A GUIDE TO

NEW ACADEMIA LEARNING INNOVATION

Professor Dr. Rose Alinda Alias
Professor Dr. Baharuddin Aris
First Edition 2016
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Baharuddin Aris

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FOREWORD

UTM Deputy Vice Chancellor (Academic & International)

Assalamualaikum and Greetings!

I am thankful that with the grace of our creator the Almighty Allah SWT and through the cooperation of dedicated lecturers with UTMLead, this New Academia Learning Innovation (NALI) Guide Book was completed in time for the launch of the International University Carnival on eLearning (IUCEL) 2016 in UTM on 20th September 2016. Many requests were made for a book that guides instructors on implementation of the New Academia Learning Innovation (NALI) model ever since we introduced it in 2013 in the “Akademia Baru Inovasi Pembelajaran” book. The whole idea of modern instruction is based on this as learning emphasis shifts more and more from the all-knowing instructor perspective to student-centred learning towards nurturing an entrepreneurial academia. This guideline is UTM’s contribution to the Scholarship of Teaching and Learning as an invaluable resource based on UTM’s NALI implementation and research. Instructors should find this book useful to support their continuous efforts in improving learning. The book is a step in realising goals of UTM towards producing holistic, entrepreneurial and balanced graduates who hold the keys to a brighter future for the nation.

The diligent contribution of many authors and the editorial board members in making the dream of this first edition a reality is very much appreciated. I hope that this book will guide instructors in transforming their learning and teaching practices towards an era of 21st century learning.

Wishing all of you continuous success in your learning and teaching endeavours!

Professor Dr. Rose Alinda Alias
Deputy Vice Chancellor (Academic & International)
Universiti Teknologi Malaysia (UTM)
2016
**LIST OF ACRONYMS**

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<th>Definition</th>
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<td>BLOSSOMS</td>
<td>Blended Learning Open Source Science or Math Studies</td>
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<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
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<tr>
<td>CGCC</td>
<td>Centre for General Courses and Co-Curriculum</td>
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<td>CICT</td>
<td>Centre of Information and Communication Technology</td>
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<td>Centre for Teaching &amp; Learning</td>
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<td>GLC</td>
<td>Government-Linked Company</td>
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<td>International Business School</td>
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<td>Innovation &amp; Commercialisation Centre</td>
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<td>IT</td>
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<td>LMS</td>
<td>Learning Management System</td>
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<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>OBE</td>
<td>Outcome Based Education</td>
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<td>OCW</td>
<td>Open Courseware</td>
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<td>OCWC</td>
<td>Open Courseware Consortium</td>
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<td>Open Educational Resources</td>
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<td>Peer Instruction</td>
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<td>SBL</td>
<td>Scenario Based Learning</td>
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<td>SCL</td>
<td>Student-Centered Learning</td>
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<td>SL</td>
<td>Service Learning</td>
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CHAPTER 1: NALI MODEL

Centre for Teaching and Learning (CTL), UTMLead has been given a great responsibility to carry out initiatives under the New Academia Learning Innovation (NALI). NALI emphasises the concept of entrepreneurship. By entrepreneurship, we refer to the context of learning that is more productive, creative and innovative (Zaini, 2012). Figure 1.1 shows the model of NALI. There are two modes under NALI - Pedagogy/Andragogy and Digital Resources, all of which contains 15 projects.

![Figure 1.1: Model of New Academia Learning Innovation (NALI)](image_url)

In support of the national e-Learning policy or ‘Dasar e-Pembelajaran Negara (DePAN)’, UTM through NALI runs courses that implement blended learning approaches. Blended learning is defined as the practice of combining both online and face-to-face learning experiences, where 30% to 80% of the course content is delivered online. Face-to-face learning covers Case study, Problem Based Learning, Scenario Based Learning, Peer Instruction, Service Learning, Job Creation, CDIO and OBE practices. Digital learning involves the use or the development of internet and video materials in the forms of Open Courseware, UTM MOOC, BLOSSOMS, Video of Exemplary Professionals, Student to Student Edutainment, and UTM e-Learning.
Figure 1.2 shows the homepage screen view of the university’s NALI website. More information on NALI is available through the site link: http://ctl.utm.my/nali/

![NALI Homepage Screen View](image)

**Figure 1.2**: Homepage Screen View of NALI website: [http://ctl.utm.my/nali/](http://ctl.utm.my/nali/)

The main objectives of the NALI initiative are:

1. To align UTM teaching and learning models, activities, materials, environments and systems with the Malaysian National Higher Education Strategic Plan, the needs of employers and the requirements of accreditation bodies,
2. To emulate best teaching and learning practices from the World’s best universities,
3. To develop UTM’s own identity related to teaching and learning models, activities, materials, environments and systems,
4. To create meaningful and interactive learning activities, materials, environments and systems appropriate to UTM Graduate Student Attributes.
CHAPTER 2: SCL AND BLENDED LEARNING

Student-centered Learning (SCL) and Blended Learning underpin UTM New Academia Learning Innovation Model. Many view SCL as the concept of students being active versus passive learners and Blended Learning integrates multiple learning modes and materials.

UTM NALI initiatives to enrich Teaching and Learning (T&L) are based on well-known and best teaching and learning practices which have been proven to be effective. These best practices include for example Case Study Teaching, Problem-based learning and Peer Instruction. In order to create memorable learning experiences among learners, meaningful and interactive learning experiences, which are motivating and able to engage students in relatively higher levels of concentration throughout the lecture, are required. Therefore, a systematic incorporation of active learning strategies and digital learning materials into lectures is required to minimise many of the weaknesses of traditional lectures. In addition, online systems and learning environments will also help support student centred learning. It is therefore, NALI model is structured into 2 modes, namely:

- Learning Mode (Pedagogy/Andragogy) and
- Learning Materials (Digital Resources).

Under Learning Mode (Pedagogy/Andragogy), there are:
- Outcome-Based Education (OBE)
- Case Study Teaching
- Problem-Based Learning (PBL)
- Scenario Based Learning (SBL)
- Peer Instruction
- Service Learning
- Job Creation
- High-Impact Educational Practices (HIEPs)
- Conceive, Design, Implement and Operate (CDIO)

Under Learning Materials (Digital Resources), there are:
- UTM Open Courseware (OCW)
- UTM MOOC
- UTM-MIT BLOSSOMS
- Video of Exemplary Professionals
- Student-to-Student Edutainment
- UTM e-Learning
CHAPTER 3: LEARNING MODES

New Academia Learning Innovation (NALI) consists of 9 learning Modes (Pedagogy/Andragogy) which are:

- Outcome-Based Education (OBE)
- Case Study Teaching
- Problem-Based Learning (PBL)
- Scenario Based Learning (SBL)
- Peer Instruction
- Service Learning
- Job Creation
- High-Impact Educational Practices (HIEPs)
- Conceive, Design, Implement and Operate (CDIO)

3.1 OUTCOME BASED EDUCATION

Yahya Samian, Yeo Kee Jiar, Hayati Abdullah, Istas Fahrurrazi Nusyirwan, Norihan Abu Hassan

3.1.1 Introduction

Outcomes in learning refer to what learners are able to demonstrate at the end of the learning experience. Learning outcomes are outcomes that are expected from a certain subject and these are assessed and evaluated through various measurement tools. Outcome-Based Education (OBE) is a method of curriculum design and instruction that is focused on the outcome of the instruction, that is, the competencies a learner achieves after instruction (Chong, 2008). OBE involves the restructuring of the curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery rather than the accumulation of course credits (Tucker, 2004). Thus, the primary aim of OBE is to facilitate desired changes within the learners, by increasing knowledge, developing skills and/or positively influencing attitudes, values and judgment. OBE embodies the idea that the best way to learn is to first determine what needs to be achieved. Once the end goal (product or outcome) has been determined the strategies, processes, techniques, and other ways and means may be put into place to achieve the goal. Therefore, the OBE system is one in which outcomes drive the whole course content and assessment structure; and a central aspect of OBE is the alignment of learning outcomes, teaching and learning processes and assessment.
William Spady known for his “OBE Paradigm”, has developed a systematic account of OBE, which operated on two purposes, three premises and four principles. The two purposes reflect OBE’s underlying philosophy in ensuring that all students are equipped with the knowledge, competency and qualities needed to be successful after they exit the educational system and structuring and operating schools so that those outcomes may be achieved and maximized for all students. The three premises are, all students should be able to learn and succeed, but not on the same day in the same way; successful learning promotes even more successful learning and schools control the conditions that directly affect successful school learning. The four principles include clarity of focus on culminating exit outcomes of significance, expanded opportunity and support for learning success, high expectations for all to succeed and design down from your ultimate, culminating outcomes (Spady, 1994).

Spady (1994) believes that in an OBE system, ‘WHAT and WHETHER students learn successfully’ is ‘more important than WHEN and HOW they learn it’. OBE is therefore focused on answering the questions of what students need to learn, the purpose of the instruction or what the learning aims to achieve (full description of learning outcomes), how best to assist students in achieving this (appropriate learning activities) and how to ascertain that learning has been achieved (assessment). OBE is thus focused on what the learner should learn and not on ‘when; and ‘how long’ the learning takes. The primary aim of OBE is to facilitate desired changes within the learners, by increasing knowledge, developing skills and/or positively influencing attitudes, values and judgment.

3.1.2 Processes and Procedures of Implementation

The OBE system is one in which outcomes drive the whole course content and assessment structure; and a central aspect of OBE is the alignment of learning outcomes, teaching and learning processes, and assessment. The main steps in the implementation process of an OBE system are illustrated in Figure 3.1.1.
To arrive at the desired outcomes, OBE practitioners are required to focus their approaches on (i) planning, (ii) delivering and (iii) assessment.

**(i) Planning**
Planning involves stating clearly what the student is to learn and developing course content, course design and assessment methods. The instructor should design a systematic education curricular; providing flexible and effective teaching methodology and appropriate instructional materials to match against the needs of the learners. Learning outcomes should be assessed through challenging performance standards. At the planning stage, the vital factor to be considered is providing vast learning opportunities for students. Baume (2005) emphasised that course learning outcomes must be attractive for students to achieve; comprehensible where students know the meaning; attainable by students and coherent where course learning outcomes map with the program learning outcomes. Biggs (2003) proposed that the intended learning outcomes to be achieved at the end of a learning period must be stated clearly. These outcomes should provide clear guidance for the planning and development of the teaching.
process which includes the design and organisation of materials, the selection of the most appropriate teaching methods, as well as the provision of a measurement method for quality assurance. Wang (2011) described these as prioritizing learning above teaching, learning outcomes above teaching objects, aligning teaching and teaching process with outcomes and assessment processes (constructive alignment) and quality of learning as representing the measure of the quality of teaching. Figure 3.1.2 shows the structure of the continuous flow process in OBE implementation. The different facets of outcome measures and assessment are illustrated.

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<td>Quality Assurance Continuous Improvements</td>
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<td>OBE Syllabus Student learning Teaching Methods Learning Activities Assessment Tools</td>
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**Figure 3.1.2: Process Flow for Continuous Improvement Process of OBE Implementation**

(ii) Delivering

The key focus of OBE delivery methods is on Student-Centered Learning (SCL) and taking into consideration learner differences (Spady & Marshall, 1991; Spady, 1994; Towers, 1996; Felder & Brent, 2003; Lui & Shum, 2012). While conventional one-way lecturing may still be needed, OBE requires SCL approaches as most of the learning outcomes are best achieved using SCL. To date there have been many SCL approaches (techniques) which have been established and widely used. However, there is no single best strategy that will always provide the best outcomes for all students. Hence, practitioners should identify and use appropriate teaching methods that enable desired learning outcomes to be achieved effectively. They should align their instructional methods and activities with learning outcomes using any of the appropriate strategies (Ramoroka, 2007); these could include Cooperative Learning, Experiential Learning, Inquiry/Investigation, Inductive Learning and Problem Solving.
Owing to the importance of SCL in OBE, UTM has introduced the transformational learning mind-set and culture through the establishment of the New Academia Learning Innovation, NALI in 2010 (Zaini Ujang, Rose Alinda & Baharudin Aris, 2011). The spin off of this NALI initiative, several T&L approaches was implemented for many courses across all programmes. On the learning modes, NALI initiatives include, Case Study Teaching, Problem-Based Learning, Scenario Based Learning, Peer Instruction, Service Learning, Job Creation, while on the technology used, the initiatives include UTM OpenCourseWare (OCW), UTM-MIT BLOSSOMS, UTM MOOC, Video of Exemplary Professionals, Student-to-Student Edutainment and UTM e-Learning. The concept underlying each of the above approaches, method of implementation and preliminary assessment of their effectiveness will be discussed in the following chapters.

At the individual course level, the course instructor is required to list down the appropriate teaching methods to be implemented in class along with the intended learning outcomes and the expected learning taxonomy level to be achieved. This information is to be included in the course outlines (and course mapping) and to made known to students from the first day of the semester. A typical example of such mapping is shown in Appendix 1.

(iii) Assessment

Under OBE, the main purpose of an assessment is to measure and analyse the learning outcomes, which in turn provide valuable inputs for improvement measures to be taken. Under the OBE system, assessment aims at determining the degree of attainment of outcomes at the course and program level for the purpose of evaluation (or grading) as well as providing information for continuous improvement process. Outcomes are assessed in different methods and on an on-going basis. OBE aims to assess various competencies of students in terms of knowledge, skills and attitudes, which are related to the taxonomies of Bloom (cognitive domain), Krathwohl (affective domain) and Harrow (psychomotor domain). OBE requires authentic-based and performance-based assessment to be carried out but other types of assessment methods are also integrated into the whole system of assessment. Methods of assessment include authentic assessment, formative assessment, summative assessment, continuous assessment and criterion-based assessment. Whatever the methods of assessment, students should be provided with the feedback of assessment. Students should be informed on how well they are doing and how much they have learnt. The comments and input from the instructors guide students on their strengths and weaknesses, thus helping them to improve their learning. For instructors, the feedback from assessment enables them to provide more
effective guidance to learners on how to progress as well as to improve teaching delivery. Some of the assessment methods / tools / templates are included in Appendix 2.

3.1.3 Outcome / Preliminary outcomes

UTM On-Line OBE Analysis System
One of the main challenges of OBE implementation is in designing the course outcomes, mapping process to the programme outcomes and designing assessments to assess both course outcomes and programme outcomes. It involves a huge amount of data to be processed even for a single course and this need to be repeated every semester. To do it manually is cumbersome and consumes a lot of time. In the effort to address this issue, the Faculty of Mechanical Engineering (FKM) initiated an effort in 2009 to develop an online OBE analysis system (http://obe.utm.my/). Since its conception, the system has assisted to automate the whole process of OBE analysis.

The entire UTM online OBE analysis involves course preparation, assessment design, mark entry and OBE analysis reporting. The main motivation of the system is to have a one-stop centre for OBE analysis for all instructors. The system collects all OBE-related information and stores them in a single database. The benefit of such a system is tremendous. Since data is stored in a single repository, the OBE analysis for all students and programmes becomes a simple task. Analysis may be performed anywhere and at any time enabling the administrators to access the data in real time and from anywhere. The system has been running since 2009 and many improvements have been made based on feedback given by users. It has proven to provide great assistance to the faculty during the accreditation exercise. In 2015, the university decided to implement the OBE system developed by FKM to be used across programmes and courses in UTM. Some of the screen shots showing samples on the On-Line OBE Analysis System are included in Appendix 3.

3.1.4 Summary

OBE is focused on outcomes rather than the input or processes involved in an education system. It advocates all educational activities conducted with a focus on what it is meant to achieve. Hence, instructional design should employ the backwards model and begin from determining the outcomes intended. Educational, learning and programme objectives are determined and assessment goals are set based on them. This is to create a condition whereby the learning goals (what learners should be able to do or what they should be like after going through the learning process) determines the design of the assessment procedure or type which in turn determines the types of learning activities that
could best represent the means for achieving these goals. In essence, instruction in OBE goes from determining the learning outcomes (LOs) to determining what will represent a measure of the achievement of these objectives, what procedures are best for measuring the achievement and what are the best ways to conduct instruction (types of required learning activities) such that the required outcomes can be achieved.

**References**


3.2 CASE STUDY TEACHING

Yahya Samian, Wardah Zainal Abidin, Rossilah Jamil, Zaiton Abdul Majid

3.2.1 Introduction

The case study method, case method teaching or case teaching refers to the use of a study on a company or situation with great length and depth close to reality with issues and conflicts which need to be resolved. Case study has been reported as a highly effective pedagogy (Ozdilek, 2014) that emphasises the constructivist or active learning approach (Sudzina, 1997; Tan, Guo, Zheng, & Zhong, 2014) to instruction and engages learners in critical thinking as a process of solving problems (Papil, 2011; Schwartz, 2015). The activities of solving real problems are proven to gain students’ engagement (Taylor & Parsons, 2011) and attention as well as involvement in the learning process (Tan et al., 2014). The case study approach offers many advantages. Students are trained to arrange ideas and perform discussions based on fact, which make their arguments more structured, sensible, and believable. According to Velenchik et al. (2016) and Watson and Sutton (2012), the case study approach in teaching helps develop students’ skills in:

1. Problem solving
2. Analytical thinking, quantitative and/or qualitative, depending on the case
3. Decision making in complex situations
4. Coping with ambiguities

Business schools such as Harvard Business School use case method totally in their teaching. This method of teaching delivery is now making inroads in engineering and technical discipline courses and programs. After all one of the goals of case teaching is to produce practitioners by exposing the students to complexities and uncertainties of the real world through the case stories. The use of case study teaching among undergraduate engineering students in UTM has been around nearly a decade and it proves to be one of the popular methods of teaching. While there are probably differences in its approach, objectives and style between the undergraduate and postgraduate students, there are also a lot of similarities. Thus, this section intends to share some of the skills, knowledge and attitude required for instructors to conduct the case study as an alternative method in course delivery.

The most significant difference between case teaching and traditional teaching is the Socratic approach, used by the instructor to impart usually a complex unit of knowledge to the students. Solutions are not given outright to the students unlike in normal lectures.