' low motivation and HOTs issues. These are the factors that have led to the implementation of the OBE-based hybrid learning model.

https://10.24191/cplt.v11i3.25104

The results show the student's high inclination towards the outcome-based education elements of the hybrid learning courses. The scores also show the students' favourable inclination towards the investigated learning in enhancing academic motivation and HOTs levels. The positive correlations between OBE-based hybrid learning elements to JCNCST students' academic motivation and HOTS levels support the results. The students agreed that OBE-based hybrid learning could help them to be academically more motivated to learn. Implementing an OBE-based hybrid learning model is also helpful in instigating them to apply HOTs in their studies. The study has similar findings to Zhou and Zhang (2021), but this study is specific to JCNCST students majoring in Fundamentals of Computer Applications.

CONCLUSION AND RECOMMENDATIONS

The OBE-based hybrid learning model in this study received positive student feedback. The students accepted the convenience of outcome-based education when combined with hybrid learning in the curriculum. On top of that, the experience during the COVID-19 pandemic has indirectly expedited the need for education reform in China. The findings gathered from correlations between hybrid learning and the level of students' motivation, and HOTs indicated significant effects on their motivation and HOTs levels. Though the correlations cannot be generalized to other contexts of study, it underscores the relevancy of OBE, which has begun to be widely implemented in higher education institutions (HEIs) in China. Here also lies the need to investigate the delivery methods of this kind of teaching mode to optimize students' HOTs and motivation for sustainable quality education reform. The results of this study support the positive changes for conducting high-quality hybrid courses and the potential positive effects of the OBE-based hybrid learning model on students' motivation levels and HOTs.

Though Chabeli (2006) claims that outcomes-based education augments students' higher-order thinking skill competencies, more studies are needed to highlight the hybridity in aspects of the model. Hence, further investigation is recommended to extend the types of academic fields with more extensive sampling. Qualitative inquiries should also be conducted about how and why the students accepted the OBE-based hybrid learning model. Subsequent measures to underscore the positive impact of the model would possibly lessen or diminish the strong emphasis on traditional methods or exam-oriented education in the country.

REFERENCES

Arlianty, W. N., Febriana, B. W., Diniaty, A., & Fauzi'Ah, L. (2018). Student profile in completing questions based on the cognitive level of Bloom's taxonomy by Anderson and Krathwohl. *AIP Conference Proceedings*. https://doi.org/10.1063/1.5065023

Benesty, J., Chen, J., & Huang, Y. (2008). On the importance of the Pearson correlation coefficient in noise reduction. *IEEE Transactions on Audio, Speech and Language Processing, 16*(4), 757-765. https://doi.org/10.1109/TASL.2008.919072

Chabeli, M. M. (2006). Higher-order thinking skills competencies are required by outcomes-based education from learners. *Curationis, 29*(3), 78-86. https://doi.org/10.4102/curationis.v29i3.1107

Chen, R., & Zou, M. (2018, November 24-25). *Discussion on the relationship between exam-oriented education and quality-oriented education* [Conference session]. 2nd International Conference on Education Innovation and Social Science, Jinan, China.

https://10.24191/cplt.v11i3.25104

Cody, B. L., Kuyini, A. B., & Smith, L. V. (2021). Psychometric analysis of the academic motivation scale with native Arab college students. *Journal of College Student Development, 62*(5), 591–606. https://doi.org/10.1353/csd.2021.0055

Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative*. Prentice Hall.

Dello-Iacovo, B. (2009). Curriculum reform and "Quality Education" in China: An overview. *International Journal of Educational Development, 29*(3), 241-249. https://doi.org/10.1016/j.ijedudev.2008.02.008

Duo, J. C. R., Fan, Z. X., Xu, Y. L., & Nan, J. C. (2020). Research on satisfaction of high school Mathematics teaching efficiency based on OBE-Take Gansu and Qinghai Tibetan Ethnic Middle Schools as examples. *Proceedings-2020 International Conference on Information Science and Education*, 70-74. https://doi.org/10.1109/ICISE51755.2020.00022

Ekolu, S. O., & Quainoo, H. (2019). Reliability of assessments in engineering education using Cronbach's alpha, KR and split-half methods. *Global Journal of Engineering Education, 21*(1), 24-29. http://www.wiete.com.au/journals/GJEE/Publish/vol21no1/03-Ekolu-S.pdf

Erbil, D. G. (2020). A review of flipped classroom and cooperative learning method within the context of Vygotsky theory. *Frontiers in Psychology, 11*, 1157. https://doi.org/10.3389/fpsyg.2020.01157

Espiritu, J. L., & Budhrani, K. (2015, March 2-4). *Implementing an outcome-based education (OBE) framework in teaching Industrial Psychology* [Conference session]. DLSU Research Congress, De La Salle University, Manila, Philippines.

Good, P. (2009). Robustness of Pearson correlation. *Interstat, 15*(5), 1-6. https://web.archive.org/web/20090824010005id_/http://interstat.statjournals.net:80/YEAR/2009/articles/0906005.pdf

Gurukkal, R. (2020). Outcome-based education: An open framework. *Higher Education for the Future, 7*(1), 1-4. https://doi.org/10.1177/2347631119886402

Krathwohl, D. R., & Anderson, L. W. (2010). Merlin C. Wittrock and the revision of Bloom's taxonomy. *Educational Psychologist, 45*(1), 64-65. https://doi.org/10.1080/00461520903433562

Kristjánsson, Á., & Egeth, H. (2020). How feature integration theory integrated cognitive psychology, neurophysiology, and psychophysics. *Attention, Perception, and Psychophysics, 82*(1), 7-23. https://doi.org/10.3758/s13414-019-01803-7

Kwon, B. R., & Lee, J. (2017). What makes a maker: The motivation for the maker movement in ICT. *Information Technology for Development, 23*(2), 318-335. https://doi.org/10.1080/02681102.2016.1238816

Landell, K. (1997). *Management by menu*. Wiley and Sons Inc.

Li, M. Y. (2021). "Nei Juan" in exam-oriented education in China. *Journal of Literature and Art Studies, 11*(12), 1028-1033. https://doi.org/10.17265/2159-5836/2021.12.015

Magas, C. P., Gruppen, L. D., Barrett, M., Dedhia, P. H., & Sandhu, G. (2017). Intraoperative questioning to advance higher-order thinking. *The American Journal of Surgery, 213*(2), 222-226. https://doi.org/10.1016/j.amjsurg.2016.08.027

Mettis, K., & Väljataga, T. (2021). Designing learning experiences for outdoor hybrid learning spaces. *British Journal of Educational Technology, 52*(1), 498-513. https://doi.org/10.1111/bjet.13034

Natalya, L., & Purwanto, C. V. (2018). Exploratory and confirmatory factor analysis of the Academic Motivation Scale (AMS)-Bahasa Indonesia. *Makara Human Behavior Studies in Asia, 22*(1), 29. https://doi.org/10.7454/hubs.asia.2130118

https://10.24191/cplt.v11i3.25104

Parlakkılıç, A. (2014). Change management in transition to E-learning system. *Qualitative and Quantitative Methods in Libraries, 3,* 637–651. https://qqml-journal.net/index.php/qqml/article/view/171

Pavlidou, I., Dragicevic, N., & Tsui, E. (2021). A multi-dimensional hybrid learning environment for business education: A knowledge dynamics perspective. *Sustainability, 13*(7), 3889. https://doi.org/10.3390/su13073889

Premalatha, K. (2019). Course and program outcomes assessment methods in outcome-based education: A review. *Journal of Education, 199*(3), 111-127. https://doi.org/10.1177/0022057419854351

Rafiola, R. H., Setyosari, P., Radjah, C. L., & Ramli, M. (2020). The effect of learning motivation, self-efficacy, and blended learning on students' achievement in the industrial revolution 4.0. *International Journal of Emerging Technologies in Learning, 15*(8), 71-82. https://doi.org/10.3991/ijet.v15i08.12525

Rutberg, S., & Bouikidis, C. D. (2018). Exploring the evidence quantitative and qualitative research focusing on the fundamentals: A simplistic differentiation between qualitative and quantitative research, *Nephrology Nursing Journal, 45*(2), 209-212.

Senkbeil, M., & Ihme, J. M. (2017). Motivational factors predicting ICT literacy: First evidence on the structure of an ICT motivation inventory. *Computers and Education, 108,* 145-158. https://doi.org/10.1016/j.compedu.2017.02.003

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics, 9*(1), 4-11. https://doi.org/10.12691/ajams-9-1-2

Spady, W. G. (1982). Outcome-based instructional management: A sociological perspective. *Australian Journal of Education, 26*(2), 123-143. https://doi.org/10.1177/000494418202600203

Urgo, K., Arguello, J., & Capra, R. (2019, September). Anderson and Krathwohl's two-dimensional taxonomy applied to task creation and learning assessment. *Proceedings of the 2019 ACM SIGIR International Conference on Theory of Information Retrieval,* 117-124. https://doi.org/10.1145/3343413.3377947

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and motivation in education. *Educational and Psychological Measurement, 52*(4), 1003-1017.

Xiao, C., & Li, Y. (2020, April 23-25). *Analysis of the influence of the epidemic on the education in China* [Conference session]. International Conference on Big Data and Informatization Education, Zhangjiajie, China.

Zajda, J., Brock-Utne, B., Davies, L., Evans, K., Geo-JaJa, M., Kazamias, A., Mollis, M., Nikandrov, N., Avalos, B., Biraimah, K., Chapman, D., Yao Cheng, S., Ginsburg, M., Levin, H., Phillips, D., & Postglione, G. (2021). *Globalization, Comparative Education and Policy Research.* Springer. https://link.springer.com/bookseries/6932

Zhao, J., Gao, H., & Li, P. (2019). The application and research of the case-based evoked hybrid teaching model based on the OBE in application-oriented universities. *Proceedings IEEE International Conference on Computer Science and Educational Informatization,* 282-285. https://doi.org/10.1109/CSEI47661.2019.8938911

Zhou, L., & Zhang, Y. (2021). Data-driven mixed teaching of financial investment courses based on the OBE concept to improve learning effectiveness. *Proceedings - 2021 International Conference on Internet, Education and Information Technology*, 549–552. https://doi.org/10.1109/IEIT53597.2021.00129

Conflict of Interest

The authors reported no potential conflict of interest.

Acknowledgement

The author acknowledges the help given by TS. DR. Irwan Mahazir Bin Ismail. The author also thanks the 1st International Student Symposium of Instructional Technology (ISST) 2023 for the Centre for Instructional Technology and Multimedia for funding the program.

About the Authors

	Irwan Mahazir bin Ismail is the Deputy Director of Academic, Career, and International in the Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia. He was awarded a Technologist from MBOT with Ts. as Malaysian Qualifications Agency (MQA) Auditor for ODL, TVET, and Information Technology. He is also a member of the International Association of Blended Learning (IABL), a member of the Association for Computer Machinery (ACM), and the Technological Association Malaysia (TAM).
	Zheng Zheng is a PhD student at the Center for Instructional Technology and Multimedia, Universiti Sains Malaysia, Malaysia and a lecturer/senior engineer at North China University of Science and Technology, China.
	Wang Hanxu is a PhD student at the Center for Instructional Technology and Multimedia, Universiti Sains Malaysia, Malaysia and a lecturer at the School of International Education and Exchange, Cangzhou Technical College, Cangzhou, China.
	Azwin Arif Abdul Rahim, Apple Professional Learning Specialist, is a senior lecturer at the Centre for Modern Languages, Universiti Malaysia Pahang. He has more than two decades of experience facilitating ESL at tertiary institutions. His research and training cover Technology in Language Learning, Instructional Design, eLearning, MLearning and Fuzzy Delphi Methods.

https://10.24191/cplt.v11i3.25104