ESLG College

GUIDELINES FOR CONSTRUCTIVE ALIGNMENT OF LEARNING OUTCOMES WITH LEARNING ACTIVITY AND STUDENT ASSESSMENT

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1. INTRODUCTION

The present Guide aims at explaining the principle of Constructive Alignment. Constructive alignment refers to an approach to instructional design that integrates Course Learning Outcomes (CLOs), (b) Teaching and Learning Activities (TLAs), and (c) Assessment methods (Ass.). As shown in Figure below the constructive alignment demands optimal coherence between these three elements in a course or curriculum. Moreover, constructive alignment underpins and assures the quality of an educational programme.

Figure 1: Constructive alignment

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"[Constructive alignment] makes quite explicit the standards needed if the intended learning outcomes are to be achieved and maintained" (Biggs & Tang, 2015, p. 14).

Constructive alignment at the course level implies that course learning outcomes, student assessment, and learning and teaching activities all act in support of each other. The constructive alignment triangle is symmetrical triangle. If one part of the triangle is absent or is not supportive of the other parts, the triangle will collapse, hence the constructive alignment will not function.

2. ENSURING ALIGNMENT

Student assessment based on well-guided criteria lay down the clear foundation for inclusive learning processes at ESLG College. If implemented properly, the student assessment with well guided criteria can provide a shared language between students and professors, who serve as assessors at the same time.

In ensuring constructive alignment, course learning outcomes play a primary role. Course learning outcomes guide the selection and design of learning activities and assessments.

Furthermore, assessment is in alignment with the course learning outcomes, when it really assesses whether or not a student can achieve a specific course learning outcome.

In addition, the part of constructive alignment is also the teaching and learning activities and teaching resources, which are in alignment when they provide students the best opportunity to learn what is specified in the learning outcome.

An effective learning outcome contains a verb that can guide the selection or creation of activities that students need to engage with to achieve the outcome. The same verb can guide the selection of student assessment mechanisms, which can measure how well students achieved the outcome and facilitate appropriate feedback.

It is essential that teaching and learning activities, including skills practice, match the learning outcome and that assessments measure what students learned and practiced. Oftentimes, upon course review, the course bearer may discover that teaching and learning activity or student assessment form is not aligned with the specific course learning outcome for which it designed for. To this end, the course bearer should modify the teaching and learning activity or student assessment format in order to reflect the course learning outcome. If this is not applicable, the course bearer may end up revising the learning outcome.

Here is an example of this relationship between these three components affecting each other.

- The *learning outcome*, or *objective* of a lesson is to explain the events that caused global energy crisis in 1970s;
- The *learning activity* is to define the historical events that lead to the tensions which sparked the global energy crisis in 1970s;
- The *assessment* of this lesson comes in the form of an exam question, which asks students to discuss the role of international politics and global economy which gave rise to the global energy crisis.

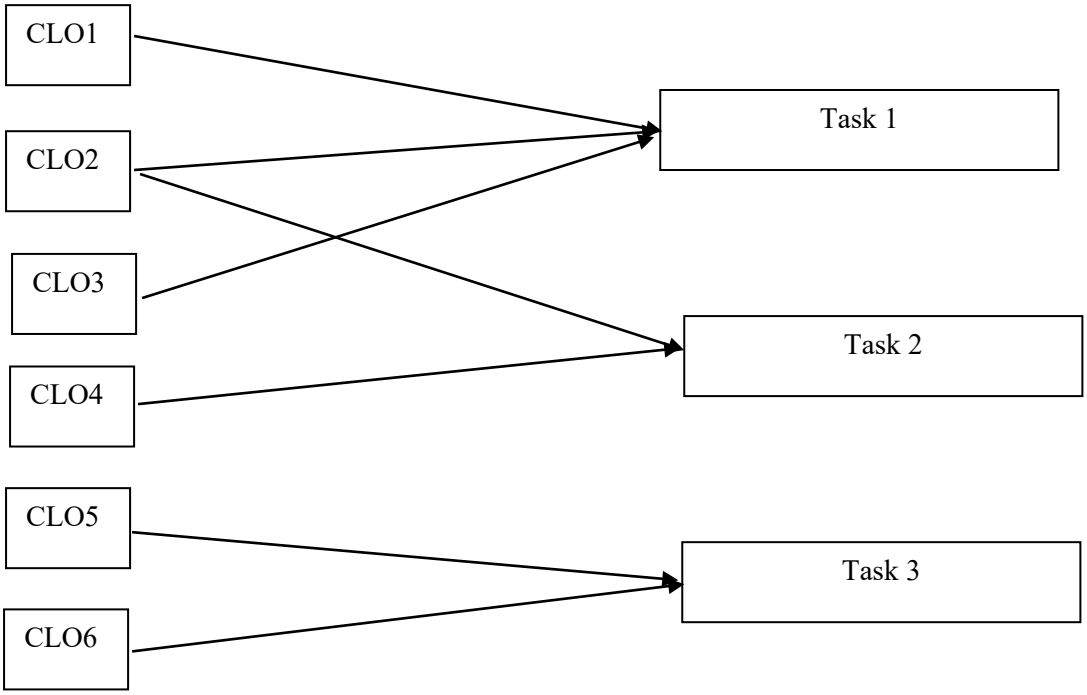
3. LINKING LEARNING OUTCOMES TO ASSESSMENT

The assessment process examines the extent to which students have achieved the course learning outcomes. Therefore in designing an assessment program it is essential that the course learning outcomes form the basis of what is assessed and how it is assessed.

Each course learning outcome should be assessed. If a stated course learning outcome is not assessed, neither the course professor nor the students will know if it has been realized. If the

learning outcome is framed in such a way that assessment is not feasible, the course bearer must reframe it so that demonstration of course learning outcome attainment is possible.

Figure 2: Alignment of CLOs with tasks



4. LINKING OUTCOMES TO TEACHING AND LEARNING STRATEGIES

The action verbs of course learning outcomes will flag the sorts of learning activities that will best lead to their attainment. For example, if one learning outcome is for students to be able to analyze and interpret data, then there should be activities where students are asked to analyze and interpret data, and opportunities for them to monitor, assess and receive feedback on their progress regarding these skills. If, as an outcome, students are expected to be able to construct a written legal argument based on particular law, then they will need to be taught the skills involved and engaged in activities that allow them to practice and refine those skills.

5. DIFFERENCE BETWEEN TRADITIONAL COURSE OUTLINES AND OUTCOME-BASED LEARNING COURSE OUTLINE

Proper constructive alignment between teaching, learning, assessment activities and learning outcomes is crucial for successful implementation of the OBL approach (Barkley & Major 2016; Biggs & Tang 2007).

Table 1: Difference between traditional course outlines and OBL course outlines

Traditional course outline	**OBL course outline**
Course objectives	**Course learning outcomes**
1. Introduce students to life cycle costing in design, material selection, construction and operation and maintenance. 2. Familiarize students with formulation techniques for effective design, material selection, construction and operation and maintenance. 3. Introduce students to methods of LCC costing, formulation of strategies for design, material selection, construction and operation and maintenance.	CLO1: Understand concepts such as LCC costing in design, material selection, construction and operation and maintenance; CLO1: Apply principles of LCC costing in building design, material selection, construction and operation and maintenance; CLO3: Develop an appropriate a LCC strategy for effective building design, material selection, construction and operation and maintenance. CLO4: Communicate effectively with peers and clients at a high level of proficiency.

Comparison of assessment tasks under the traditional model and outcome-based learning model is shown below:

Table 2: Assessment tasks under old course outline and OBL course outline

Assessment tasks in the old course outline	Assessment tasks in the new OBL course outline
1. Mid-term exam (30%)a 2. Final exam (30%)a 3. Three assignments (40%)a	1. Exam 1 (25%)a 2. Take Home Exam 2 (25%)a 2. Case study home assignment (20%)b 5. Team Role play in debating about LCC costing for effective building design, materials selection, and operational and maintenance (15%)c 6. Research paper and presentation on LCC costing and its effect on building design strategies, materials selection, and operational and maintenance (15%)c

a Individual assessment.

b Group assessment.

c Group assessment for the written document and individual assessment for the presentations.

5. CONSTRUCTIVE ALIGNMENT SAMPLE

Table 3: Constructive alignment sample

Type of course learning outcome	**Course learning outcome**	**Teaching and Learning activity**	**Assessment task**
Cognitive (Demonstrate: Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation)	CLO1: Apply life cycle costing in design, material selection, construction and operation and maintenance	Lectures Tutorials Case study discussion	Case study home examination

Affective (Integration of beliefs, ideas and attitudes)	CLO2: Display a willingness to co-operate with peers.	Field work Group work	Field work report Project work
Psychomotor (Acquisition of skills)	CLO3: Demonstrate good arguing skills	Documentary movie discussion	Debate assessment on LCC by evaluation panel

6. UTILITY FORMULA IN SELECTION OF ASSESSMENT METHOD

Examples of criteria to assess the student achievement of intended learning outcomes are presented below as a form of guidelines for professors of various courses:

Selecting appropriate assessment methods for a course is often a difficult task. Prior to wise selection of assessment method, it is very important to assess the specific function of the respective assessment.

Why measuring the function of respective assessment method is important?

The function that assessment method plays in a study process is influenced by five factors and so-called utility formula.

The functions of assessment method can be the following:

- Provision of feedback to students;
- assigning grades to students;
- selecting students;
- Influencing student's learning behavior like timely starting to study the materials;
- Make student's experience satisfaction for the learning effort they put in, or completing or wrapping up the learning process;
- Be accountable to external stakeholders.

The utility of an assessment method is influenced by five factors such as reliability, validity, educational effects, acceptance of stakeholders, and cost efficiency.

The reliability reflects the extent to which repetitive sessions of an assessment instrument will generate the same results. In other words, if two or more comparable groups of students will be assessed, the same results should come out of it. The reliability is influenced by the length of an exam, the number and the diversity of questions in an exam, the transparency of an assessment, and the clarity of the language used then the clarity of expectations of both students and the course professor.

The next factor is validity. The validity raises the question whether the assessment method really measures what is really intended to measure. In other words, the validity questions whether the assessment method is aligned with the formulated learning outcome and whether the assessment method provides the course professor with the insight about the extent to which the learning outcome has been attained.

The third factor is the educational effects of the assessment method. It measures the extent to which the learning process is influenced by the assessment method and measures whether the effect is positive or negative and does it have a positive or a negative effect.

The assessment method's intentions are as follows:

- stimulate students to put time and effort in the learning process
- assists students to start timely with the learning activities
- provide students information on how well they did in the learning process (feedback);
- offer students information on how to improve next time (feed forward);
- offers students information on how their learning outcomes contribute to achieving the higher level program outcomes (feed up);

The fourth factor that influences the utility of the selected assessment method is acceptance by stakeholders. A chosen assessment methodology needs to be accepted by all crucial stakeholders. This means students, professors, and program management should have enough confidence in the outcomes generated by the assessment. In some cases, this means that before a new assessment methodology is used, effort needs to be put in creating commitment for it especially by students

The final factor influencing the utility of the selected assessment method is better cost efficiency. In all assessment methods, costs are involved, cost for the staff, locations, technology, etc.

The utility equals reliability multiplied by validity multiplied by educational effects multiplied by acceptance and, finally, multiplied by cost efficiency.
For a utility formula to work, none of the factors should be too low or even zero, because in that case, the utility of the assessment will not function.

Table 4: Utility formula factors

	Utility Formula Factors				
Methods of Assessment	Reliability	Validity	Educational Effect	Acceptance	Cost Efficiency
MC Exam	+	+	+/-	+	+
Essay	-	+	+	+/-	-

Utility = R x V x E x A x C
(R= Reliability, V= Validity, EI= Educational impact, A= Acceptability, C= Cost)
In some cases, the utility formula also includes practicability.

Utility = R x V x EI x P x A x CE

(R= Reliability, V= Validity, EI= Educational impact, P = Practicability, A= Acceptability, CI= Cost-effectiveness)

The utility of the assessment method is functional if none of these factors equals or nears zero.

7. ALIGNMENT EXAMPLE

As an example how to link the assessment criteria to learning outcomes by using particular assessment assignments, these Guidelines use one of learning outcomes of the course Sustainable Facility Management of the master study program in Management of Real Estate and Infrastructure (MA), for which a team project report is used as an assessment assignment to measure the student achievement of the learning outcome 1: Apply life cycle costing in design, material selection, construction and operation and maintenance

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Table 5: Example of assessment criteria for intended learning outcomes in the course Sustainable Facility Management

Intended learning outcomes	Assessment criterion	Fail descriptor
Apply life cycle costing in design, material selection, construction and operation and maintenance	Demonstrate and apply theoretical and practical knowledge of life cycle costing principles to material selection, operation and maintenance of the building	Demonstrate partially-developed knowledge of life cycle costing related to the design, material selection, construction and operation and maintenance of the building Make insufficient or wrong assumptions and partially calculate some of the expected life cycle parameters in materials and building operations, occasionally justifying the use and outcomes of selected materials. Partially link to some life cycle costing practices.

The achievement of learning outcome: Apply life cycle costing in design, material selection, construction and operation and maintenance is measured by the assessment assignment Team Project Technical Report as described in the section Types of Assessment Assignments, which is assessed by the following assessment criteria:

1. Demonstrate and apply theoretical and practical knowledge of life cycle costing principles to material selection, operation and maintenance of the building (35 %);
2. Solve energy consumption problems during construction and operations phase of the building (35 %);
3. Communicate in a team in writing in the form of a technical project report (30 %);

The standard descriptors used to assess the student achievement of the learning outcome: Apply life cycle costing in design, material selection, construction and operation and maintenance through the assessment assignment (Team Project Technical Report) are:

- Fail – Grade 5;
- Pass – Grade 6;
- Average credit – Grade 7 and 8;
- Distinction – Grade 9;
- High distinction – Grade 10

The descriptors are explained for each assessment criterion in Table 6.

Intended learning outcomes	Assessment criterion	High Distinction – Grade 10	Distinction – Grade 9	Average credit- Grades 7 and 8	Pass – Grade 6	Fail – Grade 5
Apply life cycle costing in design, material selection, construction and operation and maintenance	Demonstrate and apply theoretical and practical knowledge of life cycle costing principles to material selection, operation and maintenance of the building (35 %)	Demonstrate and apply comprehensive knowledge of life cycle costing when thoroughly discussing and describing the main concepts and features related to the design, materials selection, and buildings operations and maintenance. Make meaningful assumptions and correctly calculate all of the expected parameters in building	Demonstrate and apply broad knowledge of life cycle costing when discussing and describing the main concepts and features related to the design, materials selection, and buildings operations and maintenance. Make relevant assumptions and correctly calculate the expected parameters in building operations and maintenance, justifying the	Demonstrate and apply knowledge of life cycle costing when discussing and describing most of the concepts and features related to the design, materials selection, and buildings operations and maintenance. Make assumptions and calculate most expected life cycle costing parameters in building operations and maintenance,	Demonstrate and apply basic knowledge of life cycle costing when discussing and describing some of the concepts and features related to the design, material selection, and building operations and maintenance. Make at least half the required assumptions and calculate some of the expected life cycle parameters in building operations,	Demonstrate partially-developed knowledge of life cycle costing related to the design, material selection, construction and operation and maintenance of the building Make insufficient or wrong assumptions and partially calculate some of the expected life cycle parameters in materials and building operations,

		operations and maintenance, thoroughly justifying the use and outcomes of selected materials. Support all your work with extensive, relevant and current literature, link all of your design and development work to relevant LCC theory in industry practices.	use and outcomes of selected materials. Support your work with relevant and current literature, link most of your design and development work to relevant LCC theory in industry practices	justifying the use and outcomes of selected materials. Support most of your work with relevant literature, link some of your design and development work to relevant LCC theory in construction industry practices.	partially justifying their use and outcomes of selected materials. Support at least half of your work with literature, link some of your design and development work to life cycle costing theory in construction industry practices.	occasionally justifying the use and outcomes of selected materials. Partially link to some life cycle costing practices.
Apply life cycle costing in design, material selection, construction and operation and maintenance	Solve energy consumption problems during construction and operations phase of the building (35 %);	Communicate and work effectively in a team and as a leader to efficiently plan and conduct the project to achieve all	Communicate and work effectively in a team and as a leader to plan and conduct the project to achieve all stipulated goals	Communicate and work in a team and occasionally as a leader to plan and conduct the project to achieve most of the stipulated	Communicate and work regularly in a team to plan and conduct the project to achieve some of the stipulated goals of	Work mainly as an individual. Partially solve building energy consumption problems in the construction & operations phases to:

		stipulated goals of calculating energy consumption of the building. Solve energy consumption problems in the construction & operations phases of the building to: provide accurate, innovative and practical building materials solutions,	of calculating energy consumption of the building. Solve energy consumption problems problems in the construction & operations phases to: provide accurate and practical building materials solutions most of which are innovative,	goals of calculating energy consumption of the building Solve energy consumption problems in the construction & operations phases of the building to: provide accurate and practical building materials solutions,	calculating energy consumption of the building. Solve energy consumption problems in the construction & operations phases of the building to: provide some accurate and practical building materials solutions,	□ provide inaccurate and/or incomplete building materials solutions,
Apply life cycle costing in design, material selection, construction and operation and maintenance	Communicate in a team in writing in the form of a technical project report (30%)	Communicate concisely and coherently in a structured and readable report that adheres to the given format with comprehensive and fully	Communicate concisely and coherently in a structured and readable report that adheres to the given format.	Communicate coherently in a structured and readable report that adheres to the given format.	Communicate in a structured and readable report that largely adheres to the given format.	Present information.

		detailed, diagrams and photos				