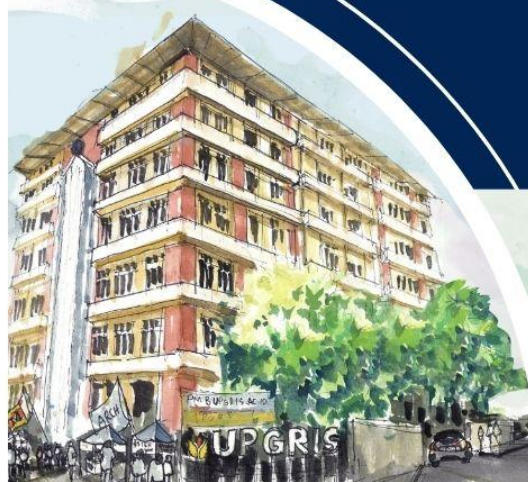




GUIDELINES FOR IMPLEMENTING STUDENT-CENTRED LEARNING



**UNIVERSITAS PGRI SEMARANG
2023**

**GUIDELINES FOR
IMPLEMENTING STUDENT-
CENTRED LEARNING**



YAYASAN PEMBINA LEMBAGA PENDIDIKAN PERGURUAN TINGGI PGRI SEMARANG UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG (UPGRIS)

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PERATURAN REKTOR

UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG

RECTOR'S REGULATION OF UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG

Nomor : 003.a/PR/UPGRIS/VIII/2026

Number : 003.a/PR/UPGRIS/VIII/2026

Tentang

Regarding

PANDUAN IMPLEMENTASI

PEMBELAJARAN BERPUSAT PADA MAHASISWA / *STUDENT-CENTERED LEARNING* (SCL) DI LINGKUNGAN UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG

*IMPLEMENTATION GUIDELINES FOR STUDENT-CENTRED LEARNING (SCL)
WITHIN UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG*

REKTOR UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG,

THE RECTOR OF UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG,

Menimbang
Considering

- a. bahwa dalam rangka meningkatkan kompetensi lulusan yang adaptif dan inovatif, diperlukan transformasi metode pembelajaran dari yang berpusat pada dosen (*Teacher-Centered Learning*) menjadi berpusat pada mahasiswa (*Student-Centered Learning*).
that in order to improve the adaptive and innovative competencies of graduates, a transformation of learning methods is required, transitioning from Teacher-Centred Learning to Student-Centred Learning.
- b. bahwa implementasi pembelajaran berpusat pada mahasiswa merupakan bagian integral dari pengembangan kurikulum di Universitas Persatuan Guru Republik Indonesia Semarang yang selaras dengan perkembangan ilmu pengetahuan dan regulasi pemerintah.
that the implementation of student-centred learning is an integral part of curriculum development at Universitas Persatuan Guru Republik Indonesia Semarang, aligned with the advancement of science and technology as well as government regulations.
- c. bahwa sehubungan dengan butir (a) dan (b) di atas, dipandang perlu ditetapkan panduan Implementasi Pembelajaran Berpusat Pada Mahasiswa / *Student-Centered Learning* (SCL) di Lingkungan Universitas Persatuan Guru Republik Indonesia Semarang dengan peraturan Rektor.
that in connection with points (a) and (b) above, it is deemed necessary to establish guidelines for the Implementation of Student-Centered Learning (SCL) in the Republic of Indonesia Teachers Association University Semarang environment through a Rector's regulation.

Mengingat
Having Regard To

1. Undang-Undang No. 12 Tahun 2012 tentang Pendidikan Tinggi;
1. Law No. 12 of 2012 concerning Higher Education;
2. Peraturan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi No. 53 Tahun 2023 tentang Penjaminan Mutu Pendidikan Tinggi;
2. Regulation of the Minister of Education, Culture, Research, and Technology No. 53 of 2023 concerning Quality Assurance in Higher Education;
3. Peraturan Pemerintah Republik Indonesia Nomor 4 Tahun 2014 tentang Penyelenggaraan Pendidikan Tinggi dan Pengelolaan Perguruan Tinggi;
3. Government Regulation of the Republic of Indonesia No. 4 of 2014 concerning the Implementation of Higher Education and the Management of Higher Education Institutions;
4. Surat Keputusan Menteri Pendidikan dan Kebudayaan RI Nomor 143/P/2014 tanggal 17 April 2014 tentang Penggabungan IKIP PGRI Semarang dan Akademi Teknologi Semarang yang diselenggarakan oleh YPLP PT PGRI Semarang di kota Semarang, provinsi Jawa Tengah menjadi Universitas PGRI Semarang yang diselenggarakan oleh YPLP PT PGRI Semarang di kota Semarang, provinsi Jawa Tengah;
4. Decree of the Minister of Education and Culture of the Republic of Indonesia Number 143/P/2014, dated 17 April 2014, concerning the Merger of IKIP PGRI Semarang and Akademi Teknologi Semarang, managed by YPLP PT PGRI Semarang in Semarang, Central Java Province, into Universitas PGRI Semarang, managed by YPLP PT PGRI Semarang in Semarang, Central Java Province;

5. Surat Keputusan YPLP PT PGRI Semarang Nomor: 075/P.Y/U/Kpts/3.1/YPLP PT PGRI/V/2019 tanggal 10 Mei 2019 tentang Statuta Universitas PGRI Semarang;
5. *Decree of YPLP PT PGRI Semarang Number 075/P.Y/U/Kpts/3.1/YPLP PT PGRI/V/2019, dated 10 May 2019, concerning the Statutes of Universitas PGRI Semarang;*
6. Surat Keputusan Pengurus YPLP PT PGRI Semarang Nomor 095/PY/U/Kpts/3.1/YPLP PT PGRI/V/2022 tanggal 20 Mei 2022 tentang Pengangkatan Rektor Universitas PGRI Semarang masa jabatan 2022-2026.
6. *Decree of the Board of YPLP PT PGRI Semarang Number 095/PY/U/Kpts/3.1/YPLP PT PGRI/V/2022, dated 20 May 2022, concerning the Appointment of the Rector of Universitas PGRI Semarang for the 2022-2026 term of office.*

MEMUTUSKAN

DECIDES

- Menetapkan**
To Enact : **PERATURAN REKTOR UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG TENTANG PANDUAN IMPLEMENTASI PEMBELAJARAN BERPUSAT PADA MAHASISWA/*STUDENT CENTERED LEARNING* (SCL) DI LINGKUNGAN UNIVERSITAS PERSATUAN GURU REUBLIK INDONESIA SEMARANG**
RECTOR'S REGULATION OF UNIVERSITAS PGRI SEMARANG ON THE IMPLEMENTATION GUIDELINES FOR STUDENT-CENTRED LEARNING (SCL) WITHIN UNIVERSITAS PERSATUAN GURU REPUBLIK INDONESIA SEMARANG
- Pertama**
First : Mengatur panduan implementasi pembelajaran berpusat pada mahasiswa/*student centered learning* (SCL) di Universitas Persatuan Guru Republik Indonesia Semarang sebagaimana tercantum dalam lampiran peraturan rektor ini;
To regulate the implementation of Student-Centred Learning (SCL) within Universitas Persatuan Guru Republik Indonesia Semarang, as stated in the attachment to this rector's regulation;
- Kedua**
Second : Peraturan ini mulai berlaku sejak tanggal ditetapkan dan apabila di kemudian hari terdapat kekeliruan dalam keputusan ini akan diadakan perbaikan sebagaimana mestinya.
This regulation shall come into effect on the date of its enactment; should any clerical errors or discrepancies be identified in the future, the necessary rectifications shall be made accordingly.

Ditetapkan di : Semarang
Enacted in : Semarang
Pada Tanggal : 1 Agustus 2023
On Date : August 1st, 2023



Rektor,
Dr. Sri Suciati, M.Hum.
NPP 196503161990032002

Tembusan disampaikan kepada Yth.:

CC (Copies to):

1. Wakil Rektor / *Vice-Rectors*;
 2. Dekan / *Deans*;
 3. Ketua Lembaga / *Heads of Institutions*;
 4. Kaprodi / *Heads of Study Programmes*;
- di Lingkungan UPGRIS / *within UPGRIS*

FOREWORD

Praise be to God Almighty for His grace and blessings, enabling the compilation and publication of the Student-Centered Learning Implementation Guidebook at Universitas PGRI Semarang. This guidebook serves as a guideline for all study programs in implementing quality, relevant learning that aligns with national higher education policies.

The National Higher Education Standards (SN-Dikti) affirm that a study program is a unit of educational and learning activities that has a specific curriculum and learning methods in academic, professional, and/or vocational education. Therefore, in addition to developing a curriculum, study programs are obligated to develop and implement learning methods that facilitate student-centered learning, as mandated by SN-Dikti.

Student-centered learning positions students as active subjects in the learning process. No single learning method is most appropriate for all contexts, as its suitability is influenced by learning outcomes, material and student characteristics, resource availability, and the learning environment. Furthermore, learning implementation cannot be separated from the assessment system. Students' tendency to focus on the aspects being assessed emphasizes the importance of designing assessments that align with learning outcomes to ensure optimal learning.

Based on this need, the Curriculum Center, Center of Excellence, and Student-Centered Learning (MBKM) of Universitas PGRI Semarang have compiled a Student-Centered Learning Implementation Guidebook as a reference for all study programs in implementing learning that aligns with the SN-Dikti and aligns with the Higher Education Key Performance Indicators (KPI), particularly KPI 7 on collaborative and participatory learning.

Finally, we hope this guidebook will be beneficial and contribute significantly to improving the quality of learning at Universitas PGRI Semarang and supporting the development of superior and competitive graduates.

Semarang, August 1st, 2023
Rector,

Dr. Sri Suciati, M.Hum.
NPP 196503161990032002

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I. INTRODUCTION



Learning Challenges in the Industry 4.0 Era

Industry 4.0 has brought about unexpected changes in social life. The digital revolution in the previous era not only impacted technological transfer in the industrial world but also had a broader impact on life in general, with exponential rates of change. These rapid and unpredictable changes have arisen as a result of billions of people being connected. The third industrial revolution was driven by the use of computers, which led to a transition to telecommunications technology, production automation, and fast services (Fomunyan, 2019). Society uses digital technology and the internet in all aspects of life.

Higher education has been quicker to adapt and utilise these changes for learning and research. According to George Courous, "technology will never replace great teachers, but technology in the hands of great teachers is transformational" (Dabbagh, Marra, & Howland, 2018). The benefits of technology in education are related to expanded accessibility, collaboration, communication, diversity of values, active and social learning, self-direction, content engagement, project-based learning, and global exposure. Issues that have arisen in our lives as individuals and as a society have encouraged interdisciplinary learning approaches such as combining science, technology, engineering, arts, and mathematics (STEAM).

The twenty-first century is marked by the need for higher levels of education. Wider access to education has been accompanied by a highly diverse profile of new students with varying abilities and backgrounds. This diversity has carried over into the learning environment on campus (Gosper & Ifenthaler, 2014).

The shift in how learning resources are fulfilled has also shifted from print media to electronic media, which can be accessed more easily and quickly through the internet. The diversity of easily accessible learning resources still requires guidance and assistance to ensure that the scientific information sought is accurate and in line with learning objectives.

The availability of communication devices such as *smartphones* and tablets has created a new model of communication between lecturers and students, between lecturers, between students, and also other supporting staff. Lecturer and student interactions can take place anytime and anywhere, allowing students to not have to be on campus all the time, but to choose a pleasant place to study that makes it easier for them to learn and gain the real-life experience needed after completing their education.

Freedom of access in content development and presentation platforms poses a challenge to lecturers in their traditional role as curators and providers of knowledge. Kittur and Kraut (2008) state that the *wisdom of crowds*, characterised by the emergence of websites with many authors and volunteers such as Wikipedia, has proven capable of replacing print media such as encyclopaedias. Access to information has become a new business opportunity with the existence of *Big Data*, which can access information about user habits, browsing and search history, interests, hobbies, and social networks (Cavoukian, 2000).

Based on the above description, the concept of lifelong learning has become a reality. Lecturers are required to continuously update their knowledge to keep pace with students' learning needs. The forms and methods of learning chosen must also provide opportunities for students to acquire their own knowledge from various learning sources and meaningful learning experiences.

B Shift in the Learning Paradigm

In the era of Industry 4.0, the world of education has not escaped the impact of the accompanying changes. The way students learn, the way lecturers teach, and the way learning is managed have also changed. Learning is required to be more open, more flexible, and not averse to the use of technology. Similarly, the challenges faced by the world of higher education have changed from domestic to regional and now international. The globalisation of education is inevitable.

The world of higher education has truly entered the era of Education 4.0. The *Education 4.0* era requires lecturers and education managers to provide choices for students who more than ever before, and more personalised choices (*personalised learning*) in line with students' interests and talents.

Education that not only focuses on the achievement of student learning competencies, but also the formation of character and noble morals. Education that does not only focus on mastering knowledge in accordance with the field, but is also required to be able to develop multidisciplinary, interdisciplinary, and transdisciplinary science and technology. This is in accordance with Law No. 12 article 4 of 2012 concerning higher education, namely: 1) developing capabilities and shaping the character and civilisation of a dignified nation in order to educate the nation; 2) developing innovative, responsive, creative, skilled, competitive, and cooperative academics through the implementation of the tridharma; and 3) developing science and technology by considering and applying humanistic values.

One of the prominent features of the Education 4.0 era is the massive use of information technology in the learning process, so that students have access to richer learning resources and can learn anytime and anywhere. Learning becomes a matter of choice, and learning experiences will help students not only to achieve learning competencies but also to increase their learning capacity. This approach is often referred to as the heutagogy approach, as shown in Figure 1.

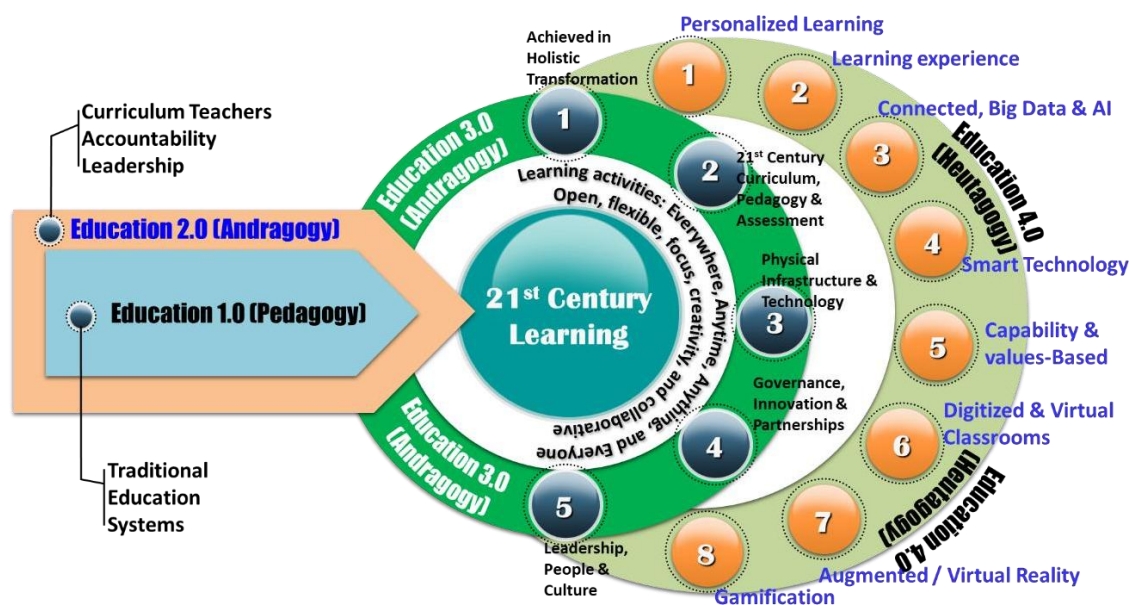


Figure 1. Shift in the educational paradigm

Higher education institutions must be able to provide innovative learning that supports the efficient and effective development of each student's potential. The role of lecturers as drivers of learning must be able to develop a student-centred learning system. Lecturers must be able to innovatively choose forms and methods of learning that encourage students to have the ability to communicate, work in teams, collaborate, think critically, act creatively, think logically and argumentatively, care for environmental sustainability, and respect differences with the noble values of the nation.

The accuracy of selecting learning activities and methods combined with the harmonious use of technology in learning is the key to success. Methods that can be chosen include case-based learning, problem-based and inquiry-based learning, collaborative learning, cooperative learning, and project-based learning in collaborative teams. Of course, the use of technologies such as *eLearning*, *mLearning*, *smart classrooms*, *augmented and virtual reality*, and the presentation of material in gamification will be very helpful. Therefore, lecturers need to be encouraged and facilitated to have the knowledge and skills to develop and implement these learning methods combined with the use of Information and Communication Technology (ICT).



Definitions Used in the Guidelines

The following are the definitions used in this guidebook.

- 1) **The curriculum** is a set of plans and arrangements regarding the objectives, content, and subject matter, as well as the methods used as guidelines for conducting learning activities to achieve the objectives of Higher Education (Permendikbud, 2020).
- 2) **Higher Education** is the level of education after secondary education, which includes diploma programmes, bachelor's degree programmes, master's degree programmes, doctoral programmes, professional programmes, and specialist programmes, organised by higher education institutions based on Indonesian culture.
- 3) **The Higher Education Curriculum** is developed by each Higher Education Institution with reference to the National Standards for Higher Education for each Program Study which includes development of intellectual intellectual development, noble character, and skills Law No. 12 of 2012 on Higher Education: Article 35 paragraph 2 (Law, 2012).

- 4) **The Higher Education Curriculum for bachelor's and diploma programmes** in accordance with Law No. 12 of 2012: Article 35(3) must include courses (Law, 2012):
 - a) Religion;
 - b) Pancasila;
 - c) Citizenship; and
 - d) Indonesian Language.
- 5) **Learning** is the process of interaction between students and lecturers and learning resources in a learning environment.
- 6) **A Study Programme** is a unified set of educational and learning activities that has a specific curriculum and learning methods within one type of academic education, professional education, and/or vocational education.
- 7) **Graduate Profile** is a characteristic or role that graduates can perform in a particular field of expertise or work after completing their studies.
- 8) **Program Educational Objectives (PEO)** are general statements that describe what graduates are expected to achieve within a few years after *graduation*. PEOs are based on future needs and predictions of capabilities.
- 9) **Learning Outcomes** are the abilities acquired through the internalisation of knowledge, attitudes, skills, competencies, and accumulated work experience (Presidential Regulation No. 8, 2012).
- 10) **Graduate Competency Standards (SKL)** are minimum criteria for graduate qualification that include attitudes, knowledge, and skills as stated in the Programme Learning Outcomes (PLO) formulation in Permendikbud No. 3 of 2020: article 5 (1) (Permendikbud, 2020).
- 11) *Subject* matters contain knowledge from specific disciplines or knowledge studied by students and can be demonstrated by students (Anderson & Krathwohl, 2001).
- 12) **Learning materials** consist of knowledge (facts, concepts, principles, theories, and definitions), skills, and processes (reading, writing, arithmetic, dancing, critical thinking, communication, etc.), and values (Hyman, 1973).
- 13) **A course** is a unit of study taught (and studied by students) at the university level (source: KBBI) which is structured based on the PLo assigned to it, containing learning materials, learning forms and methods, and assessments, and has a minimum weight of one semester credit unit (sks).
- 14) **The Semester Learning Plan (RPS)** for a course is a learning process plan developed for learning activities during one semester to meet the Programme

Learning Outcomes (PLO) assigned to the course. The semester learning plan, or other terms, is determined and developed by lecturers independently or together in a group of experts in a field of science and/or technology in a study programme.

- 15) **Learning Assessment Standards** are the minimum criteria for assessing the learning process and outcomes of students in order to meet the Programme Learning Outcomes (PLO).
- 16) *Learning Experience* is a student's learning activity through interaction with external conditions in their learning environment (Tyler, 1949). Learning activities that transform learning material into meaningful knowledge that can be used to do new things (Ornstein & Hunkins, 2004) and provide benefits.
- 17) **Forms of Learning** are learning activities that can take the form of lectures; responses and tutorials; seminars; and practicums, studio practice, workshop practice, field practice; work placements, research, design, or development; military training, student exchanges, internships, entrepreneurship, and/or other forms of community service (Ministry of Education and Culture Regulation No. 3 of 2020: Article 14 paragraph 5 (Permendikbud, 2020)).
- 18) **Learning Methods** are the ways used to realise learning strategies by making optimal use of learning resources, including learning media (*a way in achieving something*) (Joyce & Weil, 1980).
- 19) **Assessment** is one or more processes of identifying, collecting, and preparing data to evaluate the achievement of Programme Learning Outcomes (PLOs) and curriculum objectives (ABET, 2016). Assessment must contain motivational content, fostering self-confidence to contribute to the chosen path of life as a lifelong learner. Then, using specialised skills to work in *the superteam* of their choice.
- 20) **Learning Evaluation** is one or more processes of interpreting data and evidence accumulated during the assessment process (ABET, 2016).
- 21) **Curriculum Programme Evaluation** is a process or series of processes of collecting data and information, which is then analysed and the results used as a basis for improving curriculum performance to be more optimal and effective (formative evaluation), or used as a basis for drawing conclusions and making decisions (summative evaluation) (Ornstein & Hunkins, 2004).
- 22) *Assessment* criteria are benchmarks used as measures or references for learning achievement in assessments based on predetermined indicators. Assessment criteria serve as guidelines for assessors to ensure consistent

and unbiased assessments. Assessment criteria can be quantitative or qualitative (Brookhart & Nitko, 2015).

- 23) **Assessment indicators** are specific and measurable statements that identify the achievement of learning outcomes or student learning performance accompanied by evidence.
- 24) **Data literacy** is the ability to read, analyse and use data and information (*big data*) in the digital world.
- 25) **Technology Literacy** is the understanding of how machines work and technological applications (*coding, artificial intelligence, and engineering principles*).
- 26) **Human Literacy** is the understanding of humanities, communication, and design.
- 27) **MBKM Learning Activities** are learning activities outside the study programme that students can participate in for a maximum of three semesters, either within or outside their university, consisting of nine forms, including student exchanges, internships/work placements, teaching assistance in educational units, research, humanitarian projects, entrepreneurial activities, independent studies/projects, national defence, and village development/thematic fieldwork (Merdeka Belajar Guidebook, 2020).
- 28) **The Learning Management System (LMS)** is a system used to carry out the learning process by utilising Information and Communication Technology (ICT) and is the result of the systematic integration of learning components with regard to quality, learning resources, and characterised by learning interactions (*engagement*) across time and space. An important objective of the LMS is to provide students with access and facilities to build their knowledge independently and purposefully, as well as to give lecturers an important role as designers, catalysts, facilitators, and motivators of learning.
- 29) **Blended learning** is a learning approach that harmoniously, structurally, and systematically combines the advantages of face-to-face and online learning.
- 30) **Massive Open Online Courses (MOOCs)** are a type of online learning that is attended by a large number of participants and is open in nature. The most noticeable characteristic of MOOCs is that they are designed for *self-directed learning/self-paced* learning.

D

Objectives of the Student-Centred Learning Implementation Guide

The characteristics of learning in higher education institutions in accordance with the National Higher Education Standards are student-centred, with Programme Learning Outcomes (PLOs) achieved through a learning process that prioritises the development of students' creativity, capacity, personality and needs, as well as developing independence in seeking and discovering knowledge. The diversity of educational backgrounds among lecturers in various study programmes who have not yet had experience implementing various learning methods needs to be facilitated by the availability of guidelines for applying student-centred learning methods. To that end, this guidebook has been written with the following objectives:

- 1) to serve as a guide for lecturers in selecting and applying learning methods in accordance with the characteristics of the field of study and learning materials, as well as being in line with the Main Performance Indicators (IKU) of Higher Education, particularly IKU 7 related to collaborative and participatory classes;
- 2) to improve the quality of the learning process and its effectiveness in meeting student learning outcomes;
- 3) to increase student interest in learning through appropriate learning methods; and
- 4) encourage lecturers to develop innovative learning that can equip students with 21st-century skills to face the challenges of science and technology development.

E

Understanding Learning Models, Learning Methods, and Learning Forms

The definitions of learning models, learning methods, and learning forms are presented by Joyce and Weil, as well as SN-Dikti as follows.

- 1) A learning model is a learning pattern that is structured based on learning principles, psychological theories, sociology, system analysis, and other supporting theories (Joyce & Weil, 1980).
- 2) Learning Methods are ways used to realise learning strategies by making optimal use of learning resources, including learning media (Learning Methods = *a way in achieving something*) (Joyce & Weil, 1980).
- 3) Learning formats can include lectures, tutorials, seminars, practicals, studio

practice, workshop practice, field practice, work practice, research, military training planning or development, student exchanges, internships, entrepreneurship, and/or other forms of community service (SN-Dikti Article 14 paragraph 5).

Each course may utilise learning formats by applying models and several learning methods appropriate to the Learning Outcomes assigned to the course.

II. CHARACTERISTICS OF THE LEARNING PROCESS

Learning process standards are minimum criteria for the implementation of learning in Study Programmes to achieve Programme Learning Outcomes (PLOs). Learning is defined as the process of interaction between students and lecturers and learning resources in a learning environment. Learning process standards in SN-Dikti consist of learning process characteristics, learning process planning, learning process implementation, and student learning load. The characteristics of the learning process include interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centred nature, as illustrated in Figure 2.

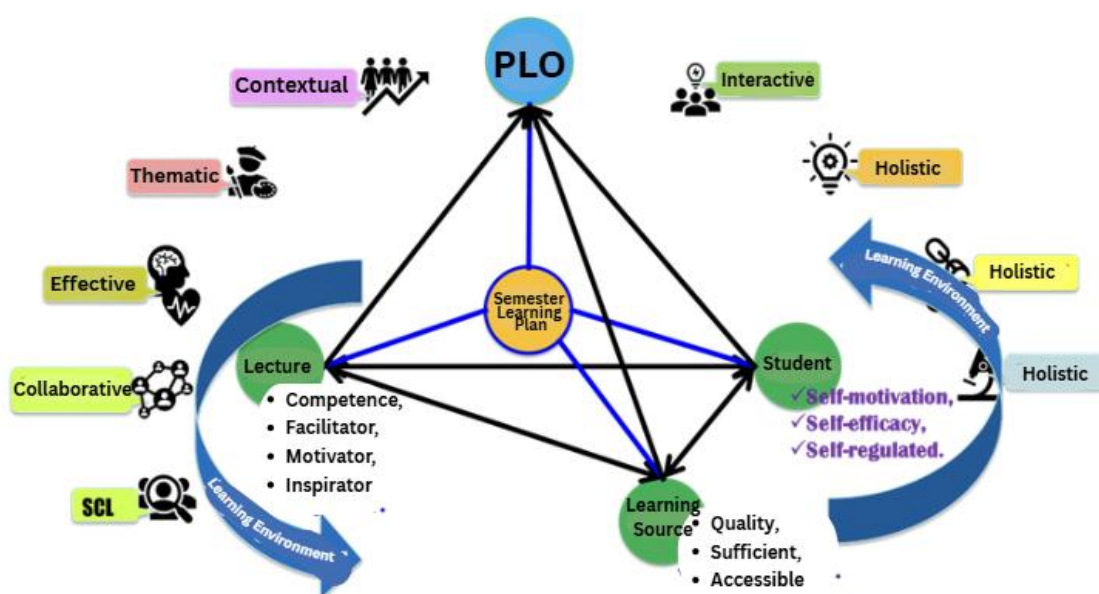


Figure 2. Characteristics of the learning process

These characteristics are intended to enable the learning process to achieve Programme Learning Outcomes (PLO). Each characteristic is explained in the following description.

A

Interactive

Interactive learning is a characteristic of the learning process that states that Programme Learning Outcomes (PLOs) are achieved by prioritising two-way interaction between students and lecturers. The characteristic of interactive learning is one of the learning methods that is oriented towards student-centred learning.

(*student-centred learning*). Active interaction between students and lecturers, students and fellow students, and the freedom to interact with various learning media are some of the characteristics that facilitate students in achieving Course Learning Outcomes (CLO) and Programme Learning Outcomes (PLO).

One example of interactive learning is *the flipped learning* process, where before entering the classroom, students are required to access various learning resources related to the topics/materials that will be discussed in class. Before entering the classroom, students also have the opportunity to actively interact with lecturers/tutors or discuss with fellow students. Students can interact again through various activities such as group discussions, exercises, practices, and others in class.

B Holistic

Holistic learning is a characteristic of the learning process that encourages the formation of a comprehensive and broad mindset by internalising local and national excellence and wisdom. In the learning process, in understanding information, students are encouraged to relate it to other topics so that a comprehensive and broad knowledge framework is built. This characteristic of the learning process encourages students to gain learning experiences by actively and effectively utilising all the potential of their minds, souls and bodies.

Holistic characteristics in learning can be exemplified from the perspective of context-based learning. For example, when learning how to handle an epidemic, students also need to understand the climate, culture and population level in a particular area.

C Integrative

Programme Learning Outcomes (PLOs) are achieved through an integrated learning process to fulfil the overall Programme Learning Outcomes (PLOs) in a single programme through an interdisciplinary and multidisciplinary approach.

An example of an integrative characteristic in learning is encouraging students to be able to relate one topic or field to another.

D

Scientific

Programme Learning Outcomes (PLOs) are achieved through a learning process that prioritises a scientific approach, thereby creating an academic environment based on the values, norms, and principles of science, while upholding religious and national values.

Scientific learning involves activities such as presenting phenomena and formulating problems, developing hypotheses, designing and collecting data to prove hypotheses, managing and analysing the data obtained, and drawing conclusions. Not all learning activities can use this approach, but in lectures, students need to gain learning experiences similar to those of experts discovering new knowledge. This experience also trains students to be systematic in solving problems they will face in the future.

E

Contextual

Programme Learning Outcomes (PLO) are achieved through a learning process that is tailored to the demands of problem solving in their field of expertise. In contextual learning, students acquire knowledge and skills in accordance with their field of expertise. Contextual learning can also be interpreted as the learning material presented by lecturers being linked to real life through REACT activities/strategies, namely *Relating, Experiencing, Applying, Cooperating, and Transferring* (Davtyan, 2014).

F

Thematic

Programme Learning Outcomes (PLO) are achieved through a learning process that is tailored to the scientific characteristics of the study programme and linked to real-world problems through a transdisciplinary approach. The principles underlying the thematic learning process are: 1) integrating several subjects into a theme that is relevant to the field of study; 2) raising real-world issues related to a theme; 3) solving problems with a transdisciplinary approach involving several disciplines and/or methods; and 4) providing students with direct experience in solving real-world problems.

These thematic principles are at least reflected in the Semester Learning Plan (RPS) in the section on learning forms and methods as well as student learning experiences. Basically, all student-centred learning methods can integrate thematic principles. For example, the use of the theme of environmental conservation in science learning with case-based *learning* methods. Several cases can be raised in learning with the theme of environmental conservation, such as *illegal logging*, the greenhouse effect, factory waste, and others.

G

Effective

Programme Learning Outcomes (PLOs) are successfully achieved by emphasising the proper and thorough internalisation of material within an optimal time frame. Strategies that can be implemented to ensure effective learning include implementing learning designs in accordance with the Programme Learning Outcomes (PLO) and Course Learning Outcomes (CLO) to be achieved. To achieve effective characteristics, a comprehensive and well-designed learning plan is required, covering content, interaction, assessment, and evaluation. Effective learning is demonstrated by the results of process evaluation and learning outcomes.

H

Collaborative

The collaborative characteristic states that Programme Learning Outcomes (PLO) are achieved through a collaborative learning process involving interactions between learners to capitalise on attitudes, knowledge, and skills. The collaborative learning process and interactions among students to achieve Programme Learning Outcomes (PLO) certainly requires a well-designed learning environment.

Examples of collaborative characteristics in learning can be seen in group discussions, group assignments, and group practicals, where interaction occurs between group members and each actively contributes to the group activity.

I

Student-centred

The characteristics of student-centred learning are mentioned in SN-Dikti, which states that Programme Learning Outcomes (PLO) are achieved through a learning process that prioritises the development of creativity, capacity, personality, and student needs, as well as developing independence in seeking and discovering knowledge.

Student-centred learning is a learning characteristic that gives students an active role in improving their independent learning abilities and gives them confidence as adults who are fully responsible for their learning and provides space to develop beyond their designed abilities. With these characteristics, it is hoped that graduates of the study programme will have independent learning abilities and will become lifelong learners who are able to adapt to changes that occur. On the other hand, educators shift their roles to become designers, facilitators, and motivators of the learning process.

III. CENTRED LEARNING METHOD

Student-Centred Learning (SCL) has long been widely recognised as an approach to learning. Traditional learning, which places lecturers as experts and the main source of learning, has made classes boring for students. A change in the academic atmosphere is needed so that the student learning process can develop optimally to achieve the expected competencies. A shift in the educational paradigm has encouraged a shift in the learning process from being lecturer-centred to student-centred.

O'Neil and McMahon (2005) concluded that student-centred learning is a concept chosen by students in their education, whereby students do more than lecturers (active versus passive learning). In a broader sense, it describes the power of interaction between students and lecturers. Various *Student-Centred Learning* (SCL) methods have been developed, but in reality, not all of what is claimed by educational institutions or educators has been implemented correctly (Lea et al., 2003). Lea and colleagues formulated the principles of SCL from various sources, namely: 1) a tendency towards active rather than passive learning; 2) an emphasis on deep learning and understanding; 3) increased responsibility and accountability for students; 4) increasing student independence in learning; 5) interdependence and mutual respect between lecturers and students; and 6) a reflective approach to the teaching and learning process by both lecturers and students.



Small Group Discussion

Small Group Discussion (SGD) is a learning method in the form of small groups consisting of 3-5 members. Group members interact in learning by exchanging ideas, information, experiences, and providing solutions to the problems being discussed. The *Small Group Discussion* (SGD) learning method is effective if the following five interrelated aspects are taken into account: 1) maintaining *positive interdependence*, meaning that each member motivates one another in learning interactions; 2) individual accountability (*individual accountability*), mutual support and assistance among group members to cover each other's shortcomings and weaknesses. Given that group members may have different abilities and learning speeds; 3) *face-to-face interaction* among group members to build learning interactions between students and between students and lecturers; 4) each group member acts as a

learning resource in the context of peer learning. Peer learning is often more effective for understanding an idea or solving problems together due to the equal level of communication. This will encourage the development of *social skills*, including those related to polite behaviour, respecting others' opinions, learning to listen and not being dominant, as well as having the courage to offer suggestions and defend logical thinking; and 5) *group processing* that focuses on evaluating the extent to which each group member can interact effectively in achieving common goals, as well as assessing which group members participate or do not participate, which are cooperative and which are not, so that improvements can be made in the future.

The role of lecturers as facilitators, preparing teaching materials and compiling guidelines for group discussions. In addition, lecturers can act as moderators in discussions, as well as providing reviews and feedback at the end of the discussion session. Lecturers can also assess each student's mastery of the material that has been studied, as well as assess the attitudes and skills demonstrated by students in group discussions. For example, a lecturer can use the *Small Group Discussion (SGD)* method to discuss the stages of designing a new product discussed in groups, then compile the results in the form of a paper to be presented in front of other groups. Lecturers can assess each group, as well as each student in the group. Assessments can be made on the students' mastery of knowledge, attitudes, and skills. Lecturers can also assess the results of group work, such as the papers presented by students. Assessments can use rubrics or portfolios. The assessment results are used by lecturers to evaluate the mechanisms and procedures of small group discussions for future improvement. Evaluation and reflection can also be carried out at the end of the *Small Group Discussion (SGD)* session, by assessing aspects of mastery of the material, paper writing structure, presentation, and ability to answering questions asked during the question and answer process. The results of the evaluation and reflection can be used by students to improve their learning outcomes according to the recommendations given by the lecturer.

B Role-Playing and Simulation

The learning process sometimes needs to involve students' feelings or emotions, especially to develop *soft skills*, both social and personal, such as caring attitudes and impartiality based on clear arguments. These *soft skills* can be developed through the application of *role-play* and *simulation* learning methods that facilitate students' learning through role-playing in scenarios related to real-life phenomena.

Role-play is a method that facilitates student learning by acting out scenarios related to real-life phenomena and relevant to the topic being

discussed. This method involves students dramatising, simulating, playing or acting out, and demonstrating real-life cases (Erturk, 2015). Although students play a role with full appreciation (involving feelings and emotions), in this case, students are not learning to play a role, but rather learning through role-playing (Heyward, 2010). According to McSharry and Jones (2000), there are seven categories of *role-play* methods, namely experiments/investigations, *games*, presentations, metaphors, analogies, simulations, and theatre. So, according to them, simulation is one category of *role-play*. In this simulation method, students play their respective roles to simulate an activity related to real life. For example, students play the roles of stakeholders (policy makers, NGOs, etc.) in a discussion about plans to build a nuclear power plant. The implementation of role-playing in learning can be carried out in three main steps (Kodotchigova, 2002).

1

Preparation

In this step, the learning objectives or outcomes, *role-play* scenarios, roles and situations or contexts, role assignments, and stage layout are discussed. *Role-play* scenarios can be provided by the lecturer or students (the group that will perform) or the result of class discussions, with situations or contexts created to reflect reality. Role allocation can be done by students, but if the class is still passive, it can be done by the lecturer. Students or groups who are not performing can act as observers. The stage can be set up to resemble reality, such as the atmosphere in a courtroom or hospital emergency room with appropriate equipment and costumes, but it can also be set up simply in front of the class without special equipment and costumes.

2

Implementation

Students individually or in groups play their roles according to the scenario. Students who are not performing act as observers. In addition to observing, lecturers also take notes on the *role-play* performance as feedback material. During the *role-play*, there should be no intervention or interruption from lecturers or other observers, but if the game deviates from the scenario and causes dangerous chaos, the lecturer may intervene or even stop the game.

3

Conclusion

After *the role-play* is completed, a discussion is held on the course of the game. The discussion focuses on two things, namely an evaluation of the course of the game, the results of which can be used as material for reflection to be followed up in the next *role-play*, and an evaluation to see the extent to which *the role-play* can achieve the learning targets of students, both for those who are actors/players and observers.

In the application of *role-play* and *simulation* learning, the roles of lecturers and students are as follows.

The role of the lecturer

- 1) prepare topics or cases and draft scenarios as material for discussion in class;
- 2) preparing a draft of the rules for conducting *role-play* as material for discussion and mutual agreement;
- 3) Observing and supervising the *role-play*; and
- 4) facilitating discussion after *the role-play* and providing *feedback* on *the role-play* implementation.

Student roles

- 1) studying the topic material to support the *role-play*;
- 2) Discussing or studying the *role-play* scenario;
- 3) preparing the necessary materials for *the role-play*;
- 4) playing roles according to the scenario, while students who are not playing roles observe the *role-play*; and
- 5) discussing and summarising the results of *the role-play*.

Advantages and weaknesses methods of *role-play* and *simulation* are as follows.

The advantages

- 1) enhancing interaction among students, as each group must engage in discussions before and after role-playing;
- 2) training students' skills and responsibility in managing a performance activity;
- 3) training students' courage to act out a case that is in line with reality;
- 4) brings the learning situation closer to real-life situations;
- 5) Engaging students' emotions, making it suitable for teaching social attitudes and personality development; and
- 6) developing communication and argumentation skills.

Disadvantages

- 1) requires more time, from preparation to performance and evaluation discussions;
- 2) adds to the burden for shy students who are reluctant to take on roles;
- 3) it can be boring for students who are not very sociable; and
- 4) success implementation is dependent on the readiness and sincerity of the students playing the roles.

The application of role-playing learning methods, for example, in order to achieve learning outcomes related to radioactivity, students are assigned to play the role of television presenters delivering information about radioactivity in a language that can be understood by viewers. Another example is a group of medical or nursing students playing roles in handling traffic accidents in an emergency unit.



Case-Based Learning (CBL)

We encounter many problems in our daily lives, whether at home/in the family, in the community, or at work. Among these problems, some can be resolved well and there are even several alternative solutions that can be taken, but there are also many complex and difficult problems for which no good solution can be found. To provide students with learning experiences in solving problems in a real-world context, relevant cases from our surroundings that align with the field of study can be incorporated into the learning process.

Case-based learning is a method that involves students in real-world situations presented in learning to improve problem-solving and decision-making skills. Active learning that focuses on a case involves students learning by *doing*. Cases can be real or fictional stories that are relevant to the subject matter or recount events, problems, dilemmas, theoretical or conceptual issues that require analysis and/or decision-making (Kemdikbudristek, 2021).

In general, the following points should be considered in the case method: 1) students act as "protagonists" who try to solve a case; 2) students analyse the case to develop recommended solutions, assisted by group discussions to test and develop solution designs; and 3) the class engages in active discussion, with the majority of the conversation conducted by students, while the lecturer only facilitates by directing the discussion, asking questions, and observing.

The problems in a case are presented in narrative form to be studied or discussed for alternative solutions. The cases can be taken from the real world or can also be contextualised fictional cases. Examples include the Lapindo mudflow case, the decline in a company's performance, the implementation of a policy, and so on.

The principles of case-based learning in higher education include the following:

- 1) using real-world problems described in narrative form with adequate information or data;
- 2) facilitating students to apply their theoretical knowledge in a real-world context; and
- 3) involving students mentally in experiencing situations in real cases and trying to find solutions.

In implementing *Case-Based Learning (CBL)* in the classroom, there are several steps or stages that are carried out, namely preparation, implementation (core activities), and conclusion. The explanation of each step is as follows.

1

Preparation

During the preparation stage, the lecturer identifies and compiles the cases to be discussed in the form of written narratives, determines the procedures and alternative solutions to the problems, and prepares the classroom layout according to the needs of group discussions. Students are assigned to prepare various literature sources related to the cases to be discussed.

2

Implementation

The lecturer begins the activity by explaining the learning outcomes and the scenario for achieving them, preparing the classroom, distributing the cases, facilitating and observing the group discussions. Students work in groups to identify problems and information or data available in the cases and from the literature, analyse the information/data to find alternative solutions to the problems, and decide on the best solution.

3

Closing

At this stage, a class discussion is held, with each group presenting the results of their problem-solving for the case assigned to them. The lecturer reinforces the conclusions or results of the problem-solving and conducts a joint reflection on the discussion, including its strengths and weaknesses.

In the application of case-based learning, the roles of lecturers and students are as follows.

Role of the lecturer

- 1) prepare cases to be discussed based on the learning outcomes to be achieved in the course;
- 2) determining the case study discussion procedure, whether it will be analysed individually or in groups, and the time allocated for discussing the case in groups;
- 3) During the group discussion process, the lecturer is only tasked with observing, unless it is necessary to provide additional information required by the group.
- 4) the key to successful case studies is student "involvement", therefore lecturers need to ensure that every student has the same opportunity to participate actively;
- 5) after the group discussion time is up, the lecturer calls the groups back together for a class discussion and each group reports the results of their discussion in the form of analysis and problem solving; and
- 6) The lecturer then summarises and concludes the learning outcomes and provides notes on the discussion. This opportunity can also be used to bridge theory and practice. The lecturer can clarify (reinforce) what the group has learned and ask the group about their impressions as a reflection on the learning process and outcomes.

The role of students

- 1) prepare various literature sources in accordance with the case to be discussed;
- 2) pay attention to the case-based learning outcomes to be achieved;
- 3) receive case studies assigned to their group, discuss and analyse them to find alternative solutions, and determine the best solution to the problem; and
- 4) presenting the solution to the case study assigned to them in a class discussion forum.

The advantages and disadvantages of case-based learning methods are as follows.

Strength

- 1) training students to learn contextually;
- 2) trains students to think critically;
- 3) introduces problem-solving and decision-making procedures;
- 4) provides students with the opportunity to integrate *prior knowledge* with the issues presented in the case in order to learn to make professional decisions;
- 5) providing students with opportunities to explore their potential and develop concepts/ideas; and

- 6) providing students with opportunities to appreciate the values of tolerance, respect for others' opinions, and democracy.

Weakness

- 1) learning will not be optimal if students have not mastered the material and cases presented because they are required to think critically;
- 2) learning is perceived as boring for passive students;
- 3) requires a significant amount of time for learning and managing classroom dynamics; and
- 4) Learning cannot be carried out effectively if lecturers are not creative and actively seek relevant cases.

The topics raised are derived from real cases, such as cases that have occurred or are currently occurring in an institution or company. Cases that have occurred in a company and have been successfully handled can be used as examples of case resolution at the beginning of the implementation of case-based learning in the classroom. This activity can begin with fieldwork to gather information related to the company's success in handling the case, for example by interviewing company representatives. This example can be followed by assigning group work to students to find alternative solutions, beyond the solutions that have already been successfully implemented by the company.

One of the most needed 21st-century competencies is the ability to collaborate. This ability needs to be honed through various efforts to create a conducive learning environment.

Collaborative Learning (CL) is a learning method that emphasises cooperation between students based on agreements made among group members. Problems/tasks/cases are indeed provided by the lecturer and are *open-ended*, but the formation of groups based on interests, group work procedures, determining the time and place for group discussions/work, and even how the results of group discussions/work will be assessed by the lecturer, are all determined through mutual consensus among group members.

Klemm (1994) states that *Collaborative Learning (CL)* has characteristics that include: 1) positive interdependence, 2) interaction, 3) individual and group accountability, 4) development of interpersonal skills, 5) formation of heterogeneous groups, 6) sharing of knowledge between lecturers and students, 7) sharing of authority or roles between lecturers and students, and 8) lecturers as mediators.

The main reason and advantage of implementing the *Collaborative Learning (CL)* method is that students can develop the ability to work together, tolerance, mutual dependence, mutual motivation, and leadership skills. *Collaborative Learning (CL)* can also equip students with broad knowledge and insight from their group learning experiences, examining and analysing problems from various perspectives. The limitation of the collaborative method is that it is difficult to apply in classes that do not yet have adequate knowledge and skills, especially in early classes that are still in the adaptation and socialisation stage. This method will not be successful if the lecturer does not have the ability to motivate and manage groups well.

The success of the *Collaborative Learning (CL)* method is highly dependent on the preparation and initial conditioning of the material, participants, and facilitators. The preparation of a *Collaborative Learning (CL)* learning plan includes the following:

Course Design

1

This section contains the course title, objectives, topics, and how sequence the activities that will be carried out by in completing tasks in groups.

Learning Outcomes

2

The learning outcomes of the *Collaborative Learning* (CL) method include at least the following abilities of students: 1) receiving recognition, 2) appreciating opinions and tolerance, 3) networking, 4) sharing ideas and opinions, 5) making joint decisions, 6) time management, and 7) gaining new perspectives.

Selection of Materials

3

This activity includes: 1) open-ended task design, 2) task completion beginning with the reading of a number of materials or theoretical concepts related to the task to be completed together, and 3) discussion of the reading results to reach an agreement

Facilitator

4

Things that need to be prepared by the facilitator are: 1) the ability to design open-ended tasks, 2) the ability to motivate (give instructions about group learning), and 3) the ability to act as a facilitator.

Learning Participants

5

The things that students need to have are: 1) a basic understanding of the tasks to be performed, 2) the ability to work with group members, and 3) the ability to discuss and analyse.

Learning Materials and Resources

6

The materials and resources prepared include: 1) tasks designed by lecturers together with students, 2) main materials, and 3) supporting materials.

Facilities and Infrastructure

7

The facilities and infrastructure required include: 1) adequate lecture rooms

that are adequate so that students can be divided into several groups, 2) work and discussion rooms complete with equipment, 3) a library, and 4) a laboratory.

Assessment Plan

8

This section is an important part of the *Collaborative Learning* (CL) method so that the achievement of objectives can be measured validly. This section requires the formulation of indicators and assessment criteria as well as the development of assessment tools in the form of rubrics or portfolios. Assessment and evaluation of the *Collaborative Learning* (CL) method can be carried out on many aspects, not only on cognitive learning outcomes. For example, evaluation can be carried out on students' discussion skills. Due to observation limitations, lecturers can choose *peer evaluation*.

E

Cooperative Learning (CoL)

Cooperative Learning (CoL) is a learning method carried out in groups and designed by lecturers to solve a problem or case. The groups formed consist of several students with varying academic abilities. The groups are divided into several students (usually small groups) proportionally according to the design of the problem or case to be solved.

This method is highly structured because the formation of groups, the material discussed, the discussion steps, and the final product to be produced are all designed by the lecturer. In this case, students play an active role in discussions and follow the guidelines designed by the lecturer.

The benefits of *Cooperative Learning* (CoL) include:

- 1) encouraging active learning habits among students;
- 2) enhancing individual and group responsibility among students;
- 3) enhancing students' ability and skills to collaborate with one another; and
- 4) improving students' social skills.

Cooperative Learning (CoL) is implemented in several steps as follows:

- 1) lecturers prepares a problem/case or form task to be completed by students in groups;
- 2) lecturers design the learning process;
- 3) lecturers convey objectives and motivation to students;
- 4) lecturers present information or concepts of learning material;
- 5) lecturers organise students into study groups; and
- 6) lecturers guide and monitor study groups, evaluate group work, and assess group presentations.

According to Lie (2007), the principles of *Cooperative Learning (CoL)* are positive interdependence, individual responsibility, communication between members, and evaluation of the group process. The *Cooperative Learning (CoL)* process is carried out between students and lecturers through interactions based on mutual respect and appreciation. The roles played by students in the *Cooperative Learning (CoL)* process include:

- 1) discussing and summarising problems/cases given by lecturers in groups;
- 2) completing assignments and materials provided by the lecturer; and
- 3) carrying out and completing learning materials in groups.

One evaluation model according to Denise M. Woods and Kuan-Chou Chen (2010) is the *Cooperative Learning (CoL)* evaluation model. This evaluation emphasises interdependence among students. Cooperation is a very important requirement, so the *Cooperative Learning (CoL)* evaluation system procedures include individual and group responsibility.

Similarities between *Cooperative Learning (CoL)* and *Collaborative Learning*

(CL) include:

- 1) requiring active student participation;
- 2) requiring responsibility for the learning process;
- 3) requiring the lecturer to act as a facilitator;
- 4) requiring accurate task plans or case studies;
- 5) building teamwork skills and social interaction;
- 6) preparing students for the workplace;
- 7) enhancing thinking skills;

- 8) sharing learning experiences;
- 9) improving knowledge retention; and
- 10) enhancing mutual respect.

The differences between *Cooperative Learning* (CoL) and *Collaborative Learning* (CL) can be presented in Table 1 (L, S, Davidson, & Hawkes, 1995)

Table 1 Differences between *Cooperative Learning* (CoL) and *Collaborative Learning* (CL)

<i>Cooperative Learning/CoL</i>	<i>Collaborative Learning/CL</i>
CoL is carried out to achieve predetermined/assigned objectives. Each group member has the same task and will later participate in a forum to present the results of the task. In this case, students will gain perspectives or viewpoints from other group members.	CL is conducted to achieve predetermined/assigned objectives, and each group member has a different task to complement one another.
The activity is structured by the lecturer, assigning specific roles to each student.	Students arrange the division of roles within their group themselves.
The lecturer provides materials for students to read and analyse.	Students seek out materials to assist in solving problems (cases).

F

Project-Based Learning (PjBL)

Project-based learning facilitates students in working on tasks (in the form of projects) that have been systematically designed, then demonstrating their performance and taking responsibility for the results of their group work in the form of products. The learning activity takes the form of designing a systematic task (project) so that students learn knowledge and skills through a structured and complex process of inquiry, then formulating and carrying out a process of guidance and assessment.

The Project-Based Learning (PjBL) method in the curriculum is implemented at least at after semester ke-2, because students must

first acquire theoretical knowledge. In *Bloom's* taxonomy, *Project-Based Learning* (PjBL) falls under the levels of applying, analysing, evaluating, and creating. The project assigned may be a combination of several subjects applied to solve a specific problem. First, the problem must be clearly defined. If necessary, the sequence of activities should be illustrated using a flowchart and then a block diagram. Each part of the block diagram needs to be clarified so that its suitability can be tested.

All these steps must be written in the form of a report and presentation so that the results can be presented in a discussion forum as a form of accountability that the project has been successfully completed. Discussions also allow for constructive feedback with the aim of improving the project's completion.

The implementation of *Project-Based Learning* (PjBL) can provide authentic experiences for students in developing problem-solving skills in everyday life through collaboration and communication. These authentic experiences are necessary for graduates to be competitive in the world of work. This statement is supported by research findings which reveal that the *Project Based Learning* (PjBL) method can prepare graduates to enter the world of work better than verification-based learning methods, as well as developing *life skills* for students (Jollands, Jolly, & Molyneaux, 2012); (Wurdinger & Qureshi, 2015).

According to Cahyono et al. (2020), *Project-Based Learning* (PjBL) can run smoothly and effectively provided that students already possess foundational knowledge or skills.

The learning steps in *Project-Based Learning* according to the stages developed by the George Lucas Educational Foundation (2005) are:

- 1) *Start With the Essential Question.* Learning begins by posing an essential question raised from real-world problems in line with the learning material. These problems are expected to be relevant to current developments and interesting for students to solve. The problems to be solved are agreed upon by the student group with the guidance of the lecturer.
- 2) *Design a Plan for the Project* Plan problem solving through a mutually agreed project so that each group member feels responsible for the completion of the project. The design must take into account the capabilities of the students as well as the equipment and infrastructure available for the implementation of the project.
- 3) *Create a Schedule* Lecturers and students agree on a project completion schedule consisting of components, stages and completion times, and activities involved in completing the project.

- 4) *Monitor the Students and the Progress of the Project* Lecturers monitor the progress of student project completion, both in terms of activities and the quality of the project products in accordance with the established standards. Important activities are recorded for discussion and assessment.
- 5) *Assess the Outcome* Assessment of attitudes, knowledge and skills in accordance with the Learning Outcomes assigned to the course. Students work in groups to present the products they have produced to solve relevant problems. Students' active participation in project completion and discussions, as well as the quality of the products, are also assessed using appropriate techniques and instruments.
- 6) *Evaluate the Experience.* At this stage, students reflect on their learning experiences. In groups or individually, students share their experiences in a discussion. Feedback from lecturers and other students is noted for improvement of project performance and products. Ultimately, students realise how to discover new concepts through the inquiry process.

A summary of the stages of implementing the project-based learning method is presented in Figure 3.



Figure 3. Stages of learning using the *Project-Based Learning* (PjBL) method

The characteristics of the *Project-Based Learning* (PjBL) method according to Guo et al. (2020) can be identified in the following aspects.

1) Driving questions

- a) driving questions are related to the real world and students' interesting experiences;
- b) driving questions are open-ended and challenging for students to complete intellectual tasks in accordance with their knowledge and skills.

2) Learning objectives

- a) project-based learning enables students to learn new subject matter and skills in line with curriculum requirements;
- b) project-based learning requires more learning time than conventional learning;
- c) In order for students to have a good understanding of concepts, solve problems and collaborate, more than one meeting is required.

3) Scientific Experience

- a) Students actively carry out the stages of the scientific method they have designed to solve problems;
- b) The scientific experiences undertaken are *inquiry-based learning*.

which consists of the following stages.

- Orientation to the topic: students have specific problems related to the subject matter that they must solve.
- Conceptualisation: presenting research questions and hypotheses (if any);
- Investigation: exploration (if there are only research questions but no hypotheses) or conducting experiments (if there are hypotheses), followed by interpretation of the data obtained;
- Conclusion: students draw conclusions based on the collected data;
- Discussion: communicating the results;
- Reflection

4) Collaboration

In carrying out the project, students collaborate with one another, also practising their communication skills. Collaboration should be seen as a means to achieve the main learning objectives, practising science, understanding concepts, and learning how scientific knowledge is created and used.

5) Use of technology

Students use technology in data collection, data analysis, and presentation. Lecturers use technology in delivering learning materials, facilitating project completion, monitoring, and assessment.

6) Producing products

- a) The learning process focuses on activities to create a product as a solution to a problem. Creating a product as a project outcome is what distinguishes this method from *problem-based learning*.
- b) The product produced must:
 - address the problems or questions raised;
 - reveal the level of students' understanding of the concept;
 - assist students in mastering the concepts of the subject matter being studied;
 - meaningful;
 - Project-based learning enables students to produce various products, but ultimately leads to the resolution of problems or answers to motivating questions.

The application of *the Project-Based Learning (PjBL)* method in chemistry learning has several advantages for students, including: 1) increasing student motivation to learn, 2) improving problem-solving skills, 3) improving students' skills in searching for and obtaining information, 4) developing and practising communication and collaboration skills, 5) providing students with learning and practical experience in organising projects, allocating time and other resources, 6) providing learning experiences in gathering information and demonstrating knowledge, which is then implemented in the real world, and 7) creating a pleasant learning atmosphere.

Project-Based Learning (PjBL), despite its advantages, also has several disadvantages, including: 1) it requires a lot of time to solve problems, 2) it requires considerable costs, 3) students who have weaknesses in experimentation and information gathering will experience difficulties, and 4) when the topics given to each group are different, there is a concern that students will not comprehensively master the learning material. To overcome the weaknesses of *Project-Based Learning (PjBL)*, the following efforts can be made:

by facilitating students in dealing with problems, limiting the time students have to complete projects, and providing simple equipment found in the surrounding environment, choosing a research location that is easily accessible so that it does not require a lot of time and money, creating a pleasant learning atmosphere so that lecturers and students feel comfortable in the learning process.

The stages in implementing *team-based project learning* are as follows:

- 1) the class is divided into groups of more than one student to work on assignments together for a specified period of time;

- 2) the groups are given real problems that occur in society or complex questions, then given space to make work plans and collaboration methods;
- 3) Each group prepares a presentation/final project to be presented in front of lecturers, the class, or other audiences who can provide constructive feedback; and
- 4) lecturers mentor each group during the project period and encourage students to think critically and creatively in collaboration.

G

Problem-Based Learning (PBL)

Problem-Based Learning (PBL) is a learning method that challenges students to solve real-world problems. Students must actively explore/search for information (*inquiry*) and use the information obtained to solve problems/cases that must be solved. The expectation of students through this learning method is to have certain competencies in solving real-world problems. For this reason, case creation must meet several aspects in order to achieve the objectives of applying the *Problem-Based Learning* (PBL) method.

The problems raised are authentic, meaning that the problems given originate from the real world and are rooted in the principles of specific disciplines. Problems are presented clearly, are easy to understand, and cover all the material to be learned in accordance with the time, space, and resources available. Solving these problems is beneficial for students.

For example, in the *Event Management/MICE* course, students are expected to have the competencies of *an event organiser*. In order to achieve this goal, the *Problem-Based Learning* (PBL) method is used, whereby lecturers prepare problems based on real issues in *event* management or problems that actually occur in the real world. In this case, the information obtained by students is crucial to their ability to solve these problems. In the real world, the indicators of success in organising an *event* can be seen in the stages of preparation, implementation, and post-implementation. Problems that commonly occur include unprofessional committees, speakers or guest stars who suddenly cancel their attendance, unruly participants or *audiences*, *sponsorship* defaults, and schedules that may need to be rescheduled. Students will be assessed on their ability to solve problems based on each stage of *event* organisation. Technical guidelines for solving a case must be well prepared by a lecturer supervising the course so that problem/case solving is in line with expectations.

Many questions or problems that arise in everyday life require scientific information to solve them. Questions that pique curiosity or efforts to fulfil needs have encouraged scientists or experts to conduct scientific investigations or scientific work (*doing science*) on the questions or problems they face, until a scientific solution or product is found. This habit of scientific work makes scientists skilled at solving problems, even problems outside their field in everyday life. Based on this advantage, efforts have been made to apply the habits of scientists in scientific work to learning. This is important because the problems in our lives today are increasing and becoming more complex. The learning process that facilitates students to discover knowledge or solutions to problems on their own, as scientists usually do, is called inquiry-based learning.

Inquiry can be defined as the process of searching for information, solutions, or knowledge by questioning a phenomenon or Situation. Inquiry-based learning is a method that facilitates students to work like scientists in questioning why phenomena occur, then attempting to collect data or information and analyse it, followed by drawing conclusions, so that ultimately students can find the answers to a problem themselves (Wiyanto, 2008).

The principles of inquiry-based learning are as follows:

- 1) students are presented with problems or phenomena or descriptions of situations as stimuli that pique their curiosity;
- 2) students are facilitated to solve problems until they find their own solutions;
- 3) students engage in direct activities related to the process of gathering information or data to solve problems; and
- 4) students are facilitated to develop their *data-driven* inductive thinking skills.

Trowbridge et al. (1981) distinguish between inquiry strategies and discovery strategies. Discovery is a mental process of assimilating concepts and principles. The *discovery* process includes: observing, classifying, measuring, predicting, describing, and concluding. Meanwhile, inquiry is the process of uncovering and investigating problems, formulating hypotheses, designing experiments, collecting and analysing data, and drawing conclusions.

Trowbridge and Bybee (1990) distinguish inquiry approaches into three levels. The first level is called discovery, where the lecturer determines the problem and the process of solving it, while students work on the process determined by the lecturer until they can find the solution themselves.

The second level is called *guided inquiry*, in which the lecturer presents the problem, while the students determine the process of solving the problem themselves and carry out the process until a solution is found. The third level is called *open inquiry*, in which the lecturer only provides a platform to stimulate problem solving, while students identify and formulate problems, design the problem-solving process, and carry out the process until a solution is found.

Steps or stages in implementing *discovery/inquiry learning* in the classroom consists of at least 6 steps.

1

Stimulation

At this stage, students are presented with something (an object or phenomenon) that raises questions, which can stimulate students to think critically about the phenomenon, thereby arousing their desire to investigate it themselves. In addition, lecturers can begin the teaching and learning process (PBM) by asking questions, recommending books to read, and other learning activities that lead to problem-solving preparation.

2

Problem Identification and Hypothesis Formulation

After stimulation, the next step is for the lecturer to give students the opportunity to identify as many issues as possible that are relevant to the subject matter, then select one of them and formulate the problem in the form of a question. The selected problem is then followed up with the submission of alternative temporary answers or hypotheses. The hypotheses proposed are based on the knowledge possessed by the students (*theory-driven*). The process of proposing hypotheses requires creativity from students.

3

Data Collection

Hypothesis testing requires data support. This stage involves designing an experiment (or method of hypothesis testing) and implementing it to collect data in order to answer questions or test hypotheses. Students are given the opportunity to objectively collect various relevant data/information, read literature, observe objects, interview sources, conduct their own trials, and other activities in accordance with the design. Thus, at this stage, students actively and objectively seek and test reliable data/information to test hypotheses. Experimental design or hypothesis testing is a creative process, so it is hoped that students' creativity will develop. In addition, a sceptical

attitude will also develop, namely not believing information that is not supported by data, as well as an objective attitude, namely viewing something (especially in measurement or data collection) without prejudice (not "biased").

4

Data Processing

At this stage, the collected data is processed, classified or categorised, and presented in the form of tables, graphs, or diagrams. The relationships between data are analysed to see the deductive consequences of the hypothesis.

5

Hypothesis Testing

At this stage, students carefully examine the results of data processing and relate them to the hypotheses proposed at the beginning. If the data supports the hypothesis, then the hypothesis is accepted, but if the data does not support it, then the hypothesis needs to be modified or replaced.

6

Drawing Conclusions

At this stage, students draw conclusions that can be used as general principles and apply to all similar events or problems. Conclusions are drawn based on the results of data verification and their support for the hypothesis.

In the application of *inquiry/discovery* learning, the roles of lecturers and students are as follows.

The role of the lecturer

- 1) preparing problem stimuli that can arouse students' curiosity;
- 2) facilitating students in forming groups;
- 3) presenting stimuli to students;
- 4) facilitating, observing, and monitoring student activities; and
- 5) Facilitate and observe the implementation of class presentations/discussions until conclusions are reached.

Student roles

- 1) Forming groups to carry out activities in *inquiry/discovery*;

- 2) Observing the stimulus presented by the lecturer, followed by formulating problems;
- 3) formulating/proposing hypotheses;
- 4) designing activities/experiments to test hypotheses;
- 5) carrying out the planned activities/experiments to collect data;
- 6) processing data and testing hypotheses;
- 7) drawing conclusions based on the hypothesis and the results of data analysis or verification; and
- 8) actively participating in class discussions after *inquiry/discovery* activities.

Based on the observations, the application of *discovery/inquiry* learning has advantages and disadvantages, including the following.

Advantages

- 1) fostering sceptical, objective, curious, critical and creative thinking among students;
- 2) fosters problem-solving skills and learning to learn;
- 3) developing the ability to work together in a team;
- 4) developing communication skills (presentations and discussions);
- 5) improving skills in using measuring instruments;
- 6) because students discover concepts on their own, learning becomes memorable and learning outcomes can be retained longer in memory;
- 7) Hypothesis testing activities can eliminate doubts and even remedy misconceptions.

Disadvantages

- 1) students who are less intelligent or less experienced may find it difficult to express the relationships between concepts, which can lead to frustration;
- 2) it is inefficient for large numbers of students, as it takes a long time to help them discover concepts, theories or other problem-solving methods for themselves;
- 3) in some disciplines, such as science, there may be a lack of facilities for measuring/collecting the data needed to test hypotheses.

An example of its application in physics learning is through student inquiry laboratory activities facilitated to discover for themselves the relationship between several physical quantities, such as the relationship between acceleration (a) and force (F) acting on an object. Alternatively, students are facilitated to discover for themselves the factors or quantities that influence a physical process. Another example in the social sciences is in

In history lessons, students are facilitated to discover for themselves the connections between cultures from one era to the next. The process of finding these connections can be facilitated, among other things, through wiki *tools* on the learning management system (LMS).

I

Self-Directed Learning (SDL)

Self-Directed Learning (SDL) or independent learning is learning that gives each individual the opportunity to take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning outcomes, identifying learning resources, selecting and applying appropriate learning strategies, and evaluating learning outcomes. In 21st century learning, independent learning skills are required, making this method highly strategic to implement.

The definition of *Self-Directed Learning* (SDL) continues to evolve, vary and expand according to the academic traditions of its authors (Olivier, 2020). Independent learning can be considered part of a movement towards student-centred learning that emphasises increasing student responsibility. The use of technology influences the way of thinking and causes students to be more independent, therefore students must be encouraged to search, discuss, and experiment with applications or software, and other useful devices, including resources that may not have been known before.

The stages need to be planned to develop a *Self-Directed Learning* (SDL) programme. The following five basic elements can be followed sequentially as steps in the *Self-Directed Learning* (SDL) development process (Gibbons, 2002):

- 1) identifying learning outcomes;
- 2) creating an environment conducive to the learning process;
- 3) equipping students with the skills and experience necessary to meet learning outcomes;
- 4) discussing with each student the proposals, contracts, or plans that have been prepared to meet the Programme Learning Outcomes (PLOs) and their individual goals; and
- 5) establishing processes for student self-assessment, procedures, and monitoring their learning progress.

The Self-Directed Learning (SDL) method makes students aware that the actions they take and think about during the learning process are their own responsibility. The assumptions that must be met in order to apply the *Self-Directed Learning (SDL)* method are as follows:

- 1) students as adults, becoming individuals who are capable of learning independently and not relying on others;
- 2) experience is a very useful source of learning;
- 3) readiness to learn is essential to begin becoming an independent learner;
- 4) learning from a problem is more interesting for adults than the content of a course; and
- 5) Good relationships and interactions between lecturers and students, complementing and strengthening each other. The learning environment for adults is built through recognition, appreciation, and support for the learning process.

In *Discovery Learning*, lecturers play a role in developing knowledge and skills that cannot be obtained or that students find difficult to understand in a concept or theory. *Self-Directed Learning (SDL)* does not completely leave students to their own devices in learning; the role of lecturers is very important as experts who master the material and lead students, as well as mentors who guide and advise students.

Based on facts and observations, the application of the SDL approach in learning has advantages and disadvantages. The advantages of the *Self-Directed Learning (SDL)* method include students being able to: 1) learn according to their learning style, interests and talents, 2) learn from various learning sources that meet the criteria, 3) learn material that interests them, and 4) develop comprehensive knowledge and skills. Meanwhile, the disadvantages of the *Self-Directed Learning (SDL)* method are: 1) students who are less active and slow will fall behind, and 2) students may experience difficulties in choosing the right material and learning methods if they are not yet familiar with their own potential and interests.

The *Self-Directed Learning (SDL)* learning process is highly flexible but remains within the stages of *planning*, *monitoring*, and *evaluating*, which depend on the student's ability to manage their learning. Assessment of results Learning with *Self-Directed Learning (SDL)* cannot be done simultaneously due to the diversity of each student's learning process. Lecturers provide time to prepare evaluations and feedback for each student.

In *Contextual Instruction* (CI) learning, students learn concepts/theories that are related to real situations and conduct field studies to learn the suitability of concepts/theories with the realities they encounter in life. Contextual learning is a method that helps students understand what they are learning by connecting the subject matter to the context of their lives (Johnson, 2002). Furthermore, Johnson (2002) presents strategies for learning using the contextual method, which include *Relating, Experiencing, Applying, Cooperating and Transferring* (REACT).

Relating is the most important contextual learning strategy, as it is also a key part of constructivist learning. Students learn in the context of their life experiences or prior knowledge. At this stage, students connect new information with their life experiences or prior knowledge that they bring to the classroom. Therefore, it is important to identify whether students have relevant experiences/knowledge, which are usually expressed as apperceptions and preconceptions. If students do not have prior experience or knowledge, lecturers can arrange direct experiences in the classroom through demonstrations, video screenings, or other forms related to events or phenomena in students' lives. In learning about carbohydrates in organic chemistry courses, students will quickly answer when asked about foods or drinks that taste sweet. What causes the sweet taste? Is it carbohydrates that cause the sweet taste?

Experiencing or experiencing, students learn by doing through exploration and discovery. Direct experiences in the classroom can be done through manipulative activities, problem-solving activities, and laboratory activities. To prove that the sweet taste in food or drinks comes from carbohydrates (sugar) then can be done a general test experiment to detect the presence of carbohydrates and identify the types of carbohydrates.

Applying, students apply the concepts they have learned through problem-solving projects, with lecturers providing guidance and motivation. Students can be given projects to identify the types of carbohydrates in beverages or drinks that are commonly consumed in everyday life. Students are also challenged to prove that sweetness does not always come from sugar.

Cooperating, students work together in groups to complete exercises or real-life experiences. Students in the group share, respond, and communicate with each other. In the process of problem solving through these projects, students work together to divide the work of finding samples, determining test methods, and conducting tests to reach conclusions.

Transferring, or communication, is a learning strategy for using knowledge in new contexts or situations not previously discussed in class. Students gain new experiences and knowledge after going through the *Relating, Experiencing, Applying, and Cooperating* strategies. Lecturers give students the opportunity to share their new experiences and knowledge in class.

The findings obtained by each group are presented, discussed, and summarised into new knowledge acquired through the REACT strategy.

IV. IMPLEMENTATION OF STUDENT CENTRED LEARNING USING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

The development of Information and Communication Technology (ICT), particularly technology that supports learning, is advancing rapidly. The ease of developing videos and digital learning media has encouraged the growth of digital content. One of the most relevant student-centred learning implementations today is learning with the *flipped learning* strategy. Similarly, in 21st-century learning, students are required to have independent learning skills, as discussed in this chapter.



Flipped Learning

Traditional learning with a one-way approach utilises meetings with students solely to explain material and ends with the assignment of homework or tasks. The next meeting will repeat the same approach and may miss the opportunity to discuss tasks that actually lead to the achievement of *high-order thinking* skills (*HOTS*). The development of ICT has led to the revival of this long-established approach. This can be seen in the ability of lecturers to record and create interactive materials. Students can study these materials before class, so that class time can be used for discussion and clarification. This approach to learning is called flipped learning.

Some terms that have the same meaning as *flipped learning* are *flipped classroom*, *flipped model*, and *inverted model*. *Flipped learning* is defined as a pedagogical approach in which direct (one-way) learning takes place outside the classroom, so that time in the classroom can be filled with active group learning that encourages learners' creativity on a given subject matter (*Flipped Learning Network* (FLN, 2014)). The definition of *flipped learning* is illustrated in Figure 4.

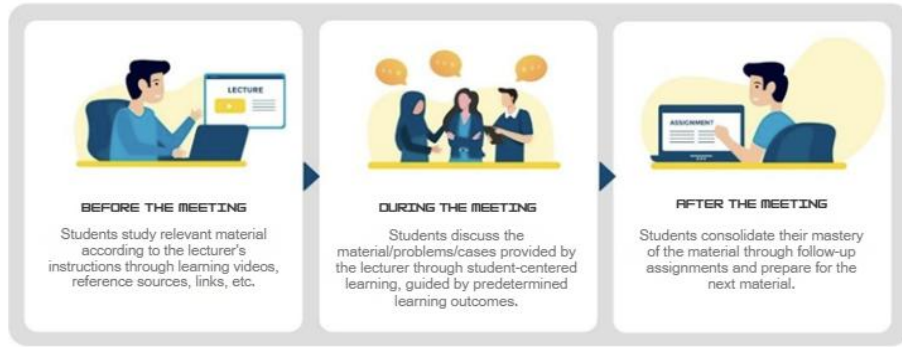


Figure 4. Illustration of *flipped learning*

Figure 5 shows the difference between traditional learning and *flipped learning* in relation to the achievement of thinking skills (using the *Revised Bloom's Taxonomy*).

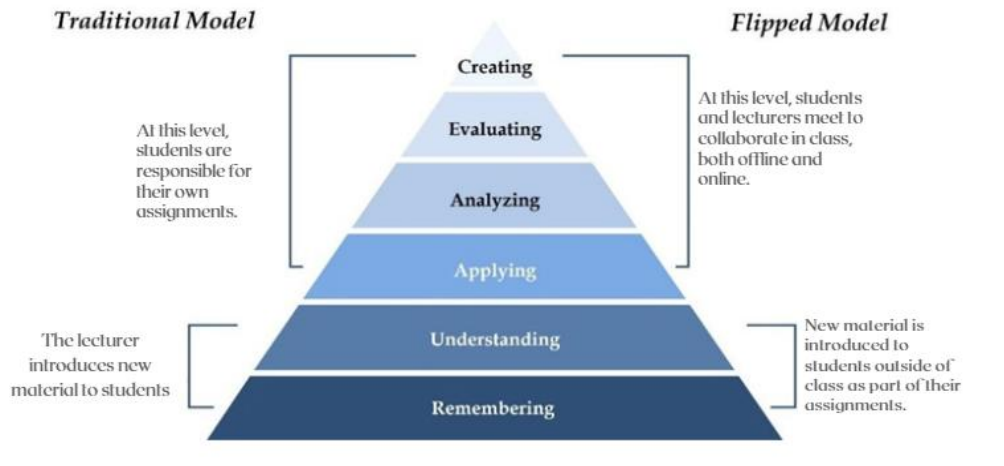


Figure 5. Differences in perspective between traditional and *flipped learning* methods in terms of achievement levels in the *Revised Bloom's Taxonomy*

The levels of learning according to Bloom's Taxonomy that are relevant to traditional and *flipped learning* activities are shown in Figure 6.

Learning Level	Traditional Class	Flipped Classroom
Remember	Face-to-face lectures	Studying material from lecturers, reference sources, links, etc.
Understand	Question and answer	Reflection, discussion and collaboration
Apply	Homework	Lecturers support class activities
Analyze, evaluate, and create	No homework	Student projects and presentations

Figure 6. Learning activities in traditional and *flipped learning* methods

B

Self-Paced Learning

Self-paced learning, also known as *individualised learning* or *self-instruction*, is a learning method in which students work at their own pace and actively carry out various learning tasks/activities and learning experiences to achieve learning outcomes.

Since all control lies with the students, the most important elements of *self-paced learning* are responsibility, pace, and student success in learning based on learning outcomes and various activities supported by available resources. In this case, educators/lecturers need to determine the learning outcomes and set various requirements that must be met by students. Thus, success in implementing this *self-paced learning* method requires a good and comprehensive learning design, in accordance with the learning outcomes and containing various learning activities that are tailored to the characteristics, preparation, needs, and interests of each individual student. The implementation of this method generally requires a computer-based *learning management system*, which can be used to track the learning progress of each student and to select appropriate learning outcomes.

The rapid development of Information and Communication Technology (ICT) in the last decade has encouraged the use of ICT in various fields, including learning technology. The use of internet technology in learning has made the learning process easier anywhere, anytime and by anyone. Internet-based learning, commonly referred to as online learning, is becoming increasingly widespread, especially for accessing the many learning resources available on the internet. This has encouraged the implementation of *self-paced learning* methods, which give students the freedom to access various learning resources and carry out various learning activities according to their own control and learning speed.

Figure 7 shows a blended *learning* method that involves *self-paced learning*. Within a learning period (e.g. one semester), tutorial sessions can be conducted either online or face-to-face with a tutor. In these tutorial sessions,

Students are encouraged to study independently from various learning resources and engage in various activities during *self-paced learning* sessions. *Drop-in* sessions may be provided, either online or face-to-face, if students require specific interaction with tutors or lecturers at their request. Whether during tutorial sessions, *self-paced learning*, or *drop-in* sessions, students can still interact with lecturers, tutors, or fellow students through online forums, which are available in a *learning management system*.



Figure 7. A blended learning method that applies *self-paced learning*

One example of the implementation of *self-paced online learning* is the *Massive Open Online Courses* (MOOCs) programme. This programme offers a variety of free online lectures that anyone can take. MOOCs provide affordable and flexible learning programmes that students can take to learn new skills or advance their careers, as well as providing a high-quality learning experience on a massive scale. The learning process in MOOCs gives students the freedom to set their own learning pace and a high degree of flexibility in terms of learning time. In this case, the learning materials are available in various media, usually in the form of videos, which students can access online for free. Coursera, Khan Academy and edX are examples of popular MOOC providers.

V. STRATEGIES FOR SELECTING LEARNING METHODS

A good curriculum supported by adequate facilities and infrastructure will not run as expected if lecturers do not select and apply appropriate learning methods. This indicates that learning methods are a prerequisite for successful learning outcomes. This implies that lecturers have a responsibility to master strategies for selecting learning methods and apply them consistently. There are many choices of student-centred learning methods, including group discussions, role-playing, case-based learning, project-based learning, and others as described in Chapter III.

In general, learning methods can be interpreted as a means of achieving learning outcomes or learning objectives. Therefore, the selection of learning methods must be based primarily on the type of learning objectives (Bonner, 1999). In line with this, according to Biggs (Biggs, 1996), the selection and application of learning methods should be oriented towards achieving learning outcomes. In addition to the suitability of learning methods with learning outcomes (CP), according to Shailaja (2017) and Taylor et al. (2013), factors such as teaching material characteristics, student characteristics, resource availability, and the learning environment must also be considered.

A

Alignment with Learning Outcomes (CP)

According to Biggs (1996), the learning process should facilitate students in achieving CP. Therefore, constructive alignment between learning methods and CP needs to be established in order to achieve CP. In addition to the alignment between CP and learning methods reflected in the learning process, Biggs also recommends alignment between CP, learning methods or processes, and assessment. Figure 8 shows the operational framework of Biggs' constructive alignment model (Alfauzan & Tarchouna, 2017).



Figure 8. Operational framework of Biggs' constructive alignment model (Alfauzan & Tarchouna, 2017)

Biggs identifies a tendency for students to only learn what will be tested, with the result that assessment becomes their orientation in learning. Thus, rather than the curriculum being the guideline, assessment becomes the focus of their orientation. This is not a problem if the assessment is in line with the curriculum, or if the assessment is aligned with the CP that has been formulated. Therefore, the alignment between CP, assessment, and learning methods needs to be considered so that students will learn what they need to learn to achieve CP. One way to check this alignment is by creating a mapping table as shown in Table 2.

Table 2 Mapping the alignment between CP, assessment, and methods

Attitude			
Knowledge			
Skills			

B Characteristics of Teaching Materials

Teaching materials are closely related to CP, therefore the alignment of learning methods with CP also implies the need for alignment of these methods with teaching materials. Teaching materials consist of facts, concepts, principles, and procedures. The characteristics of teaching materials for each course vary,

even between topics in the same course. In addition, the level of difficulty or complexity also varies. This diversity affects the success of the learning methods applied. There is teaching material that can be taught well with several learning method options, but there is also teaching material that is only suitable for certain methods. For example, measurement topics in physics or science are best taught using methods that involve laboratory activities or practical work, so that students not only understand the concept of measurement but also become skilled in using measuring instruments. Therefore, lecturers are required to have the ability to select and apply the most appropriate teaching methods for the teaching materials.

C Student Characteristics

Student-centred learning places learning activities at the centre of attention. Students have the opportunity to control their own learning through active involvement in the learning process. In student-centred learning, the responsibility for learning has shifted to the students (Wright, 2011). In fact, students have diverse characteristics, including gender, age, socioeconomic background, learning experience, and psychological development. The diversity of student conditions must be taken into account in the selection of learning methods and the management of their implementation. This is necessary so that learning can proceed according to plan, all students are actively involved, and learning is not dominated by certain students.

D Availability of Resources

Resources that support the learning process include rooms or buildings, classroom equipment, laboratories, and libraries; IT facilities; assistants, laboratory assistants, technicians, and librarians. The adequate availability of these resources will support the successful implementation of student-centred learning methods. Conversely, limited resources will clearly be an obstacle to learning. For example, limited tools and materials and the absence of laboratory assistants are often reasons for lecturers not to conduct laboratory activities.

Learning success is related to the environment in which learning activities take place. For example, compared to learning activities in the classroom, activities in the laboratory are less formal, allowing students to observe, act, and interact individually or in groups. Therefore, the selection and application of learning methods must take into account the situation and conditions of the existing learning environment. Conversely, if a lecturer is going to apply a learning method, they must create a conducive learning environment that supports that method. This conducive learning environment will enhance interaction between students and students, students and lecturers, and between students and learning resources, both offline and online. Therefore, in relation to the learning environment and the selection of methods, the number of students in a class or group must also be considered so that student-centred interaction in learning can be maintained properly.

VI. CONCLUSION

Student-centred learning is one of the learning approaches mentioned in Permendikbud No. 3 of 2020 concerning National Standards for Higher Education (SN-Dikti). This approach states that Programme Learning Outcomes (PLO) are achieved through a learning process that prioritises the development of creativity, capacity, personality, and student needs, as well as developing independence in seeking and discovering knowledge. Various methods included in student-centred learning, such as *Case-Based Learning*, *Collaborative Learning*, *Cooperative Learning*, *Project-Based Learning*, *Problem-Based Learning*, and others, support the achievement of students' *high-order thinking* skills, such as complex problem-solving, critical thinking, creative thinking, communication, collaboration, and empathy. These SCL methods encourage student involvement to play an active role in the learning process they are participating in. Specifically for the last two SCL methods, namely *Project-Based Learning* and *Case-Based Learning*, they are also SCL methods that are encouraged to be implemented in the form of Merdeka Belajar-Kampus Merdeka learning activities. Technological developments, particularly the use of ICT in the learning process, also colour the various SCL methods that can be applied in a blended manner. The application of SCL using ICT is also in line with the era of industry 4.0.

The selection of various SCL learning methods greatly depends on the characteristics of the learning material, curriculum, learning resources, learning environment, and the conditions of lecturers and students. On the other hand, various technological developments and changes in the demands of the world of work have encouraged lecturers to continue to develop themselves in order to be able to carry out appropriate SCL learning. The application of appropriate SCL methods is expected to support the improvement of learning quality and effectiveness for students in meeting course learning outcomes. This guidebook is compiled in a systematic and structured manner so that it can serve as a guide for lecturers in understanding various SCL learning methods, including the forms of evaluation and the use of ICT required in designing the learning process for the courses they teach.

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