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Implementation of Continuous-Assessment on Postgraduate Program

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ABSTRACT

Objective: The assessment approach is crucial to achieving learning outcomes. Contonuous-Assessment (CA) is one alternative assessment that can be used to increase various skills. This preliminary study aims to: (1) formulate CA and project-based assessment in higher education; (2) describe the lecturer's and students' perception of CA in the postgraduate program; (3) map course assignments within the framework of CA at the postgraduate level. **Method:** Data was collected through Forum Group Discussions (FGDs) and questionnaires. Data were analyzed both qualitatively and quantitatively. **Results:** The results show that the conceptual study of the CA should pay attention to the purposes, improve the learning process, involve students fully and purposefully in their learning, and explore the factors that influence the learning process. The design of CA is realized as demand mapping for each course in the form of products or small projects as part of the stages for completing a thesis/dissertation. Most lecturers and students agree that the lecture process uses a CA design in which each course contributes to achieving the thesis/dissertation. A small number of them disagree and give some suggestions. **Novelty:** The novelty of this research is to produce a mapping of assignments from all courses, which leads to the completion of writing a thesis/dissertation.

INTRODUCTION

Assessment is an activity to collect, interpret, and describe various information qualitatively and quantitatively. The collection of this information is carried out through a series of measurement activities. An accurate assessment does not just collect as much information as possible but must also be stable to produce inferences (McCarthy & McNamara, 2021). Measurements must also be precise in producing an accurate assessment (Ramalepe & Zengele, 2014). For various learning outcomes, no single action, strategy, activity, or task can provide a complete picture of a person's abilities (Ramalepe & Zengele, 2014).

Assessment activities must be distinct from learning activities. A good assessment plan will be able to measure and collect information on learning outcomes comprehensively. As the learning paradigm shifts from teacher-centered to student-centered, the assessment approach has shifted to prioritizing learning assessment. It is more focused on assessing results but is encouraged to be more holistic and sustainable by emphasizing the importance of assessment for learning and assessment as learning. Continuous-Assessment (CA) can improve the quality of teaching and learning through feedback and increase students' motivation (Holmes, 2015; Salekin et al., 2020; Vahed et al., 2021). At the high school level, the school's CA can predict the results of national-level exams (Martínez et al., 2020; Nziku & Matogwa, 2021). While at tertiary institutions, CA is an effective and efficient strategy to provide feedback on student performance (Nziku & Matogwa, 2021).

Formative assessment in the form of authentic assignments through projects, practices, and various other performances is a form of assessment that has the potential.

To be designed as a continuous assessment. It is increasingly helpful in equipping the skills needed to solve real problems (Durovic et al., 2020). Moreover, if CA emphasizes assessment as learning by actively involving someone in assessment activities, including assessing himself, the results will be very effective because students are their best assessors (De Santos-Berbel et al., 2022; Martínez et al., 2020).

In the study process for Postgraduate students, the climax is the preparation of the final work in a thesis for master's program students and a dissertation for doctoral students or other similar terms. Compiling the outcome should not be separate from the lectures taken during the study. Likewise, the implementation of the assessment should also be carried out in an integrated and sustainable manner (Day et al., 2018; Dejene & Chen, 2019; Durovic et al., 2020; González-Campos et al., 2018; Llamas-Nistal et al., 2019; Martínez et al., 2020; Sánchez-Ruiz et al., 2021). Students must be able to find real problems, which will be solved according to their competence. Students should have started designing small projects in every lecture to complete their final assignment (Carrillo et al., 2019; Gillis & Krull, 2020; Mohanty et al., 2021; Varghese et al., 2019). Based on the researcher's observations, it is often the case that final terms are only thought about before the study ends, and it seems that this is one of the sources of the length of the study completion process (Day et al., 2018; Morales et al., 2022).

It is necessary to design how the CA can encourage students to systematically organize their lecture assignments as part of completing their final project. In this context, project assignments and project-based assessments are the right choices. Project-based assessment can support the development of a student's potential because it involves many skills and integrates a piece of knowledge in planning, implementing, and compiling reports. A project is an alternative form of assessment that can be designed to become an authentic assessment (Bakhru & Mehta, 2020). Projects cannot be separated from investigative activities and can be designed to solve a real problem someone faces. The novelty of this research is that a mapping of assignments from all courses is carried out, which leads to the completion of writing a thesis/dissertation.

Research Aim and Research Questions

Based on the description above, the preliminary study aims to explore the lectures and students' perceptions of CA and map tasks in CA planning. As the preliminary research questions are:

1. How are the conceptual study of CA and project-based assessment also their implementation in higher education?
2. How do the lecturers and students perceive CA in a postgraduate program?
3. How are the mapping tasks in a CA plan at the postgraduate level?

RESEARCH METHOD

This research is descriptive explorative research to design a CA with the following stages of research activities. An exploratory, descriptive study aims to describe the state of a phenomenon; explain what a variable, symptom, or condition is; and is not intended to test any specific hypothesis (Creswell, 2014). In this study, data, information, and results are described:

1. Researchers study the CA concept and project-based assessment also their implementation in higher education.
2. Researchers share the lecturer's and students' questionnaires to collect the responses on the relevance of course assignments to the thesis/dissertation.

3. Study of the curriculum structure of specific study programs and sustainable assessment design.

Participants

Research participants in this preliminary study are the lecturers and students in the Postgraduate program at one of a university in Surabaya who are willing to fill out a questionnaire related to perceptions of CA at the postgraduate university.

Instrument and Procedures

The instruments used in this study were questionnaires about the perception of CA applications at postgraduate universities. That is the questionnaire for lecturers and the questionnaire for students. Researchers shared the questionnaire through the head of the study program and then communicated to the lecturers and students on each study program.

Data Analysis

The data analysis from the questionnaires is in graphs and tables. The descriptive explorative study was carried out to explain the result of the data analysis. It was the result of the questionnaire filled out. Based on the answer of the respondents, we take the descriptive data and convert it into a graph.

RESULTS AND DISCUSSION

Results

The CA framework is manifested in task mapping and various other forms of assessment implemented in each course. One of the implementation forms of sustainable assessment that is analyzed is project-based assessment. Some questionnaire items were developed and distributed via Google form to obtain lecturer and student responses regarding the continuous assessment. The links to Google Forms are https://ciut.in/instrumen-dosen (for lecturers) and https://ciut.in/instrumen-mhs (for students). The lecturer questionnaire information is shown in **Table 1**, and the students are shown in **Table 2.**

Table 1. The questionnaire for lecturers.

Statement	Answer choices	Open Questionnaire
According to you, lectures, assignments, and assessments carried out by lecturers in each subject must be related to the stage or process of completing a thesis/ dissertation.	a. Agree b. Disagree	Why?
Based on your experience, have the courses you taught been designed to contribute to completing a student thesis/ dissertation?	a. Already b. Not Yet	-
If the course you are capable of has yet to contribute to completing a student thesis/dissertation.	-	Why?
If the course you are capable of has contributed to completing a student thesis/dissertation.	-	Course name: … Contribution form: … Contribute to which part? Give one suggestion so that

Statement	Answer choices	Open Questionnaire
		lectures and assessments for each course contribute to completing a student's thesis/dissertation. Suggestions may be in courses that you are capable of or in subjects taught by other lecturers.

Table 2. The questionnaire for students.

Statement	Answer choices	Open Questionnaire
Assignments and assessments carried out by lecturers in each subject must be related to the stage or process of completing a thesis/dissertation.	a. Agree b. Disagree	Why?
Based on your experience, the number of courses that provide assignments and assessments contributes significantly to completing the thesis/dissertation.	a. Only 25% b. Between 25% to 50% c. More than 50% d. Almost 100%	-
Based on your experience, which courses provide the most relevant or helpful assignments in completing a thesis/ dissertation?	-	Course name: … Contribution form: … Contribute to which part?
Based on your experience, which courses do not contribute to completing the thesis/dissertation?	-	Course name: … Contribution form: … How is the assessment? Give one suggestion so that lectures and assessments for each course contribute to completing your thesis/dissertation.

The questionnaire instruments developed in Table 1 and Table 2 are qualitative questionnaires based on the need for research to explore the extent to which lecturers and students understand and agree with the CA to accelerate the completion of the doctoral program (Creswell, 2014). The results of distributing the questionnaire to all lecturers, also master and doctoral students in the field of science education analyzed based on the type of questionnaire (closed or open). **Figure 1** presents the responses of lecturers and students regarding CA and its relation to completing the final assignment in the form of a thesis/dissertation.

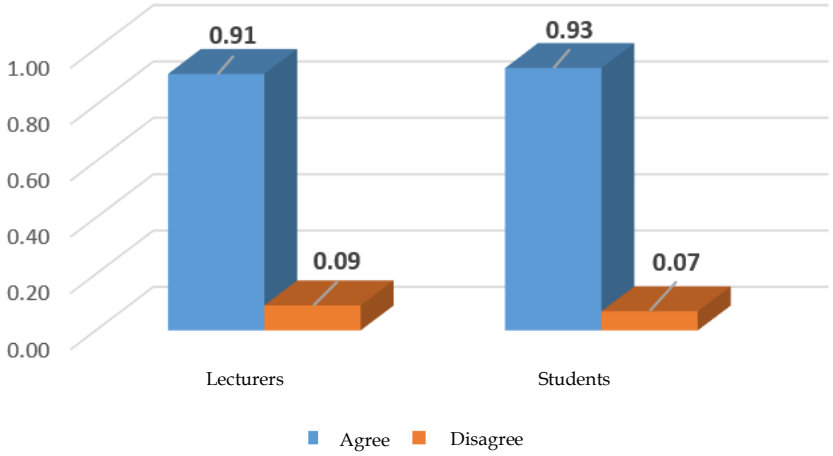

Figure 1. Graph of agree and disagree percentage on CA.

Figure 1 shows that the blue diagram agrees and the orange chart disagrees with the data. For the lecturers' graph, we know that almost all lecturers agree with the continuous assessment; 0.91 or 91.00% of respondents agree. Only 0.09 or 9.00% of lecturers disagree with the CA of courses on master's and doctoral degrees. For the students' graph, we know that almost all respondents from students agree with it; 0.93 or 93.00% agree with it. Only 0.07 or 7.00% of students disagree with it. More than 90.00% of lecturers and students agree that the lectures and assessments applied to each course are related to completing a thesis/dissertation.

The general argument of lecturers and students is that the study process becomes effective. The product of each course is valuable and contributes to the completion of the thesis/dissertation. If we explore more to the following answer for the agree respondents, the most used project-based learning. A project is an alternative form of assessment that can be designed to become an authentic assessment (Bakhru & Mehta, 2020; Billings & England, 2020). An authentic assessment is a CA that can be conducted on the course to support completing a thesis/dissertation. Projects require a relatively long period for data collection, analysis, and report writing (Bakhru & Mehta, 2020; Billings & England, 2020; Ozaktas, 2013; Pressman, 2019). Projects can also develop critical and creative thinking skills (Susantini et al., 2020).

Based on the open questionnaire that asks the reason "why" they disagree, respondents give a sense or statement about their answer-disagree. Based on the information in Figure 1, less than 10% of lecturers and students disagree with the continuous assessment. **Table 3** shows the resume of the arguments of lecturers and students who disagree with the CA.

Table 3. The arguments of lecturers and students who disagree.

Statements of Lecturers who disagree	Statements of students who disagree
"Lectures should provide broad insight to students about science. While the dissertation thesis is only part of that vast field of knowledge."	*"To support the completion of the final project."*
"This is because the preparation of a thesis is not as long as each subject is fully connected."	*"To add other insights."*
"Course assignments Not necessarily following the theme of the student's thesis."	*"Because sometimes not all courses have the same topic as each student's dissertation."*
"There are courses students must take to	*"Knowledge is not only about dissertations/thesis."*

Statements of Lecturers who disagree	Statements of students who disagree
strengthen their scientific foundation, even though they are not directly related to their final project."	
"The most important thing is that the output of the lecture is clear and valuable, significantly increasing publications."	*"Not all courses are related to a thesis/dissertation."*
"In my opinion, not all courses, maybe certain courses, are needed to prepare a thesis. Such as research methods and scientific study courses – but still required courses needed for mastery of scientific concepts that support the writing of the thesis later. In addition, new students are taking the 3rd-semester thesis, which means that in the first and second semesters, they are still taking general courses needed to understand the basic science that underlies the thesis. Thus assignments and assessments are still at the level of scientific mastery, which may still be partial, but the knowledge may be needed later when compiling a thesis."	*"In my opinion, the assignments and assessments carried out by lecturers in each subject are not always related to completing a thesis/dissertation. However, prioritizing more in-depth mastery of knowledge following scientific dimensions (by not abandoning scientific developments from time to time) and its suitability (theory of knowledge acquired) with conditions in the field. So that with the title obtained, it is following the mastery of the scientific dimension, not only the ability of the research topic."*
"If the master program, I disagree. Then for the doctoral degree, I agree."	*"Not effective and efficient."*
"Graduate profiles are not always directly related to dissertation completion."	*"Because the thesis is only one stage of the learning process."*
"Because not every subject is directly related to the student's thesis."	*"So that the knowledge we get is not limited by the thesis/dissertation we are working on."*
-	*"Because to acquire knowledge must be accompanied by experience."*

If we look closely at the arguments of the lecturers and students who disagree, they agree that each course contributes to writing a thesis or dissertation. Nevertheless, do not narrow it down that what is discussed and learned in lectures is only material or thesis/dissertation topics. It needs to be mutually agreed upon. Each course continues to equip students according to their description, according to the learning outcomes that have been formulated. It is also not possible to be narrow and narrow in one topic. Therefore, the lecture process conceptually remains broad and enlightens students. Still, when students work on assignments as part of the assessment process, the duties and assessments are designed to narrow down to the chosen thesis/dissertation theme.

It is considered based on the Indonesian National Qualifications Framework (INQF); the master's and doctoral levels have different characteristics. According to the INQF document, the master's degree is at level 8, and the doctoral level is at level 9 (Ristekdikti, 2015). At the master's level (level 8), graduates must develop skills in developing science and technology through research, innovation, testing, and solving problems with an inter/multi-disciplinary approach. Whereas in doctoral education (level 9), the unique skills that must be possessed are deepening and expanding new science and technology through research and completing problems with multi- or transdisciplinary approaches. So, the respondents have the basic argument when they disagree that CA applies to both master's and doctoral degrees.

Based on the agreed respondents, the researchers used the suggestions. They explored more for the characteristics of the course to make the mapping of continuous

assessments for the masters and doctoral programs of science education. Even though some respondents disagree with the idea of CA in postgraduate programs, it can be designed for operational mapping assessments so it can become logical. Based on the exploration of the kind of assessment of CA, researchers also explore the program learning outcome (PLO) on each course to fit the outcome. The most fundamental differences concern purpose, method, instrument, frequency, and context (Adesoji & Kenni, 2013; Billings & England, 2020; Durovic et al., 2020; Faremi & Faremi, 2020; Holmes, 2015; Kazerouni, 2019; Llamas-Nistal et al., 2019; Nziku & Matogwa, 2021; Perales-Gómez et al., 2022; Ramalepe & Zengele, 2014; Salekin et al., 2020; Timmerman & Doom, 2017; Vahed et al., 2021). The course outcome is in the form of a duty bill for each course.

Mapping departs from the structure of the curriculum. CA mapping is realized in the form of bills from each course. So that the type, time, and sequence of statements can be seen as a whole while students are studying. The Master Program of Science Education (MPSE) and Doctoral Program of Science Education (DPSE) were selected to focus the analysis of this research. The mapping of CA in MPSE is shown in **Table 4**, and for DPSE is shown in **Table 5.**

Table 4. CA Mapping of MPSE.

Numb	Course Name	Semester (CU)				Duty Bill (Course Outcome)
		1	2	3	4	
Institutional Subjects						
1	Philosophy of Science Education	2				The results of an in-depth study utilizing the philosophy of science (ontology, epistemology, and axiology) are relevant in building knowledge in the field of science education, adapted to the Thesis Theme (Description of the framework for the thesis theme)
2	Methodology of Research in Science Education	3				Research Proposal according to thesis theme (Chapters 1, 2, and 3)
3	Internship			2		1. Learning Devices that are relevant to the thesis theme. Or an in-depth study of the content of teaching materials pertinent to the thesis theme. 2. Articles on the results of learning practices during internship activities
Compulsory Specification						
4	Statistical Methods for Research	2				Report on the results of data analysis using statistical analysis techniques used for the completion of the thesis
5	Learning Theory for Advance Level	2				The results of the study of learning theory that underlies learning that is relevant to the Thesis Theme (Sub-section of Chapter 2), along with examples of its implementation in

Numb	Course Name	Semester (CU)				Duty Bill (Course Outcome)
		1	2	3	4	
						education: - Examples of apperception activities, motivation in learning to be designed,
6	Curriculum Development		2			The results of curriculum analysis at the academic unit level were chosen. The implementation came to an analysis of KD, GPA, learning objectives, or analysis of learning outcomes.
7	Learning Material Development		3			Examples of learning tools that are relevant to the model/method/approach and apply to the teaching materials selected for the thesis
8	Assessment and Evaluation		2			Assessment Instruments that follow the objectives of the Thesis. Ready to be validated
9	Integrated Science Learning Development	3				Science learning tools are integrated with models/strategies/approaches developed according to the thesis topic.
Non-Compulsory Specification						
10	School Physic*					The assignment is in the form of the results of teaching material analysis and the development of teaching materials relevant to the Thesis.
11	School Chemistry*					The assignment is in the form of the results of teaching material analysis and the development of teaching materials relevant to the Thesis.
12	School Biology*	2				The assignment is in the form of the results of teaching material analysis and the development of teaching materials relevant to the Thesis.
13	School Science*					The assignment is in the form of the results of teaching material analysis and the development of teaching materials relevant to the Thesis.
14	Science of Physic 1*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Advanced Mechanics
15	Science of Chemistry 1*		2			Reports/papers result from thoughts or studies on solving scientific and technological problems related to chemical principles, concepts, and laws. Chemistry 1

Numb	Course Name	Semester (CU)				Duty Bill (Course Outcome)
		1	2	3	4	
16	Science of Biology 1)*					Reports/papers result from thoughts or studies on solving science and technology problems related to principles, concepts, and laws. Biology 1
17	Science 1*					Reports/papers result from thoughts or studies on solving science and technology problems related to scientific principles, concepts, and laws. Science 1
18	Science of Physic 2*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to the principles, concepts, and laws. Electricity and magnetism
19	Science of Chemistry 2*		2			Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Chemistry 2
20	Science of Biology 2*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Biology 2
21	Science 2*					Reports/papers result from thoughts or studies on solving science and technology problems related to scientific principles, concepts, and laws. Science 2
22	Science of Physic 3*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to the principles, concepts, and laws. Quantum physics
23	Science of Chemistry 3*			3		Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Chemistry 3
24	Science of Biology 3*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Biology 3
25	Science 3*					Reports/papers result from thoughts or studies on solving science and technology problems related to scientific principles, concepts, and

Numb	Course Name	Semester (CU)				Duty Bill (Course Outcome)
		1	2	3	4	
						laws. Science 3
26	Science of Physic 4*					Reports/papers result from thoughts or studies on solving science and technology problems related to the principles, concepts, and laws. Nuclear Physics
27	Science of Chemistry 4*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Chemistry 4
				3		
28	Science of Biology 4*					Reports/papers result from thoughts or studies on solving scientific and technological problems related to principles, concepts, and laws. Biology 4
29	Science 4*					Reports/papers result from thoughts or studies on solving science and technology problems related to scientific principles, concepts, and laws. Science 4
Thesis						
30	Research Proposal			2		The assignment is the research proposal ready to be submitted to the seminar.
31	Publication			2		Research scientific articles along with supervisors published in nationally accredited scientific journals or international scientific journals
32	Thesis				4	Final thesis research report that is ready to be tested
Number of credits		**14**	**11**	**12**	**6**	

Table 5. CA Mapping of DPSE.

No	Course Name	Semester (CU)				Billing (Course Outcome)
		1	2	3-4	5-6	
Institutional Subjects						
1	Philosophy of Science, and Science Technology and Society	2				Thinking Framework for Chapter II of the Dissertation.
2	Advanced Qualitative Research Methodology	3				Preliminary study articles according to dissertation topics (submit to reputable international journals) & dissertation proposals (if taking qualitative research)
3	Advanced Quantitative Research Methodology	3				The assignment is a preliminary study of articles according to

No	Course Name	Semester (CU)				Billing (Course Outcome)
		1	2	3-4	5-6	
						dissertation topics (submitted to reputable international journals) & dissertation proposals.
Compulsory Specification						
4	Problems and Innovation in Science Education	2				The assignment is in the form of articles on problems and innovation studies in science education (submitted to reputable international journals).
5	Analysis of the Latest Journal Article	2				According to the dissertation topic, the assignment is the Theory Study (Chapter I and Chapter II).
6	Integrated Science Learning		2			Science learning tools are integrated with models/strategies/approaches developed according to the dissertation topic.
7	Assessment Development in Science Learning		2			Science learning assessment instrument according to the topic of the dissertation
8	Deepening the Concept of Science and Its Integration		3			Content studies (science concepts) according to the dissertation topic
9	Independent Study of Dissertation Supporting Study Fields			2		The assignment is the dissertation proposals and research articles submitted to reputable international journals.
10	Misconceptions and Conception changes					A diagnostic instrument for scientific misconceptions according to the topic of the dissertation
11	Local Wisdom-Based Science Learning					Learning tools based on local wisdom follow the topic of dissertation research
12	HOTS and Literacy in Science Learning					The HOTS and Science Literacy learning tools follow the dissertation research topic.
13	ICT in Science Learning		2*			The assignment is the Learning tools (including developed ICT-based learning media) following the dissertation research topic.
14	Science Education Curriculum Development					The science learning tools are integrated with the curriculum developed according to the dissertation research topic.
15	Science Learning in Special Conditions					The assignment is Science learning tools in special conditions (for example, in the context of natural disaster mitigation) according to the dissertation research topic.

No	Course Name	Semester (CU)				Billing (Course Outcome)
		1	2	3-4	5-6	
Dissertation						
16	Research proposal			3		The assignment is a research proposal ready to be disseminated (tested).
17	Research Results in Seminar				5	Dissertation research proposal and validated learning instruments and tools.
18	Publication			5		Reputable international journal articles.
19	Dissertation				9	The assignment is the Final dissertation research report that is ready to be tested.
Number of credits		12	13	8	14	
		43 + 4*				

Discussion

Assessment is an activity of collecting, interpreting, and describing various information both qualitatively and quantitatively. Information collection can be done in multiple ways. There are four assessment terms known, namely traditional assessment, alternative assessment, performance assessment, and authentic assessment, with a simple description as shown in **Table 6** (Bakhru & Mehta, 2020; González-Campos et al., 2018; Morales et al., 2022; Sridharan, 2016).

Table 6. Comparison of various forms of assessment.

Authentic Assessment	Authentic assessment is a performance assessment that uses real-world contexts or everyday life.
Performance Assessment	Performance assessment is an alternative assessment that demonstrates specific skills.
Alternative Assessment	Assessment using other methods besides the written test.
Traditional Assessment	The assessment is in the form of a written test (*paper and pencils test*)

Based on the explanation in **Table 6**, authentic assessment is the most realistic type of assessment but also the most complex in terms of planning, implementation, and reporting. A project is an alternative form of assessment that can be designed to become an authentic assessment (Bakhru & Mehta, 2020; Billings & England, 2020).

Projects cannot be separated from investigative activities and can be designed to solve a real/authentic world problem. The project includes three parts: planning, implementation, and reporting. Students in groups carry out all activities in the three sections. In the planning, of course, come up with various ideas/ideas. Every view must be discussed critically until the most optimal idea is implemented. After implementation, students certainly get multiple data and information that must be analyzed to obtain conclusions and presented in the form of written and oral reports through presentations. With the various activities above, it is clear that the project can train four C of XXI century skills, namely critical thinking, creativity, collaboration (collaborating), and communicating both in writing and orally. Projects can also develop critical and creative thinking skills (Susantini et al., 2020).

Projects require a relatively long period for data collection, analysis, and report writing (Bakhru & Mehta, 2020; Billings & England, 2020; Ozaktas, 2013; Pressman, 2019; Yakman & Lee, 2012). Therefore they need to be designed carefully and systematically by the teacher. Student projects can be developed across subjects because it is appropriate if the project is implemented in thematic and integrated learning (Yakman & Lee, 2012). Projects allow students to develop various skills: identifying and formulating problems, selecting methods and investigation procedures, collecting data and analysis, preparing conclusions, and compiling reports—the scoring. Analytical scoring deserves to be chosen in project assessment because students will receive detailed information on the achievements of each section so that students can carry out self-assessments of themselves and their groups (Llamas-Nistal et al., 2019). The study of CA is comprehensive. The main principles underlying the CA are:

1. All ongoing assessments must produce valid and reliable information following this purpose. In continuous assessment, many objectives may be formulated, such as diagnostics, assessment as, for, and of learning, or other assessment objectives.
2. Assessment should reinforce teaching and learning activities. They are improving the learning process. While assessments often only focus on what happens in the classroom, they have yet to maximally produce information to guide policies and plans and provide technical and substantial input. As well as other systemic factors affect the quality of learning in the classroom and the practice of implementing education as a whole.
3. Involve students fully and purposefully in their learning. CA must be able to dig deeper into the dimensions of learning, focus on students, provide feedback, and guide improvements as needed.
4. Exploring the factors that influence the learning process. CA can and should be able to provide information on the positive impact of factors outside the classroom, even outside the education system, which also strongly influence the quality of learning. It includes family, community, socio-cultural, and other environmental factors (Adesoji & Kenni, 2013; Billings & England, 2020; Durovic et al., 2020; Faremi & Faremi, 2020; Holmes, 2015; Kazerouni, 2019; Llamas-Nistal et al., 2019; Nziku & Matogwa, 2021; Perales et al., 2022; Ramalepe & Zengele, 2014; Salekin et al., 2020; Timmerman & Doom, 2017; Vahed et al., 2021).

Assessment so far tends only to be carried out to measure student learning outcomes and has yet to be designed in an integrated and sustainable manner. Assessment is positioned as an activity separate from the learning process. Assessment must be designed not only to find out the achievement of learning outcomes but what is more important is how assessment can improve students' abilities in the learning process. Assessment should be carried out through three approaches, namely assessment of learning (final assessment of education), assessment for learning (assessment for learning), and assessment as learning (assessment as learning) (Borich et al., 1994).

Assessment of learning is an assessment carried out after the learning process is complete (Rahman & Majumder, 2015). The entire learning process only sometimes occurs at the end of the year or with many students completing education at a certain level. Every educator assesses to provide recognition of the achievement of learning outcomes after completing the learning process. Assessment for learning is carried out during the learning process and is usually used to improve teaching and learning (Box, 2018; Zhou & Landa, 2018). In the assessment for learning, educators provide feedback

on students' learning process, monitor progress, and determine their learning progress. Educators can also use assessment for learning to improve student performance. Assignments, presentations, and projects, including quizzes, are examples of forms of assessment for learning.

Assessment as learning is similar to assessment for learning, which has a formative role and is carried out during the learning process and based on the assessment results (Box, 2018). The difference is that assessment as learning involves students actively in the assessment activities. Students are given the experience of learning to be assessors for themselves. Self-assessment and peer-to-peer assessment are examples of assessment as learning. In assessment as learning, students should be involved in formulating assessment procedures, criteria, and rubrics/guidelines for assessment to know precisely what must be done to obtain maximum learning outcomes. So far, the most dominant assessment of learning is carried out by educators compared to assessment for learning and assessment as learning. Assessment of learning achievement should prioritize assessment as learning and assessment for learning rather than the assessment of learning.

Based on the results of mapping CA, the implication is that assessment CA can be implemented as a form of assessment for learning and assessment as learning. Through CA, it is hoped that students can achieve the PLO that has been determined according to their level of education through feedback on student performance (Nziku & Matogwa, 2021). CA can also increase student involvement in learning and improve the quality of learning. Of course, it can also help explore the factors influencing student learning success to complete their studies (Holmes, 2015; Salekin et al., 2020; Vahed et al., 2021).

CONCLUSION

Fundamental Finding: (1) The study of CA is abroad. However, the need for learning outcome achievement should be in accordance with the purpose, improve the learning process, involve students fully and purposefully in their education, and explore the factors that influence the learning process. (2) In general, the responses of lecturers and students agree that the lecture process and the ongoing assessment design of each course must contribute to the operation or stages of completing a thesis/dissertation. A few lecturers or students who disagree also view it as essential to have a course that contributes to the thesis/dissertation but suggests that the scope of each subject should not be narrow and be limited only according to the theme of the thesis/dissertation. (3) The design of a CA is realized by demanding mapping for each course in the form of products or small projects to complete a thesis/dissertation. The mapping is carried out in parallel with the study program curriculum structure so that the forms of invoices, time, and sequences are in sync with the study process as a whole. **Implication:** CA can be implemented as a form of assessment for learning and assessment as learning. **Limitation:** It is the result of the exploration process and makes the mapping of CA for MPSE and DPSE. The implementation of CA still needs to measure the student's achievement or the improvement of the learning process and student's involvement in the courses. **Future Research:** Based on the mapping results of CA, the implementation of CA can be explored more and more to know how the CA follows the purpose (PLO of MPSE and DPSE), improves the learning process, involve students fully and purposefully in their learning, exploring the factors that influence the learning process.

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