COFCOE: Continuous Oral Feedback Continuous Oral Evaluation for Continuous Active Learning in Outcome Based Education, Teaching, Learning and Evaluation (OBTLE)

Debaprasad Mukherjee, Gour Sundar Mitra Thakur*

Department of Information Technology

BCREC, DGP, WB, INDIA

*[*mdebaprasad@gmail.com](mailto:mdebaprasad@gmail.com)*

Abstract

A new and extremely effective teaching-learning-assessment methodology is introduced for continuous active learning in outcome based education (Teaching, Learning and Evaluation-OBTLE). This method addresses the modern methods of education like personalized learning, participatory learning, peer evaluation, revised Bloom's Taxonomy, and all graduate Attributes including the corresponding competencies and performance indicators. Most importantly this method encourages socratic questioning which facilitates inquiry based learning, which is being projected as the future of learning in any context. The method may be extremely useful to identify and take remedial measures for students who may need additional attention from teachers.

Keywords

Continuous, Oral, Evaluation, Feedback, Active Learning, Outcome Based Education, Inquiry-based Learning, Bloom's Taxonomy, Graduate Attributes

Introduction

In every walk of life the process of evaluation takes place in one or the other form. If the evaluation process is eliminated from human life then perhaps the aim of life may be lost. It is only through evaluation that one can discriminate between good and bad. The whole cycle of social development revolves around the evaluation process.[1, 2, 3] In education how much a student has succeeded in his aims can only be determined through evaluation. Thus there is a close relationship between evaluation and aims.

Evaluation has its four different aspects namely: (i) Objectives, (ii) Learning experiences, (iii) Learner appraisal and the, and (iv) Relationship between the three. The most extended definition of evaluation has been supplied by C.E. Beeby (1977), who described evaluation as “the systematic collection and interpretation of evidence leading as a part of process to a judgement of value with a view to action.” In this definition, there are the following four key elements: (i) Systematic collection of evidence. (ii) Its interpretation. (iii) Judgement of value. (iv) With a view to action. [1,2, 3, 5, 6, 7] But teaching methodologies are central to modern and futuristic learning at all levels of education. Some of the most preferred or popular methods and their deficiencies are discussed below.

Teaching methodologies

Teacher-Centered

Often thought of as one of the most traditional teaching methods, the teacher-centered methodology, attention is concentrated on the teacher. Teachers are in charge of the classroom and direct all activities. The teacher-centered methodology has recently fallen out of favor because this strategy for teaching is seen to favor passive students. Ideally, teachers would rather their students participate actively in the learning process. The teacher-centered approach does not strategically aim to facilitate this.[2, 5] Instead, control over student behavior is a priority. One advantage is that behavior problems are typically easy to control in this environment. Another advantage is that it's rare for a student to miss a topic because the teacher directs everything that happens in the classroom.

Despite its advantages, there are quite a few downsides to the teacher-centered approach. Most importantly, students don't get to benefit from the social advantages of other approaches. In addition, students don't get the chance to direct and play an active role in their own learning. Life skills such as collaboration, critical thinking, debate, and more, are harder to gain in a teacher-centered classroom. [5, 7]

Student-Centered / Constructivist Approach

Many of the teaching methods and strategies on this list are considered student-centered or constructivist. In simple terms, it turns the focus on students rather than only on the teacher. In this approach, students may sit in small groups, access centers, and possibly move about the classroom freely. Students play a more active role in their learning and may even help choose the topics they learn about. To avoid behavior problems, teachers must lay a lot of groundwork in student-centered classrooms. Typically, it involves instilling a sense of responsibility in students. In addition, students must learn internal motivation. Although sometimes challenging to achieve, these qualities of responsibility and intrinsic motivation also build self-confidence and instill a lifelong love of learning in students. The student-centered approach can be difficult for teachers to master or perfect. However, the results and outcomes can be very positive when the approach is effectively employed. [4, 5, 9]

Inquiry-Based Learning

What if learning was question-driven? This is exactly what inquiry-based learning is about.

In this approach, the teacher guides students to develop critical thinking and problem-solving skills. To learn these skills, the teacher helps students think through their processes, teaches them possible approaches, and encourages them to try various methods. Students are encouraged to fail as a part of the process and then improve their performance in subsequent activities. Instead of repeating answers students have been taught, students learn to seek their own answers to questions. [8, 6, 10] So, students develop strong research skills. In addition, students learn how to choose questions to answer and what questions they might ask. This approach is also student-centered as it requires active participation on the part of students. The teacher guides and teaches, however, students also help choose topics of study.

Flipped Classroom

In this fascinating approach to learning, homework is very intentional. Rather than being “extra” practice, homework is a preparation for the next class. With this approach, students may watch a video or lecture about the content and ideas that will be used in the next class. In other words, lower orders of thinking in Bloom’s Taxonomy, such as remembering and understanding, are relegated to homework. Then, classroom work focuses on higher orders of thinking and learning such as analyzing, evaluating, and creating.[2, 5] The idea is that students should have more time in-classroom focusing on achieving these higher levels of thinking and learning. That way, the teacher can guide this practice more effectively. The FLIPped classroom is also an acronym. The letters FLIP represent the four pillars included in this type of learning: Flexible environment, Learning culture shift, Intentional content, and Professional educator. As you can see, the second pillar refers to a culture shift from the traditional approach where students are more passive to an approach where students are active participants. As a result, this approach is also a student-centered teaching method.[9]

Cooperative Learning

As the name suggests, cooperative learning involves a lot of group work. However, it also requires a lot of structure and intervention from the part of the teacher to make learning as effective as possible. [1, 2] Some commonly used cooperative learning strategies include “think-pair-share”. Discussions in small groups or pairs can also be effective, as can a “jigsaw” approach.

In the jigsaw model, students are broken into small groups and read or learn from a certain perspective. Then, one group member from each of the groups form new groups and they bring their understanding to that group. [5, 7, 12] Essentially, cooperative learning believes that social interactions can improve learning. In addition, the approach recreates real-world work situations in which collaboration and cooperation are required. There is good evidence that this student-centered approach is an effective teaching strategy.

Personalized Education

Personalized education takes the student-centered approach to a new level by, as much as possible, responding to each individual learner's unique needs, strengths, and weaknesses. Through individualized instruction, learning is tailored to the student. In today's world, this might be seen in one-on-one tutoring or high-tech, responsive learning applications like Happy Numbers. A very effective form of learning, personalized education can achieve outstanding learning outcomes. Some examples of this approach include the Montessori method, which strives to allow each student to follow their own interests and move at their own pace. However, many other high-tech programs may also achieve this type of learning. [2, 6, 9] Finally, a personalized education approach may also mix-in cooperative learning for a balanced mix of social and individualized learning.

COFCOE: Continuous Oral Feedback Continuous Oral Evaluation for Continuous Active Learning in Outcome Based Education, Teaching, Learning and Evaluation (OBTLE)

A new and extremely effective teaching-learning-assessment methodology is introduced for continuous active learning in outcome based education (Teaching, Learning and Evaluation-OBTLE). This method addresses the modern methods of education like personalized learning, participatory learning, peer evaluation, revised Bloom's Taxonomy, and all graduate Attributes including the corresponding competencies and performance indicators. [8, 9, 12]

Most importantly this method encourages socratic questioning which facilitates inquiry based learning, which is being projected as the future of learning in any context. The method may be extremely useful to identify and take remedial measures for students who may need additional attention from teachers. [2, 3, 7] Based on the centrality of feedback and evaluation in learning esp active learning, a new method of teaching learning is being proposed below.

The method is named COFCOE. The details of the method are as follows:

1) All faculty members follow the process of Continuous Oral Feedback Continuous Oral Evaluation (COFCOE) in every class, laboratory, the sessional and mandatory additional requirement of the University curriculum. All faculty members follow the process of Continuous Oral Feedback Continuous Oral Evaluation (COFCOE) in every class, laboratory, sessional and mandatory additional requirements of the University curriculum, and B) follow a process of Continuous Improvement of COFCOE through COFCOE R&D group. (as the COFCOE process optimally and automatically addresses all individual dimensions of Revised Blooms Taxonomy, Graduate Attributes, Next Generation Learning Taxonomy, in an adequately Graduate Attribute compliant MAKAUT curriculum). [4]

2) *The COFCOE process has four components: [6, 12]*

A) Students providing feedback to teacher (on Exam Reform Policy parameters)

B) The teacher providing feedback to students (on Exam Reform Policy parameters)

C) Teacher asking questions to the student (As per Exam Reform Policy)

D) Students asking questions to the teacher (As per 360 Degree/Socratic Questioning method)

3) The 4 components of COFCOE (2A, B, C, D) are implemented by teachers through strongly aligning these 4 components to the Course Outcomes and their subcomponents.

4) The COs are suitably adapted by the teachers, towards the Vision of Employability, using the latest placement questions covering all aspects of the COs, as per the teacher's own experience and judgment.

5) A) The teacher addresses the class/lab/sessional into THREE students' groups based on measuring and tracking the **THINKING ABILITY/APTITUDE** of the students (bright, average, weak students) through COFCOE, and B) The teacher continuously and suitably adapted COFCOE for each of the groups, as per the separate needs of each of these groups (with respect to each of the dimensions of Revised Bloom's Taxonomy).

The most popular employability tests are utilized for adopting and adapting subject-wise placement questions to be implemented through COFCOE, in class, labs and sessional, class tests, quizzes, assignments, lab viva, lab exam. (Faculty members can adopt and adapt placement questions from other sources also, as per suggestions from the placement team, or faculty member's own experience and judgment): Components of the academic audit are part of the TeachingLearning process, held on a monthly basis (preferably thrice per semester) for all students of all semesters. All faculty members use COFCOE in such a way so that the lectures/labs address all COs with almost EQUAL WEIGHTAGE in each subject paper. [4] All Faculty members use the exam reform policy documents as a regular reference for COFCOE, to align their continuous feedback and evaluation process with Blooms Taxonomy levels & keywords, Graduate Attributes, Competencies and Performance Indicators as stated in that policy document. The above will automatically make students attain the set of GAs, Competencies and Performance Indicators.

Action taken by every faculty member after every semester, esp when CO, PO and PSO attainment has gaps/deficiencies:

Every semester, each faculty member identify the gaps/deficiencies in the attainment of (G)COs, POs, PSOs of their allotted subjects based on 1) classroom/lab experience in COFCOE, 2) ability demonstrated in internal assessments, 3) analysis of university question paper, 4) latest trends in placement questions and 5) University results. Each faculty member sincerely attempts to reduce the gaps/deficiencies in attainment identified above, through refinement/improvement/innovation of COFCOE as per 1) activities in COFCOE R&D group, and 2) their own judgment and experience, addressing the 5 points mentioned above.

Teachers mentally divide the class/lab into 3 groups (bright students, average students, weak students) by using It, and then use COFCOE again to improve each group as per the groups' needs. All teachers use It to improve/attain the students on 1) all the COs and 2) all levels of Revised Bloom's Taxonomy, using primarily a) placement questions and b) University questions. [2, 9]

Four (mutually coupled) components of COFCOE [1, 5, 6]

StoT - Feedbacks given by students to teacher (and corresponding remedial measures taken by teacher)

TtoS - Feedbacks given by the teacher to students (and remedial measures taken by students.)

TtoS - Evaluation Questions asked by the teacher to students (and gaps identified in answers and remedial measures taken by teachers)

StoT - Questions asked by students to teachers (and gaps identified in the learning process of students and remedial measures taken by students.) (As per 360 Degree/Socratic Questioning method)

Process of Implementation of COFCOE in classrooms, labs and sessional and other necessary situations, for the department as a whole, for the whole University curriculum: (All teachers implementation It for all subjects in each & every period: theory period, lab period, sessional period)

Minimum Implementation

One question for each of the following 4 components (C) of COFCOE for each of the 3 groups (Bright, Average, Weak) of students (BG, AG, WG): C1: StoT(F) - Feedbacks given by students to the teacher (and corresponding remedial measures taken by the teacher) C2: TtoS(F) - Feedbacks given by the teacher to students (and remedial measures taken by students.) C3: TtoS(E) - Evaluation Questions asked by the teacher to students (and gaps identified in answers and remedial measures taken by teachers) C4: StoT(E) - Questions asked by students to teachers (and gaps identified in the learning process of students and remedial measures taken by students.) (Used by teachers to Evaluate the students based on the level/type of questions). So, at the minimum, there will be 12 questions (Q) for each period (theory/lab/sessional) Q. WG- C1:StoT(F) Q. WG- C2:TtoS(F) Q. WG- C3:TtoS(E) Q. WG- C4:StoT(E) Q. AG- C1:StoT(F) Q. AG- C2:TtoS(F) Q. AG- C3:TtoS(E) Q. AG- C4:StoT(E) Q. BG- C1:StoT(F) Q. BG- C2:TtoS(F) Q. BG- C3:TtoS(E) Q. BG- C4:StoT(E) And as stated previously, questions (Q) will be regarding (F)/from (E) Latest Placement Questions (equally distributed among the COs), to measure the THINKING ABILITY/APTITUDE of students.

Why Continuous ORAL Feedback and Continuous ORAL Evaluation (COFCOE) is much more effective compared to written/other forms of feedback/evaluation?

(Here “it” refers to COFCOE in the classroom, laboratory, sessional, and other curricular activities) (Some points may seem overlapping, but their holistic meaning has different interpretations)

It is much easier to continue and sustain over a long period of time by almost all teachers, because of its oral nature. COFCOE has more impact on the students and teachers. COFCOE is real-time that is on the spot. The effect is to a large extent immediate, but also long term. It compels both the student and teacher to think, thus making the activity a thinking session. COFCOE is very easy to personalize for maximum students. COFCOE has the advantage of the IMPACT due to the proximal physical presence of teachers & students. Through It the gaps are identified on the spot and remedial actions can be initiated almost immediately. [3] Through COFCOE the teaching-learning process becomes highly adaptive to both the teachers' and students' needs, in real-time. It encourages students to feel involved and participate in the class. COFCOE makes the student alert and much more attentive in the class. COFCOE also makes the student understand the value of learning in the physical presence of teachers and classmates, compared to isolated online learning.

Over a period of time, It makes the students more responsible for their own learning. COFCOE leads to the improvement of communication skills of both teacher and student COFCOE makes the students and teachers much more sensitive and responsive to each other. It helps the students to overcome their mental barrier of asking questions and interacting with superiors and peers. COFCOE encourages students to overcome the fear of committing mistakes while learning. COFCOE inherently makes the class much more interesting and not monotonous. It ensures real-time active participation of the students and teachers. [6] COFCOE implements the ACTIVE LEARNING model and STUDENT CENTRIC model to make the teaching-learning OUTCOME BASED. COFCOE improves the pedagogy of the teacher and helps to identify innovative but effective pedagogical methods. It makes possible continuous real-time tracking of the growth and performance and improvement of each student, in addition to the identification of strong and weak students.

COFCOE encourages a healthy competitive learning environment inside the classroom/lab. COFCOE encourages the student to improve skills of self-learning. It improves the logical reasoning and inference ability of the students (and also the instructors). COFCOE improves the speed and accuracy of thinking of the students. COFCOE improves collaborative learning among the students. [4, 5, 9] Through It students can learn from the mistakes of other students before committing the same mistake themselves. COFCOE improves listening and interpretation skills enormously.

Through COFCOE the students can absorb good learner characteristics from other students inside class/lab itself. It makes possible continuous and spontaneous faculty development. COFCOE helps to explore unforeseen aspects of the topics and topics beyond the syllabus.

COFCOE improves the real-time problem-solving ability of the students. It makes discussion-based case study (term paper assignment and mini-project) based project-based learning with accountability and is much easier to implement. COFCOE ensures the learning of the students to a large extent. COFCOE ensures the effective implementation of the affective and behaviour dimensions of bloom's taxonomy. [1] It ensures assessment and goal oriented CONTINUOUS IMPROVEMENT of the teaching learning mentoring evaluation feedback process. COFCOE improves the speed of exploration of any topic and uncovering of the curriculum COFCOE improves the identification of gaps in learning very quickly. It helps to quickly converge to the best possible solution of any problem, within the constraints of an activity session. COFCOE enables peer evaluation and peer learning. COFCOE enables efficient peer feedback. It enables the removal of gaps right at the beginning section of the course. COFCOE enables to identify the gaps in prerequisites in the students COFCOE helps to make feedback and evaluation processes with much higher frequency. [2, 8, 10].

It improves the bonding between teachers and students. COFCOE creates a flexible and comfortable learning environment inside the class. COFCOE ensures students focus on the details of the concepts. It significantly reduces the passivity in students during learning, and thus increases the cognitive power of students much more. COFCOE helps to complete preparation inside the class/lab itself. COFCOE helps the students to quicken the improvement of abstract knowledge and higher-order thinking skills due to information and analysis available from classmates. It makes students much more adaptive in their own personal learning process. Through COFCOE, the student can put together different values & information and ideas and can accommodate them in their own schema. COFCOE improves the analytical skills of the students because they are exposed to various different modes of thinking from classmates.

It also enables students to create or evaluate things/complex engineering problems due to group brainstorming. Through COFCOE students can compare, relate and elaborate on what they have learned. Through COFCOE, teachers can continuously and thus effectively mentor and motivate students towards the achievement of the vision of the department. It improves the initiative in the students. COFCOE improves the learning and responding habit of the students and teachers. COFCOE improves the quality of readiness-to-act in the students. It motivates the students to question. [7] COFCOE improves the BASIC CONCEPTS of the students much more than written evaluation. COFCOE ensures fairness of feedback and evaluation. It improves the metacognitive abilities of the students. COFCOE is a rapidly convergent process towards learning outcomes. COFCOE helps much more in remembering the concepts. It helps the students to value the learning and add value to what has already been learned. COFCOE helps the students to follow instructions more accurately (guided response). COFCOE helps to learn through an extremely effective evaluation.

It helps the teacher to satisfy the requirements of the students to the maximum. COFCOE implements both direct and indirect, formative and summative, diagnostic assessment and helps to identify gaps in attainment of learning outcomes. COFCOE motivates students much more to be in continuous learning mode. It encourages creativity and innovation through questioning. COFCOE enables students to develop the five of the most important skills in employability:

Logical/Rational Thinking, Self-learning, Communication, Performing, Adapting and Self-esteem. COFCOE makes each class/lab a forum for group brainstorming and thus makes each class/lab a session of critical thinking/reasoning. It is one of the best ways to judge & develop the inherent THINKING ABILITY/APTITUDE of each of the students and track their growth over time, by each individual teacher.

COFCOE also ensures that each individual lecture/lab session achieves some definite outcome (lecture outcome in class/ activity outcome in lab). COFCOE automatically achieves adequate attainment of the 22 dimensions of the Revised Bloom's Taxonomy (6 cognitive, 5 affective, 7 behavioural/skill, and 4 knowledge dimensions), in most students. It automatically makes most students attain the 12 Graduate Attributes (divided into 36 Competencies, and further divided into 81 performance indicators), in a University curriculum that is adequately Graduate Attribute compliant. COFCOE automatically implements core principles of Outcome Based Education inside classroom/labs, that is 1) Convergent focus and 2) Demonstrable ability/ performance.

Internal Assessments, Assignments and Evaluation

All internal evaluation questions (in the above set of tests) are adopted and adapted from the latest questions of popular employability and recruitment tests/exams. All faculty members use Continuous Oral Feedback and Continuous Oral Evaluation (COFCOE) to carefully track the development of Thinking Abilities/Aptitude in students in their allocated subjects of the university curriculum. (As per Spady's definition of OBE, departmental Vision & Mission, all 21 dimensions of Revised Blooms Taxonomy, 12 Graduate Attributes/POs, and (optionally) Next Generation Learning Taxonomy) Assignments (open-ended questions, mini-projects, term papers, micro seminars) are performed in discussion-based-viva mode in class, with optional submission of documents. (This is done in discussion-based-viva mode primarily to develop communication and thinking skills in students, effectively address 21 dimensions of Revised Blooms Taxonomy, and avoid plagiarism). [12, 6]

Marking in all internal evaluation is done based on the primary emphasis on the following parameters (through part-marking): 1) thinking ability/aptitude, 2) degree of effort/sincerity of attempt to answer questions, 3) clarity of fundamental concepts, 4) appropriate use of engineering keywords vocabulary, 5) subjective idea about the steps of solving model problems, 6) ability to analyse the problem/question in detail, 7) ability to generate an approach to the solution/answer, 8) ability to produce innovative but useful ideas, 9) ability for a brief subjective overview of the subject and 10) affective and behavioral aspects of Revised Blooms Taxonomy. [5] A continuous thrust is maintained by all faculty members to prevent the use of any unfair means by students during all the tests and examinations. Faculty members discuss with students the common gaps in conceptions identified in internal evaluations and take necessary remedial actions. Faculty members also enquire about complex questions in University conducted semester exams, and take suitable remedial action for the students. Furthermore, through Academic Audit all students are evaluated regarding employability using the employability vivas (implemented by the Academic Audit Committee).

Conclusion

A new and extremely effective teaching-learning-assessment methodology is introduced for continuous active learning in outcome based education (Teaching, Learning and Evaluation-OBTLE). This method addresses the modern methods of education like personalized learning, participatory learning, peer evaluation, revised Bloom's Taxonomy, and all graduate Attributes including the corresponding competencies and performance indicators. Most importantly this method encourages socratic questioning which facilitates inquiry based learning, which is being projected as the future of learning in any context. The method may be extremely useful to identify and take remedial measures for students who may need additional attention from teachers.

The COFCOE method may become the de facto standard in teaching learning and continuous assessments as the world moves towards active learning in stages and levels of education, especially for online education.

References

1. McKeachie, Wilbert J., Paul R. Pintrich, and Yi-Guang Lin. "Teaching learning strategies." *Educational Psychologist* 20.3 (1985): 153-160.
2. Eren, Altay, and Erkan Tekinarslan. "Prospective Teachers' Metaphors: Teacher, Teaching, Learning, Instructional Material and Evaluation Concepts." *International Journal of Social Sciences & Education* 3.2 (2012).
3. Avelino, Carolina Costa Valcanti, et al. "Teaching-learning evaluation on the ICNP® using virtual learning environment." *Revista brasileira de enfermagem* 70 (2017): 602-609.
4. Arthur Jr, Winfred, et al. "Teaching effectiveness: The relationship between reaction and learning evaluation criteria." *Educational Psychology* 23.3 (2003): 275-285.
5. Hounsell, Dai. "The evaluation of teaching." *A handbook for teaching and learning in higher education*. Routledge, 2003. 188-199.
6. Uttl, Bob, Carmela A. White, and Daniela Wong Gonzalez. "Meta-analysis of faculty's teaching effectiveness: Student evaluation of teaching ratings and student learning are not related." *Studies in Educational Evaluation* 54 (2017): 22-42.
7. Spooren, Pieter, Bert Brockx, and Dimitri Mortelmans. "On the validity of student evaluation of teaching: The state of the art." *Review of Educational Research* 83.4 (2013): 598-642.
8. Betoret, Fernando Doménech, and Adela Descals Tomás. "Evaluation of the university teaching/learning process for the improvement of quality in higher education." *Assessment & evaluation in higher education* 28.2 (2003): 165-178.
9. Macdonald, Ranald. "The use of evaluation to improve practice in learning and teaching." *Innovations in Education and Teaching International* 43.1 (2006): 3-13.
10. Carless, David, and Naomi Winstone. "Teacher feedback literacy and its interplay with student feedback literacy." *Teaching in Higher Education* (2020): 1-14.
11. Deneen, Christopher C., and Hui-Teng Hoo. "Connecting teacher and student assessment literacy with self-evaluation and peer feedback." *Assessment & Evaluation in Higher Education* (2021): 1-13.

12. Yilmaz, Fatma Gizem Karaoglan, and Ramazan Yilmaz. "Student opinions about personalized recommendation and feedback based on learning analytics." *Technology, Knowledge and Learning* 25.4 (2020): 753-768.