The Government of the Republic of the Union of Myanmar

Ministry of Education

Year 1 Semester 1

EDU1101

Educational Studies

Student Teacher Textbook

PREFACE

The Myanmar Ministry of Education developed the four-year Education College curriculum, in line with the pre-service teacher education reform as specified in the National Education Strategic Plan (NESP) 2016-2021.

The Myanmar Education College curriculum consists of several components: the curriculum framework, syllabi, Student Teacher Textbooks, and Teacher Educator Guides. This curriculum for the four-year Education College was designed and structured to align with the Basic Education Curriculum and to equip student teachers with the competencies needed to teach effectively in Myanmar's primary and middle school classrooms. It is based on a Teacher Competency Standards Framework (TCSF) which articulates the expectations for what a teacher should know and be able to do in the classroom.

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The curriculum structure provides an integrated approach, where teaching of subject knowledge and understanding educational theories are learnt through a supportive learning process of relevant preparation and practical application and experience. The focus is therefore not just on subject content, but also on the skills and attitudes needed to effectively apply their knowledge, skills, and attitudes in teaching and learning situations, with specific age groups. As the focus is on all components of a 'competency' – knowledge, skills, attitudes and their effective application – it is referred to as a competency-based curriculum.

Accordingly, a competency-based curriculum is learner-centred and adaptive to the changing needs of students, teachers, and society. Where new concepts are learnt, they are then applied and reflected on:

1. Learn (plan what and how to teach);
2. Apply (practise teaching and learning behaviours); and
3. Reflect (evaluate teaching practice).

Beyond the Education College coursework, it is intended that student teacher graduates will be able to take and apply this cycle of 'learn, apply, and reflect' to their own teaching to effectively facilitate the learning and development of Myanmar's next generation.

The Myanmar Education College curriculum was developed by a curriculum core team, which is a Ministry of Education-appointed team of Myanmar Education College teacher educators supported by the Ministry of Education, resource persons from the Universities of Education, University for the Development of National Races of the Union and a team of national and international experts. Overall guidance of the work was provided by the Department of Higher Education, Ministry of Education.

The curriculum development was also supported by the Strengthening Pre-Service Teacher Education in Myanmar project, with technical assistance from the United Nations Educational, Scientific and Cultural Organization (UNESCO) and financial contributions from Australia, Finland, and UK Governments. Substantial input to the drafting process was also provided by Japan International Cooperation Agency and the primary education curriculum development team through the Project for Curriculum Reform at Primary Level of Basic Education (CREATE) team.

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HOW TO USE THIS TEXTBOOK

Who will use this Educational Studies textbook?

This textbook has been designed to guide you, as a student teacher, through Year 1 of the Educational Studies learning area. In this textbook, you will find foundational information about Educational Studies. The textbook also includes learning activities and additional resources to help you develop the knowledge, skills, and attitudes you need to be an effective teacher in Myanmar. You will use the textbook as a key resource in class; you can also use the textbook for independent self-study.

While the content in the textbook is addressed to you, as a student teacher, it is also a resource for your teacher educators, who will serve as your facilitators and mentors as you develop key competencies in Educational Studies. Throughout this module, you and your teacher educator will work together, using this textbook as a tool for learning.

When and where does Educational Studies take place?

The learning area of Educational Studies has been allotted 240 periods of teaching for each year of your four-year Education College programme. Classes will be held in your Education College campus.

What is included in the Year 1 Educational Studies textbook?

The textbook organisation and content align with the syllabus of the four-year Education College curriculum on Educational Studies.

This textbook contains the following topics for Year 1 Educational Studies:

- Introduction to Educational Studies;
- Pedagogical Theory and Practice;
- Strategies for Effective Learning;
- Planning and Preparation;
- Assessment;
- Overview of Myanmar's Education Systems, Policies and Trends;
- Educational Philosophy;
- Educational Psychology;
- Creating a Learning Environment; and
- Professionalism.

For each unit, you will be working through learning activities, both individually and with your peers as well as teacher educators, to deepen your knowledge, skills, and attitudes on the topic. The Content Map, below, highlights the expected learning outcomes and time allocations for each unit in this textbook.

Table A. Year 1, semester 1, Educational Studies content map

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
1. Introduction to Educational Studies	1.1. What is education?	1.1.1. The meaning of education	• Provide historical and personal definitions of education	A4 A5	1
	1.2. What is Teaching? What is Learning? What is School?	1.2.1. The Relationship between Teaching, Learning, and School	• Identify linkages between teaching and learning • Identify the characteristics of school as a learning environment	A4 A5	2
	1.3. Understanding Educational Studies	1.3.1. What is Educational Studies, and Why is it Important?	• Describe the field of Educational Studies and why it is important	A4 A5	1

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	1.4. Educational Studies in the Education College Programme	1.4.1. Why Study Educational Studies in your Education College?	• Identify the purpose of the Educational Studies module • Understand the scope of content covered during Year 1 of the Educational Studies module and the linkages between Education Studies other subjects	A4 A5 C3	2
2. Pedagogical Theory and Practice	2.1. What is Pedagogy? What is Pedagogical Content Knowledge (PCK)?	2.1.1. Understanding Pedagogy and Pedagogical Content Knowledge	• Define the terms 'pedagogy' and 'pedagogical content knowledge' (PCK)	A4 A5 C3	2
	2.2. What is Pedagogical Theory and Practice?	2.2.1. Thinking About Pedagogical Theory and Practice	• Describe teaching and learning strategies	A4 A5 C1	2
	2.3. Foundational Learning Theories and Learning Theorists	2.3.1. Important Learning Theories and Theorists	• Identify foundational learning theories and learning theorists	A4 A5	2
	2.4. How Children Learn	2.4.1 Children as Natural Learners	• Explain how children naturally learn	A4 A5 C1 D1	2
	2.5 . Bloom's Taxonomy	2.5.1. The Three Domains of Learning in Bloom's Taxonomy	• Identify action verbs for Bloom Taxonomy's three domains of learning	A4 A5 C1 D3	2
	2.6 Learning Principles	2.6.1. Learning Principles for Effective Learning	• Relate learning principles to effective learning	A4 A5 C1	2
	2.7. Learning Styles	2.7.1. Understanding and Appreciating Different Learning Styles	• Explain different learning styles and their impact on students' learning	A4 A5 C1 C3	2
	2.8. Basic Learning Models and Teaching Strategies	2.8.1. Learning about Learning Models	• Relate basic learning models to local contexts	A4 A5 C1 C3 D1	4

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	2.9. The 'Input-Process-Output' Process	2.9.1. What is IPO?	• Draw an IPO process diagram with examples	A4 A5 C1 D1	2
	2.10. Child Development	2.10.1. Important Stages in Child Development	• Demonstrate knowledge of how young learners (5-10 years old) learn according to their developmental stage • Explain the concepts and theories of growth and development, nature and nurture, developmental domains and milestones, brain development, developmentally appropriate tasks, the uniqueness of a child, and the child as a whole.	A4 A5 C1 C3 D3	4
3. Strategies for Effective Learning	3.1. Questioning and Leading Learning	3.1.1. How to Lead Learning by Using Questions	• Discuss the leading role of the teacher for supporting students to meet learning outcomes • Develop different levels of questioning by using Bloom's Taxonomy	A4 A5 C1 C3 D1	4
	3.2. Communicating with students	3.2.1. Effective Communication in the Classroom	• Discuss how the teacher can communicate clearly and accurately to students • Examine the importance of the teacher listening to students • Discuss how to provide feedback to students that enhances their learning	A4 A5 C1 C3 D1 D3	4
	3.3. Active, Interactive, and Cooperative Learning	3.3.1. Designing Active, Interactive, and Cooperative Learning	• Describe various strategies for engaging primary students in effective learning	A4 A5 C1 C3 D3	4
	3.4. Developing Autonomy and Student-led Learning	3.4.1. The Importance of Autonomy and Student Ownership in Learning	• Compare and contrast the differences between teacher-centred and learner-centred approaches to learning	A4 A5 C1 C3 D3	44

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	3.5. Responding to Need and Adapting to Circumstances	3.5.1. Meeting Individual Student Needs	• Apply adjustment mechanisms in teaching and learning situations	A4 A5 C1 C3 D3	4
	3.6. Providing Positive Feedback	3.6.1. Offering Positive Feedback to Promote Learning	• Provide positive feedback to each other in demonstration	A4 A5 C1 C3 D3	4
	3.7. The Importance of Motivation for Effective Learning	3.7.1. Motivating Students for Effective Learning	• Identify the advantages of motivation for effective learning	A4 A5 C1 C3 D3	3
	3.8. The Importance of Student Engagement	3.8.1. Engaging Students in Learning	• Explain the importance of student engagement	A4 A5 C1 C3 D3	3
4. Planning and Preparation	4.1. How to Identify the Main Ideas, Related Ideas, and Details of a Reading	4.1.1. Identifying the Main Idea, Related Idea and Details of a Reading	• Identify the main concept and related ideas of a reading	A4 A5 C1 C3 D3	2
		4.1.2. Seven Steps to Teaching Yourself Content	• Identify the main concept and related ideas of a reading	A4 A5 C1 C3 D3	2
	4.2. Setting Learning Objectives, Outcomes, and Success Criteria	4.2.1. Objectives, Outcomes and Success Criteria	• Explain the importance of learning objectives, outcomes and success criteria	A2	2
		4.2.2. Comparing Learning Outcomes, Objectives and Success Criteria	• Compare the differences between learning objectives, outcomes and success criteria	A2	1
		4.2.3. SMART Learning Outcomes	• Construct Specific, Measurable, Achievable, Relevant and Time bound (SMART) learning outcomes • Compare the differences between learning objectives, outcomes and success criteria	A2	1

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	4.3. Selection of Teaching Strategies for Each Respective Subject	4.3.1. Teaching Strategies for Subjects	• Select teaching strategies based on the nature of the subject	A2	1
		4.3.2. Guided Discovery	• Select teaching strategies based on the nature of the subject	B1	2
		4.3.3. Dramatisation and Other Strategies	• Select teaching strategies based on the nature of the subject	B1	1
	4.4. Teaching and Learning Materials	4.4.1. Common Teaching and Learning Materials	• Describe the importance of teaching resources and how to use them effectively in different circumstances	A2	2
		4.4.2. Worksheets as teaching aids	• Describe the importance of teaching resources and how to use them effectively in different circumstances	A2	1
	4.5. Characteristics of Good Learning Activities	4.5.1. Learning activities	• Describe what a learning activity is and explain the characteristics of a good learning activity	A2	2
	4.6. Designing Teaching Activities	4.6.1. Teaching Activities for Introducing a Lesson and Teaching Main Idea and Related Ideas of a Reading	• Explain various types of teaching and learning activities	A2	2
		4.6.2. Activities for Teaching Vocabulary	• Explain various types of teaching and learning activities	A2	1
		4.6.3. Putting it All Together	• Explain various types of teaching and learning activities	B1	3
	4.7. Lesson Planning	4.7.1. Sequencing, chunking, estimating time, documenting the plan	• Explain what needs to be considered in order to prepare a good lesson plan	B1	1
		4.7.2. Teaching the Seasons	• Explain what needs to be considered in order to prepare a good lesson plan • Prepare a draft lesson plan and assess it using criteria for good lesson planning	B1	1

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
		4.7.3. Comparing and Creating Lesson Plans	• Explain what needs to be considered in order to prepare a good lesson plan • Prepare a draft lesson plan and assess it using criteria for good lesson planning	B1	1
		4.7.4. Creating lesson plans	• Prepare a draft lesson plan and assess it using criteria for good lesson planning	B1	2
		4.7.5. Presenting Lesson Plans	• Assess a lesson plan using criteria for good lesson planning	B1	1
5. Assessment	5.1. What is assessment for learning?	5.1.1. Introduction to assessment and feedback	• Describe the meaning of assessment and the types of assessment • Identify the guiding principles about assessment for learning • Explain why feedback is important for learning	A2 B1 B2	2
	5.2. Why and When to Assess	5.2.1. How to use assessment and feedback effectively	• Explain why assessment is needed and when assessment needs to take place • Explore when to use which types of assessment appropriately • Use feedback strategies effectively	A4 A5 C1 C3 D3	2
	5.3. Different types of assessment	5.3.1. Different types of assessment that are used	• Describe different types of assessment • Explain at least two types of assessment	A4 A5 C1 C3 D3	2
		5.3.2. The reasons for using different assessment types	• Demonstrate the reasons behind using different types of assessment	A4 A5 C1 C3 D3	2

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	5.4. Guiding principles of assessment for learning	5.4.1. Applying assessment methodologies	• Apply appropriate assessment approaches for learning in the teaching-learning situation	A4 A5 C1 C3 D3	2
		5.4.2. Self and Peer Assessment Techniques	• Describe self-assessment and peer-assessment • Evaluate your teaching ability by using self-assessment and peer-assessment	A4 A5 C1 C3 D3	2
	5.5. Appropriate Techniques of Assessment (1)	5.5.1. Understanding educational tests	• Apply the understanding of differences between nature and definition of test, measurement and assessment • Organise effectively the understanding of major functions and purposes of educational assessment	A4 A5 C1 C3 D3	2
		5.5.2. Types of Achievement Tests	• Classify the types of achievement tests according to nature of content and various function, types of approaches applied • Understand and use planning the test as summative assessment	A4 A5 C1 C3 D3	2
	5.6. Appropriate Techniques of Assessment (2)	5.6.1. Types of assessment tools	• Explain various types of assessment tools • Discuss the importance of keeping accurate records for both formative and summative purposes	A4 A5 C1 C3 D3	2
		5.6.2. Keeping Accurate Records	• Discuss the importance of keeping accurate records for both formative and summative purposes	A4 A5 C1 C3 D3	2
	5.7. Types of Test Questions	5.7.1. Different test questions that can be used in assessment	• Identify different type of written tests	A4 A5 C1 C3 D3	2
		5.7.2. Developing written tests	• Develop a good question item	A4 A5 C1 C3 D3	2

Units	Sub-units	Lessons	Learning Outcome	TCSF	Periods
	5.8. Importance of Keeping and Using Accurate Records for Improvement of Learning	5.8.1. Keeping accurate records of assessment	• Discuss ways of collecting data (primary student records)	A4 A5 C1 C3 D3	2
	5.9. Basic Statistical Knowledge on Educational Tests and Measurements	5.9.1. The quality of tests and nature of statistics	• Explain and verify the quality of classroom test • Describe nature of statistical analysis in education	A4 A5 C1 C3 D3	2
		5.9.2. Analysing data through the use of graphs	• Explain how to evaluate data using graphical analysis	A4 A5 C1 C3 D3	2
Total number of periods					120

The overall objective of Educational Studies is to introduce you to the basic concepts of educational theory, educational technology, educational management, educational psychology and educational test, measurement and assessment, and to apply them in the teaching learning process and in real life situations. You will become aware of educational trends, different philosophies, learning theories and recent trends. And you will also know the importance of developmental milestones of the primary and lower secondary students in all domains. You will get pedagogical knowledge and be able to choose the best pedagogical practices for their teaching depending on learners' needs and learning situation. Moreover, you will be able to distinguish characteristics of test, measurement, evaluation and assessment, and apply them in the teaching learning process. To educate you to become effective professionals, there are two elements in Educational Studies: the understanding of knowledge and its application situated in the disciplines of education; such as psychology and the history of education. Critical reflection about the development of education will help you change your attitudes, behaviour and skills so as to develop professional attitudes and values.

The content of this textbook is based on the Myanmar Teacher Competency Standards Framework (TCSF), which articulates the expectations of what you should know and be able to do in the classroom. The teacher competencies in focus for the Educational Studies learning area include:

Table B. Educational Studies teacher competencies in focus

Competency Standard	Minimum Requirement	Indicators
A1: Know how students learn	A1.1 Demonstrate understanding of how students learn relevant to their age and developmental stage	A1.1.1 Give examples of how the students' cognitive, physical, social, emotional and moral development may affect their learning A1.1.2 Prepare learning activities to align with students' level of cognitive, linguistic, physical, social and emotional development
	A1.2 Demonstrate understanding of how different teaching methods can meet students' individual learning needs	A1.2.2 Prepare focused and sequenced learning activities to assist students to link new concepts with their prior knowledge and experiences
A2: Know available educational technologies	A2.1 Demonstrate understanding of appropriate use of a variety of teaching and learning strategies and resources	A2.1.1 Plan learning experiences that provide opportunities for student interaction, inquiry, problem-solving and creativity A2.1.2 Use teaching methods, strategies and materials as specified in the textbooks and additional low cost support materials to support student learning
	A2.2 Demonstrate understanding of appropriate use of Information and Communications Technology (ICT) in teaching and learning	A2.2.3 Describe and demonstrate the understanding of basic concepts and principles of media and information literacy
A3: Know how to communicate well with students and their families	A3.1 Demonstrate understanding of the role, and expected duties of teachers in Myanmar	A3.1.1 Describe the role and five duties of Myanmar teachers as socially accepted norms
	A3.2 Demonstrate respect for the social, linguistic and cultural diversity of the students and their communities	A3.2.1 Give examples of inclusive communication to support all students' participation and engagement in classroom activities

Competency Standard	Minimum Requirement	Indicators
A4: Know the curriculum	A4.1 Demonstrate understanding of the structure, content and expected learning outcomes of the Basic Education Curriculum	A4.1.2 Prepare lesson plans reflecting the requirements of the curriculum and include relevant teaching and learning activities and materials A4.1.3 Describe the assessment principles underpinning the primary curriculum
A5: Know the subject content	A5.1 Demonstrate understanding of the subject matter to teach the subject/s for the specified grade level/s	A5.1.1 Describe the key concepts, skills, techniques and applications for the subjects covered in the grade levels taught
	A5.2 Demonstrate understanding of how to vary delivery of subject content to meet students' learning needs and the learning context	A5.2.1 Describe ways to contextualise learning activities for the age, language, ability and culture of students to develop understanding of subject related principles, ideas and concepts A5.2.2 Explain how lessons are contextualised to include localised information and examples related to the subject content, concepts and themes
B1: Teach curriculum content using various teaching strategies	B1.1 Demonstrate capacity to teach subject-related concepts and content clearly and engagingly	B1.1.1 Clearly explains the curriculum content and intended learning outcomes B1.1.2 Select instructional material to link learning with students' prior knowledge, interests, daily life and local needs B1.1.3 Encourage students' awareness of their own ideas to build new understanding
	B1.2 Demonstrate capacity to apply educational technologies and different strategies for teaching and learning	B1.2.1 Use teaching methods and learning strategies appropriate for the class – type, culture and size B1.2.2 Use knowledge of literacy and numeracy instructional strategies to support students learning in different subject areas B1.2.3 Create opportunities for students to investigate subject-related content and concepts through practical activities

Competency Standard	Minimum Requirement	Indicators
	B1.3. Demonstrate good lesson planning and preparation in line with students' learning ability and experience	B1.3.1 Plan and structure lesson to ensure all of the lesson time is used effectively B1.3.2 Provide lesson introductions to link new learning to prior learning, to engage students' interest and to motivate them in learning B1.3.3 Prepare focused and sequential learning experiences that integrate learning areas and are responsive to students' interests and experience B1.3.4 Use questioning techniques and examples to introduce and illustrate concepts to be learnt
B2: Assess, monitor and report on students' learning	B2.1 Demonstrate capacity to monitor and assess student learning	B2.1.1 Use assessment techniques as part of lessons to support students to achieve learning outcomes
B3: Create a supportive and safe learning environment for students	B3.1 Demonstrate capacity to create a safe and effective learning environment for all students	B3.1.1 Use space and classroom materials and resources to ensure involvement of all students in learning activities B3.1.2 Encourage students to interact with each other, and to work both independently and in teams B3.1.3 Model and promote good health and safety practices to ensure students' well-being and safety within the classroom and school
	B3.2 Demonstrate strategies for managing student behaviour	B3.2.2 Encourage students to interact with each other with mutual respect and safety
B4: Work together with other teachers, parents, and community	B4.1 Demonstrate strategies for working together with other teachers, parents, and the local community to improve the learning environment for students	B4.1.3 Seek colleagues' perspectives in attempting to respond to learning issues and accept feedback positively
C1: Service to profession	C1.1 Demonstrate values and attitudes consistent with Myanmar's tradition of perceiving teachers as role models	C1.1.1 Comply with professional codes of conduct, rules and regulations in line with the five traditional responsibilities of the Myanmar teacher
C2: Service to community leadership	C2.1 Demonstrate commitment to serving the school and community as a professional member of the teaching profession	C2.1.1 Contribute actively to a range of school and community activities

Competency Standard	Minimum Requirement	Indicators
C3: Promote quality and equity in education for all students	C3.1 Demonstrate a high regard for each student's right to education and treat all students equitably	C3.1.1 Show awareness of the right to education of every child and a commitment to nurturing the potential in each student
	C3.3 Demonstrate capacity to build students' understanding of different cultures and global citizenship	C3.3.1 Integrate concepts of sustainability, equality, justice and the rights and responsibilities of students into class and school activities
D1: Reflect on own teaching practice	D1.1 Regularly reflect on own teaching practice and its impact on student learning	D1.1.3 Regularly reflect on a wide range of actions and experiences to identify areas for own continuous professional development as a teacher
D2: Engage with colleagues in improving teaching practice	D2.1 Improve own teaching practice through learning from other teachers and Professional development opportunities	D2.1.1 Discuss teaching practices with supervisors, colleagues and willingly seek constructive feedback D2.1.3 Establish goals for own professional development as a teacher D2.1.4 Participate in professional activities conducted by school clusters and recognised professional associations
D3: Participate in professional learning to improve teaching practice	D3.1 Demonstrate understanding of the importance of inquiry and research-based learning to improve teaching practice	D3.1.1 Identify relevant professional learning material to improve own practice D3.1.2 Search and analyse online or offline information on current trends and research-based practices in primary education and for specific subjects taught to improve one's own content knowledge and teaching practice

Source: Ministry of Education, Teacher Competency Standards Framework (TCSF), Draft version 3.2. (2019, pp. 30-36).

How do I use this textbook?

You can use this textbook both for your own self-study and as an in-class resource for learning activities facilitated by your teacher educator. Each unit in the textbook includes:

Expected learning outcomes: These are listed at the beginning of each unit and at the beginning of each lesson. The expected learning outcomes indicate what you should know and be able to do by the end of the lesson or unit.

Learning content: The learning content for each unit is broken down into units and lessons that cover subject content knowledge that is important for you to know.

Learning activities: The learning activities included in the textbook are individual activities that you can do to help reinforce and deepen your knowledge and understanding of a topic. Your teacher educator will also facilitate learning activities during class. These may be individual, partner, small group or whole class activities designed to help you achieve the learning outcomes for each lesson.

Review questions: You can use the unit review questions to test your own understanding of the unit content or to help you study for an exam.

Unit summary: At the end of the unit, there is a brief summary of the main points of the unit to help you review and remember the most important information.

Unit reflection: Taking the time to deliberately think about or reflect, on what you have learned will help you remember and apply that learning, and make connections with other learning areas and real-life. Each unit ends with some suggestions on how you can reflect and follow-up on what you have learned in the unit.

Further reading: Each unit lists suggestions of additional resources on the topic. You can look these up in the library, on the internet or in your Education College's E-library to learn more about the topic.

At the end of this textbook, you will find a **Glossary** with the definitions of words found throughout the textbook that might be new to you. These words are listed in alphabetical order. You will also find a list of all the **Bibliography** which are the original sources of information used throughout the textbook.

Remember, your teacher educator is there to help facilitate your learning in this module. If there is material you do not understand in the textbook, be sure to ask your teacher educator or your classmates, for help. As a student teacher, you are part of a community of collaborative learning within your Education College as you work – together with your peers and guided by your teacher educators – to earn your teaching qualification.

Unit 1

Introduction to Educational Studies

Educational Studies is about what we can understand about how people develop and learn throughout their lives. This understanding can help us to design more effective education systems and more effective lessons that result in positive learning outcomes for all students. Through Educational Studies, you will be introduced to foundational education theories and will, eventually, be able to apply these concepts in your teaching and learning.

Educational Studies asks us to think critically about key education issues, including the nature and purpose of education, the content and development of curricula, and how teaching and learning takes place. You will begin to do this in this unit as you think about the meaning of words we take for granted every day – words like education, teaching, learning, and schools.

This unit provides an introduction to these key terms in the study of education, a summary of what Educational Studies encompasses and why it is important, and what you can expect to learn in Year 1 of the Education College Educational Studies learning area.

Expected learning outcomes

By the end of this unit, you will be able to:

- Provide historical and personal definitions of education;
- Identify linkages between teaching and learning;
- Identify the characteristics of school as a learning environment;
- Describe the field of Educational Studies and why it is important;
- Identify the purpose of the Educational Studies learning area; and
- Understand the scope of content covered during Year 1 of the Education College programme and the linkages between Educational Studies and other subjects.

1.1. What is Education?

Thinking about the definition and nature of education is at the heart of Educational Studies. Education is complex, multi-faceted, and not easily defined! In this sub-unit, you will explore some historical and well-known definitions of education from various philosophers and theorists. You will learn about some of the central tasks of education, come to understand the difference between 'formal' and 'informal' education, and reflect on what education means to you.

1.1.1. The meaning of education

Expected learning outcomes

By the end of the lesson, you will be able to:

- Provide historical and personal definitions of education.

Defining education

According to Craft (as cited in Bass and Good, 2004), the English word 'education' comes from a Latin word *'educare'* meaning 'to lead forth'. This implies that 'education consists of drawing out of students what is already inside each of them.' Other scholars claim that the word 'education' comes from another Latin verb *'educere'* meaning 'to rear or to raise.' This definition emphasises that 'education is the process of nurturing and shaping the individuals.'[1]

[1] Bass, R.V. and Good, J.W. (2004). Educare and Educere: Is Balance Possible in the Education System? *The Educational Forum,* Volume 68, pages 161 – 168. https://files.eric.ed.gov/fulltext/EJ724880.pdf

The words 'cultivate' and 'civilise' are almost synonymous to the word 'educate'. Education can be viewed as a process of civilisation, of teaching people to have right behaviour and good manners. It can be seen as the basis of culture and civilisation. Education is instrumental in the development of our individual and societal values and virtues.

Through education, people are cultivated to become mature individuals who are capable of planning for the future and making good decisions. Education can help arm people with an insight to examine their lives and learn from every experience. Education is also important for the economic growth and social development of a nation. Education forms a support system for societies, and has been called the backbone of society.

Education has also been defined as 'all actions and influences' directed to developing and cultivating a person's mental abilities, knowledge, skills, attitudes, and behaviour in such a way that the individual's personality may be developed to the fullest possible extent.

There is no single definition of education and throughout history. Various thinkers and educators have defined education in their own way. A few well-known definitions by Myanmar and Western thinkers, as cited in Kumar and Ahmad,[2] include:

1. Education exists not only in literature but also in any art or craft by which to earn a living. (Ashin Janakarbhivumsa)
2. Education is to develop all the beauties and all the perfections of which we are capable, in the body and the soul. (Plato)
3. The end of education is the attainment of a sound mind and sound body. (John Locke)
4. Education is a natural, harmonious, and progressive development of man's innate powers. (Johann Heinrich Pestalozzi)
5. Education is the development of good moral character. (Johann Frederick Herbart)
6. Education is nothing but the formation of habits. (Jean-Jacques Rousseau)
7. Education is the development of all capacities in individuals which will enable them to control their environment and fulfil their possibilities. (John Dewey)

[2] Kumar S and Ahmad S. (2008). Meaning, aims, and process of education. School of Open Learning, New Delhi. Retrieved from https://sol.du.ac.in/SOLSite/Courses/UG/StudyMaterial/16/Part1/ED/English/SM-1.pdf

Learning activity 1

1. Read carefully through the above quotes again.
2. Which of these statements on education do you like the best? Which represents how you think about education? There is no one wrong or right answer – each of these 'definitions' emphasise different characteristics of education.

The central tasks of education

The central task of education is to 'implant a will and faculty for learning' (Hoffer, 1973). True human society is a learning society. Children or students must learn the essentials of knowledge discovered in the past to acquire further knowledge by their own efforts. Additionally, they have to learn not only *what to think,* but also *how to think.*

There are several broad goals that help define education and provide key purposes of school. For one, education can be seen as any process to promote people's personal well-being and reinforce their considerate behaviour and action towards others. Education can help children build their autonomy or grow up, with essential virtues.

A major focus of education is to promote the child's or student's, overall well-being so as to ensure the best possible conditions for growth, learning, and development. A good combination of care, education, and teaching can promote children's positive self-image, expressive and interactive skills, and the development of their thinking. In promoting personal well-being, the focus is on respect for each child's individuality. This allows children to act and develop as their own unique personalities.

Reinforcement of considerate behaviour and action towards others as an educational goal means that children or students learn to think of other people and care about them. They need to think positively of themselves, other people, and other cultures and environments. Schools need to contribute to providing favourable conditions for the creation of a good society and a common world. Gradual build-up of autonomy aims to help children or students, grow up into adults who are able to take care of themselves and their communities, both local and global, and to make decisions and choices concerning their own life.

If a child is able to enjoy the company of other children and educators, experiencing joy and freedom of action in an unhurried and safe environment, that child will be interested in learning, and able to direct his or her energy to play, learning, and everyday activities with an appropriate level of challenge.

To promote their well-being, children's health and other basic needs must be met in order for children to feel that they are appreciated and accepted as they are, and that they are heard and seen. When children develop a healthy self-esteem, they will want to try new things and learn social skills. Furthermore, interactions with each child need to take into consideration his/her individual needs, personality, and family culture. Each child should have the feeling of being treated fairly, regardless of gender or social, cultural, and ethnic background.

Figure 1.1. Interactive school environment

Education as a whole involves the intertwining dimensions of care, education, and teaching, as stated in Finland's National Curriculum Guidelines on Early Childhood Care and Education (cited in White, J. and Dalli, C, 2017). These dimensions require different emphasis according to the age of the child, and the situation. The younger the child is, the greater the extent to which interactions between the child and the educators take place in care situations. These situations also involve education, teaching, and guidance as they are important for children's general well-being and learning.

In 21st century knowledge-driven economies, rapid information exchange and fast-moving communication technologies have created new demands on education systems. To meet the demands of today's world, education must focus on nurturing the whole child, morally, intellectually, physically, socially, and aesthetically. Students need to acquire new knowledge, skills, and dispositions to ensure their survival and success as individuals, as members of the community, and as citizens of our nation.

Formal and informal education

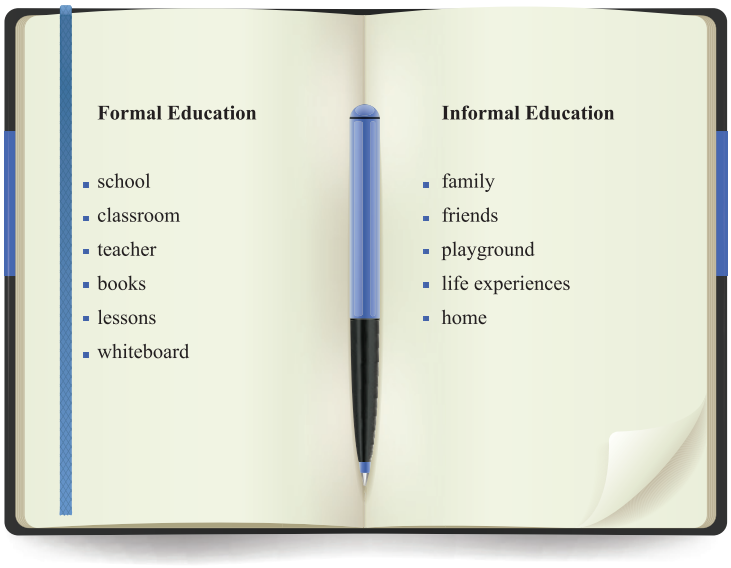
Education may be formal or it can be informal. According to Dhiman (2008), formal education is consciously and deliberately planned for the purpose of training the child and modification of behaviour. It is undertaken in schools or institutions through curriculum, schooling, pedagogy, and instruction. All teaching is formal when both the student and the teacher deliberately engage themselves in the process of education with predetermined objectives.

Dhiman (2008) describes informal education as not pre-planned or deliberate. Informal education is not provided through institutions such as a school or specialised agency. It is incidental and takes place consciously as well as unconsciously. Children learn many habits, manners, and patterns while living with others or moving in different spheres like home, society, and other groups. Informal education is gained through experience and actual living in the family or community, as well as imitation of the older members of the community. There is no prescribed course, no fixed timetable, and no formal means of education. The transmission of cultural heritage and life experiences takes place in a natural way. Such an education becomes lifelong process. In primitive times, all education was informal. With the growth of civilisation and advancements in the field of science and technology, accumulated human knowledge and skills became more and more complex, creating the need for formal education and school as a specialised agency of education.

While a child is in the school for five or six hours a day, the rest of the time is spent in other settings such as the home, community, monastery, other places of religious worship or playground – in other words in settings outside of the school. Both formal and informal types of education are independent, but are also inter-connected. Formal and informal education are complementary to each other in preparing children in how to live their lives by developing their minds and equipping them to deal with reality.

Education is a modification of human behaviour, a process of social change, and a means of transmission of cultural heritage. Formal as well as informal education form the basis of the human resource development of a community, society or nation.

Figure 1.2. Differences between formal and informal education



Learning activity 2

1. Spend some time thinking about how you learn best.
2. Is it in formal or informal settings?
3. What are some of the most meaningful learning experiences you have had both inside and outside of school? What made them meaningful?

Review questions

1. Describe the following terms in your own words:

    - Education;
    - Formal and informal education; and
    - Teaching and learning.

2. How can formal and informal education complement each other?

1.2. What is Teaching?
What is Learning?
What is School?

The teaching and learning that formally takes place in schools plays a significant role in our understanding of education. In this sub-unit, you will think about these foundational terms that we often take for granted – teaching, learning, and school. This sub-unit will help you consider what it means to teach and to be an effective teacher; what it means to learn and the four types of learning; and how school environments can support teaching and learning.

1.2.1. The relationship between teaching, learning, and school

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify linkages between teaching and learning; and
- Identify characteristics of school as a learning environment.

Teaching

According to Chowdary, teaching is 'causing to learn'.[3] The main task of a teacher is to cause the child to learn. The most fundamental principle of teaching is helping students to learn, and training them how to think and how to do things for themselves.

Teaching is a relationship between the three focal points in education: the teacher, the child, and the subject.[4] The nature of teaching is concerned with the activity of the teacher, and the nature of the learning is concerned with the activity of the student or the child. The teacher is an active agent in the process of establishing and developing this relationship. The teacher must have the knowledge of child development in general, and also, as far as possible, of the nature of the particular children being taught.

Figure 1.3. Teaching in a classroom

[3] Chowdary, S. B. J. R. (2004). *Mastery of Teaching Skills*. New Delhi: Discovery Publishing House.
[4] Lakshmi, D. V. (2004). *Basic Education*. New Delhi: Discovery Publishing House.

The teacher must remember that every child is special and differs from every other child, and they have different learning styles, interests, opportunities, and home backgrounds. To teach effectively, a teacher must have knowledge of the subject to be taught, and of how to connect the child and the subject.

Key principles of teaching include:

- Teaching will only be meaningful when learning occurs;
- Teaching includes thinking the process and application of communication and facilitating skills;
- Teaching activities can be implemented in various forms: teacher-centred activity, student-centred activity, teacher and student-oriented activity, and teacher and material-oriented activity;
- Teaching is a process including two-way interaction of teachers and students;
- Teaching also includes a teaching plan, teaching objectives, a teaching place, teaching materials, and teaching strategy, methods, and technique; and
- Teaching strategy, methods, and technique make up the science and art of teaching.

During your Education Colleges studies, you will learn about and practise many of the qualities needed to be effective teachers in order to achieve the purpose of education. The following three characteristics are essential to being a quality teacher:

- **An effective teacher has positive expectations for student success.** This means that the teacher believes in the learner and that the learner can learn. It is essential that the teacher exhibits positive expectations toward all students. That positive attitude benefits not only the individual teacher and student relationship, but also the overall classroom environment.
- **An effective teacher is an extremely good classroom manager.** Classroom management consists of practices and procedures that a teacher uses to maintain an environment in which instruction and learning can occur. For this to happen, the teacher must establish a productive and cooperative working environment, and must have a well-ordered environment. A combination of a well-ordered environment and positive academic expectations creates an effective classroom where all students can learn. The result of how well the teacher manages the classroom relies on the effectiveness of creating an environment that is conducive to learning.

- **An effective teacher makes a difference in the lives of students by possessing the competencies to design, deliver, and assess lessons that allow students to meaningfully learn and develop skills.** Effective teachers touch the lives of students by having the knowledge, skills, and practices to design lessons that allow students to learn a concept or a skill meaningfully. Teachers must also know how to evaluate the students' learning to determine if a student has mastered the concept or the skill. Student success in the subject matter of the class will be the result of how well the teacher designs lessons, checks for mastery of skills, and is able to be a reflective practitioner.

It is the teacher's job to promote a healthy and creative environment in the school as a whole, and in individual classrooms. This can be done through things like planning a classroom welcome for the first day in particular as well as every day basis, and thoughtfully preparing lessons in order to create an environment for all students to succeed. The teacher also helps create a positive school environment by being a role model for students, coming to work appropriately dressed for respect, wearing a smile on his or her face, and thinking and behaving globally.

Learning activity 1

1. Think about your favourite teacher.
2. What characteristics made this teacher memorable and effective?
3. Talk with a classmate about your favourite teachers. Did you have similar lists of characteristics to describe the teacher or different? How did you list match up with the bullet-points above on what makes an effective teacher?

Learning

Learning can be defined as a relatively permanent change in behaviour or knowledge that occurs as a result of experience. It includes most human behaviour such as the acquisition of knowledge and skills, but also the formation of habits, personality traits, emotional responses, and personal tastes.

Figure 1.4. Learning in early age

Each individual must be equipped to seize learning opportunities throughout life to broaden his or her knowledge, skills, and attitudes, and to adapt to a changing, complex, and independent world. According to UNESCO,[5] education can be organised around five fundamental types of learning or five pillars of learning, namely: (1) learning to know, (2) learning to do, (3) learning to live together, (4) learning to be, and (5) learning to transform oneself and society.[6]

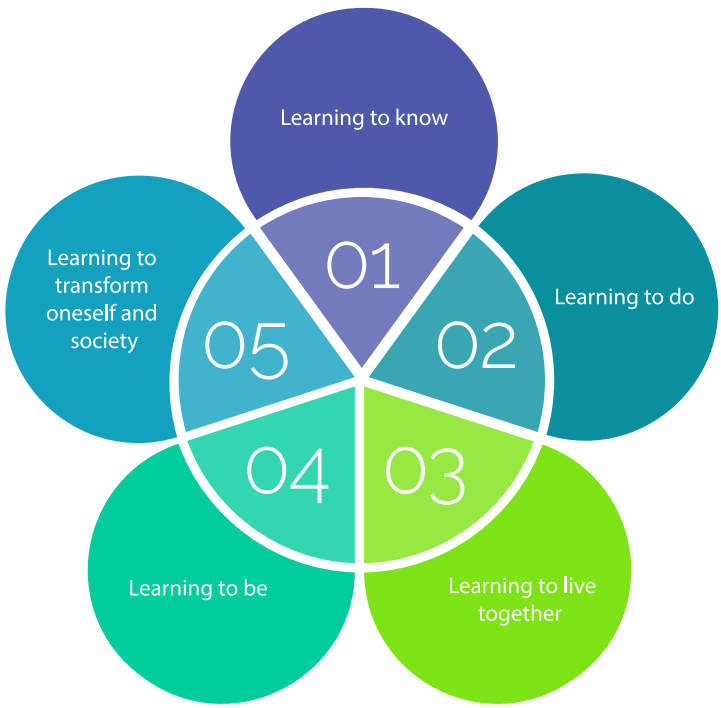
- **'Learning to know'** can be regarded as both a means and an end in life. As a means, it serves to enable each individual to understand at the very least enough about his or her environment to be able to live in dignity, to develop occupational skills, and to communicate. As an end, its basis is the pleasure of understanding, knowing, and discovering.
- **'Learning to do'** is more closely linked to the questions of vocational training: how children can be taught to put what they have learned into practice, and how education can be adapted to future work when it is impossible to foresee exactly how that work will evolve.

[5] UNESCO. (1996). Learning: *The treasure within: A report to UNESCO of the International Commission on Education for the twenty-first century. Paris:* UNESCO.

[6] There are four pillars of education described in Chapter 4 of *Learning: The treasure within: A report to UNESCO of the International Commission on Education for the twenty-first century.* UNESCO added a fifth pillar, 'Learning to transform oneself and society' under its Education for Sustainable Development Initiative in 2012; the fifth pillar has also been included in the list.

- **'Learning to live together / Learning to live with others'** refers to learning how to live and work peacefully together in a culturally-diverse society, community, and world. To give children and young people an accurate view of the world, education must first help them discover who they are. Only then will they genuinely be able to put themselves in other people's shoes and understand their reactions.
- **'Learning to be'** is the complete fulfilment of a human in all the richness of personality, the complexity of form of expression, and the various commitments as an individual, a member of a family, and of a community, citizen and producer, inventor of technique, and creative dreamers.
- **'Learning to transform oneself and society'** refers to when individuals and groups have the knowledge, skills, and values they need in order to create lasting change in organisations, communities, and societies.

Figure 1.5. Five pillars of learning



Learning is always the result of a full experience that includes the native characteristics of the child, his/her physical condition, purposes, desires, ambitions, readiness to learn, emotional development, previous experience, the guidance and instruction he or she receives, and the environment and its effects.

There are a number of conditions that can affect learning and development:

- Learning depends on hereditary endowment; the capability to learn and the rate of learning are conditioned by this endowment.
- Learning depends on the physical conditions of children.
- Learning is affected by the social situation.
- Learning depends on encouragement and motivation.
- Learning depends on a definite goal set and a standard which a student is expected to reach.
- Fruitful learning depends on meaningful guidance and instruction.
- Learning is affected by the emotional condition of students. Fear and feelings of insecurity and of inferiority are barriers to learning. Praise and approbation for work well-done and well-attempted helps to build up confidence, self-respect, self-reliance, and hope that stimulate further effort.
- Children need to be internally ready or prepared, for learning.
- Nutrition provides energy to the learner and learning cannot happen without energy. Proper nutrition and good sleep help students' brains develop, and enhances their ability to learn.
- Learning can also be positively affected by parents, who provide stimulating, supportive, and language-rich experiences for their children.

Learning activity 2

See if you can come up with an example of each of the five types of learning that takes place either in school or outside of school.

School

School is a whole learning environment formed by physical, psychological, and social elements. It includes buildings, the immediate neighbourhood, a psychological and social setting linked to different situations, and various materials and equipment. The type and quality of instructional equipment play an important part in the instructional efficiency of the school.

When the school environment is rich, flexible, and conducive to learning, it attracts the interest and curiosity in children and encourages them to experiment, act, and express themselves.

Both the functional and aesthetic aspects should be taken into account in planning the school as a learning environment. A well-built environment has good ambiance, encouraging children to play, explore, move, act, and express themselves in many different ways. The atmosphere of the learning environment should be positive, safe, and well-ordered ensuring the physical and mental well-being of all students. A well-designed school environment as a learning environment promotes a variety of activities, including small groups where everyone has an opportunity to take part in discussions and self-directed learning activities.

Figure 1.6. A learning environment

School is a place where individuals go to acquire knowledge, learn skills, and develop values that will make them productive citizens and help them grow to their fullest potential as human beings. The school occupies a very important position in the life of the child. The school has the responsibility for providing a hygienic, friendly environment, with understanding and qualified teachers. The school itself and everything that takes place there should help towards each child's well-rounded growth and adjustment. The school should be alert to seize all opportunities and experiences to provide for the needs of the whole child – including their physical, mental, emotional, and psycho-social well-being.

This means going beyond the transmission of academic content alone. If a child's home is failing to provide the child with adequate nutrition, optimal affection, suitable training, and an opportunity for developing independence from parents, the school must take these responsibilities for meeting the needs of the child at different stages of the child's developmental process.

The more that the school and the children's families are joined as partners in educating young people, the greater the children's chances for success. It is impossible to underestimate the importance of schools in the development of children and youth.

Learning activity 3

1. Draw an illustration of your ideal school or classroom.
2. What are the things it needs to include to be a welcoming, friendly environment where all children, regardless of background, can learn?

Review questions

1. Describe the purpose of school.
2. What are some of the conditions that affect students' learning and development?

1.3. Understanding Educational Studies

Educational Studies is both a subject in its own right, and an area of study that draws on other disciplines of study such as philosophy, psychology, and sociology. Educational Studies is the study of education. Through Educational Studies we seek to better understand how people develop and learn throughout their lives. This knowledge can help us be better teachers, school administrators, and policy-makers. This sub-unit will help you better understand the field of Educational Studies and why it is important for education systems and for teaching and learning in classrooms.

1.3.1. What is Educational Studies, and why is it important?

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe the field of Educational Studies and why it is important.

What is Educational Studies?

Educational Studies emphasises the study of education as a subject, and it is often an integral component of teacher education programmes at higher education level. Taking an Educational Studies course requires you to apply a critical and academic lens to the study of education, asking questions such as: What is education and what are its purposes? How does learning take place? To what extent does student achievement depend on natural ability or on social factors, such as income, life chances, gender, and ethnicity?[7]

To answer these questions, Educational Studies draws on aspects of other disciplines such as sociology, psychology, and philosophy, but with education firmly at the centre of all inquiry. The following disciplines are particularly important to help us think about different aspects of education:

Philosophy: The philosophy of education emphasises the ideas and beliefs that underpin what we think and how we enact education. Education philosophers are interested in the beliefs, morals, and values of education, and how we see these in our education systems and classrooms. For example, if there is a belief that education is a right for all children, not just those who can afford it, this will be reflected in policy decisions to make school free for everyone or if a teacher holds a belief that children learn best by doing things, not just listening, you might see this played out in the classroom in the use of experiments and activities for learning, rather than only lecture.

Sociology: The sociology of education looks at the social factors that impact how an individual experiences education. Education sociologists would be interested in how these factors - such as social class, ethnicity, and gender - affect the process of education and student achievement. Education sociology is often considered in policy decisions; for example, in some countries where girls are more likely to drop out of secondary education than boys, the government might provide scholarships for girls or bikes so that they can get safely between home and school. In the classroom, an awareness of education sociology might prompt a teacher to find extra language support for students whose mother tongue is different from the language of instruction.

[7] This section draws on Bartlett, S. & Burton, D. (2016). *Introduction to Education Studies,* 4th edition (2016). SAGE Publishing.

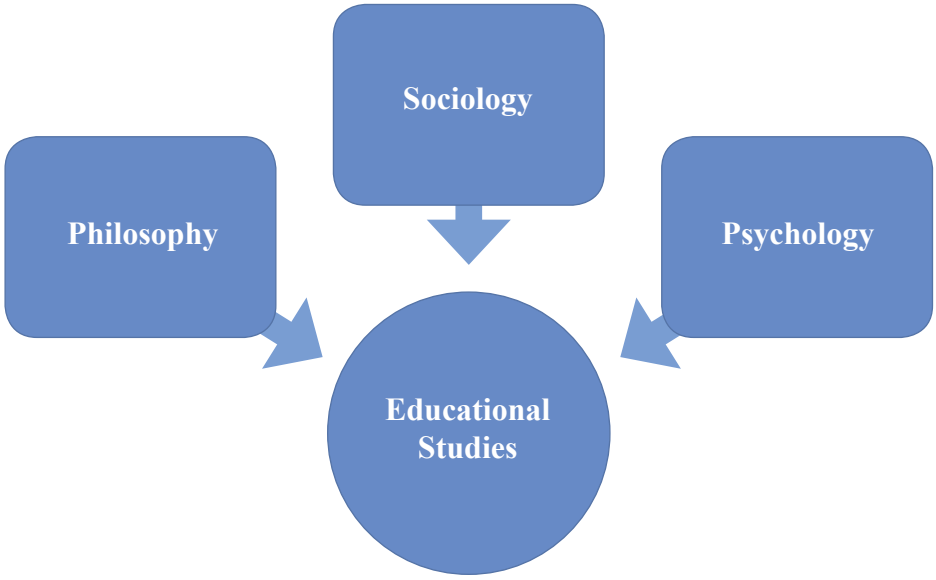
Psychology: The psychology of education focuses on how people learn and develop. It connects human development, learning processes, and questions about intelligence, personality, and motivation. Understanding a little about psychology is essential to understanding how children tend to learn best. For example, a teacher might realise that asking children in the early grades to pay attention for an hour of lecture is not appropriate for their developmental level and associated attention spans.

At its essence, Educational Studies is about what we can understand, drawing on a range of disciplines, about how people develop and learn throughout their lives. Educational Studies helps us realise that to understand the processes involved in education means understanding the cultural, societal, political, and historical contexts where education is taking place.

While the content of Educational Studies will differ from course to course, Educational Studies is typically concerned with critical analysis of:

- Key education issues, such as the nature and purpose of education
- The content and development of curricula
- How teaching and learning takes place
- The relationship between ability, opportunity and success
- Education policy issues

Figure 1.7. Branches of Educational Studies



Educational Studies is important to provide a theoretical foundation for your actions in the classroom. As you gain an understanding of the philosophy, sociology, and psychology of education, you will be more aware of how these factors impact what goes on in your classroom and how you can make sure the individual students in your class are learning. Educational Studies can also give you a 'toolbox' of teaching strategies, based on evidence from the study of education, to try in your classroom.

While, in general, the subject of Educational Studies can apply to the whole range of lifelong learning stages, from early child development to higher education to continued professional learning, this year you will focus on Educational Studies with relevance for teaching in the primary grades.

Learning activity 1

Consider what specifically you expect to learn about teaching and learning in this Educational Studies course. Highlight the text above or make your own notes.

Review questions

1. Why should student teachers study Educational Studies as a subject?
2. What skills need to be fostered through education in order for students to be successful in the 21st century?

1.4. Educational Studies in the Education College Programme

Educational Studies makes up a significant amount of your Education College coursework. The learning area is foundational for shaping your understanding of educational theories and then supporting you to apply those theories to your teaching. This sub-unit provides an overview of the competencies you can expect to begin developing in Educational Studies this year, helping you to better understand the role of the Educational Studies in your Education College studies.

1.4.1. Why study Educational Studies in your Education College?

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify the purpose of the Educational Studies Learning area; and
- Understand the scope of content covered during Year 1 of the Education College modules and the linkages between Educational Studies and other subjects.

The role of Education Colleges is to ensure that you are ready and able to teach effectively in the classroom. Teacher education is a means to an end; the end objective is to improve the learning outcomes of students in basic education schools. The Educational Studies course and this textbook represent a tool for preparing you to be effective, professional practitioners, who are equipped with the appropriate competencies (knowledge, skills, values, attitudes, and their successful application in teaching and learning situations) required to deliver high quality teaching to the appropriate age group in highly variable learning environments.

For these reasons, the purposes of this Educational Studies module are:

- To introduce you to foundations of education and the basic concepts of theories related to all aspects of educational practices; and
- To facilitate how these concepts can be applied in teaching and learning situations and to make a link between educational theories and practice in order to help you develop into a qualified teaching professional.

This Educational Studies module will introduce you to the theoretical foundations of education, child development, learning and assessment, and –importantly – how these can be applied in the classroom. The course is organised in four interrelated domains, namely: (1) lesson planning and preparation, (2) creating a learning environment, (3) developing learning strategies and assessment, and (4) professional responsibilities and teacher leadership.

The Educational Studies module will be foundational in fostering the competencies that you need to possess as beginning teachers. These include:

- Knowledge of human development and learning;
- Adaption of instruction for individual needs;
- Use of multiple instructional strategies to encourage students' development of critical thinking and problem-solving skills, and personality;
- Understanding classroom motivation (individual and group motivation) and management to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation;

[8] Ministry of Education, Education College Curriculum Framework, p. 30.

- Communication skills to foster active inquiry, collaboration, and supportive interaction in the classroom;
- Instructional planning skills based on knowledge of subject matter, students, the community, and curriculum goals;
- Assessment of student learning to evaluate and ensure the continuous intellectual, social, and physical development of the learner;
- Professional commitment and responsibility to be a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community), and who actively seeks out opportunities to grow professionally; and
- Commitment to partnerships to foster relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

Figure 1.8. Beginning teachers

Education College graduates will be expected to be able to teach the prescribed curriculum to primary or lower secondary students at the specified stage of schooling, and to assess levels of student achievement by possessing the relevant subject knowledge and skills, positive attitude towards children and youth, and commitment to education. Participation in the Educational Studies learning area, over four years, will allow you to meet these expectations and confidently and effectively take roles as teachers in classrooms across Myanmar.

Learning activity 1

1. Look through the list of competencies that you will be working to develop through the Educational Studies course.
2. Which of these are you most excited to learn more about and to practise?

Review questions

1. What are some of the characteristics of an effective teacher?
2. Do you agree or disagree with the following concepts of education? Why or why not?

    a. Education exists not only in literature but also in any art or craft by which to earn a living.
    b. Education is to develop all the beauties and all the perfections of which people are capable, in the body and the soul.
    c. The end of education is the attainment of a sound mind and sound body.
    d. Education is a natural, harmonious and progressive development of man's innate powers.
    e. Education is the development of good moral character.
    f. Education is nothing but the formation of habits.
    g. Education is the development of all capacities in individuals which will enable them to control their environment and fulfill their possibilities.

Unit Summary

Key messages

- There is no one single definition of education, and throughout history various thinkers and educators have defined education in their own way. One of the key purposes of education is to help individuals develop a will and faculty for learning. Children or students, must learn the essentials of knowledge discovered in the past to be able to acquire further knowledge through their own efforts. They must learn not only *what to think,* but also *how to think.*

- Education may be formal or it can be informal. Formal education is consciously and deliberately planned for the purpose of training a child and the modification of behaviour. Informal education is not pre-planned or deliberate, and it is not provided through institutions such as a school or specialised agency.

- Teaching is 'causing to learn.' The most fundamental principle of teaching is helping students to learn, including training them how to think and how to do things for themselves.

- Learning is a change in behaviour or knowledge that occurs as a result of an experience. Education can be organised around five fundamental types of learning or five pillars of learning, namely: (1) learning to know, (2) learning to do, (3) learning to live together, (4) learning to be, and (5) learning to transform oneself and society.

- School is a whole learning environment formed by physical, psychological, and social elements. School is a place where individuals go to acquire knowledge, learn skills, and develop values that will make them productive citizens and help them grow to their fullest potential as human beings.

- At its essence, Educational Studies is about what we can understand – drawing on a range of disciplines including philosophy, sociology, and psychology – about how people develop and learn throughout their lives. This understanding can help us to design more effective education systems and more effective lessons that results in positive learning outcomes for all students.

- The purposes of this Education College Educational Studies module are:

    - To introduce you to foundations of education and the basic concepts of theories related to all aspects of educational practices; and
    - To facilitate how these concepts can be applied in teaching and learning situations and to make a link between educational theories and practice, in order to help you develop into a qualified teaching professional.

Unit reflection

As you begin this Educational Studies course, it is a good time to stop and consider your goals for the course:

- How will you make sure you learn everything you need to in Year 1 of this learning area?
- What are some ways you can try to apply what you have learned?

- What kind of teacher do you want to be, and how can Educational Studies (and your other Education College subjects) help prepare you to be that kind of teacher?

Further reading

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Unit 2

Pedagogical Theory and Practice

The content of Unit 2 is foundational for the study of education and its application for teaching and learning. In this unit, you will focus on pedagogy – the theory and practice of education. You will be introduced to a number of influential learning theories and models, and the famous education theorists who developed these models. You will also begin to think about the application of these ideas to the practice of teaching in a classroom. This unit asks you to consider how different children learn and what you, as the teacher, can do to support that learning through the use of different teaching strategies and methods.

Expected learning outcomes

By the end of this unit, you will be able to:

- Define the terms 'pedagogy' and 'pedagogical content knowledge' (PCK);
- Describe teaching and learning strategies;
- Identify foundational learning theories and learning theorists;
- Explain how children naturally learn;
- Identify the action verbs for Bloom's taxonomy's three domains of learning;
- Relate learning principles for effective learning;
- Explain different learning styles and their impact in students' learning;
- Relate basic learning model to local contexts;
- Draw an IPO process diagram with examples;
- Demonstrate knowledge of how young learners (5-10 years old) learn according to their developmental stage; and
- Explain the concepts and theories of: growth and development, nature and nurture, developmental domains and milestones, developmentally-appropriate tasks, the uniqueness of a child, and the child as a whole.

2.1. What is Pedagogy? What is Pedagogical Content Knowledge (PCK)?

Learning about pedagogy is central to teacher education. When we understand how children of different ages learn and develop, we can better tailor instruction to meet their learning needs. Strengthening Pedagogical Content Knowledge (PCK) is also a core component of teacher education. You can think about PCK as the combination of your knowledge of the subject content (what to teach) and the pedagogy (how to teach). PCK is integrated into all of your subject-based Education College learning areas. Through this sub-unit, you will be able to make sure you are clear on the meaning of these two important terms in the study of education.

2.1.1. Understanding pedagogy and pedagogical content knowledge

Expected learning outcomes

By the end of the lesson, you will be able to:

- Define the terms ‘pedagogy’ and ‘pedagogical content knowledge’ (PCK)

What is pedagogy?

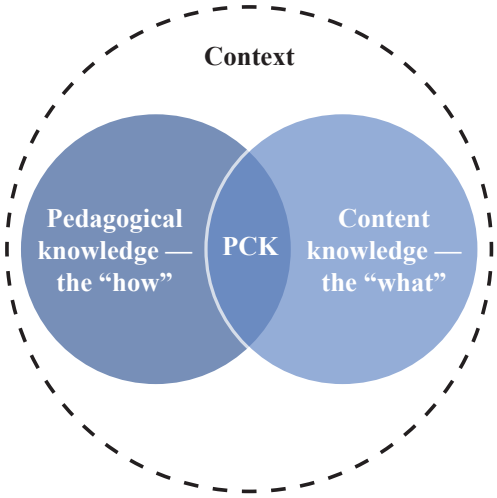
According to the Information Literacy Group, 'Pedagogy is the study of the theory and practice of education. It is concerned with the underlying values and principles that influence our approaches to learning, teaching, and assessment' (Information Literacy Group, n.d.). By understanding how individuals learn, teachers can identify how their teaching practices impact on the learning of students from diverse linguistic and cultural backgrounds. Recent educational theories help to explain the connection between a learning environment, an individual's previous educational experience and cultural and social background. These connections between a teaching and learning experience and an individual student's prior experiences can either facilitate or hinder learning.

What is pedagogical content knowledge (PCK)?

According to Shulman (1986; 1987), pedagogical content knowledge (PCK) represents the blending of *content* and *pedagogy* into an understanding of how particular aspects of subject matter are organised, adapted, and represented for instruction.

In short, PCK is a teacher's understanding of how to help students understand specific subject matter. It includes knowledge of how particular subject matter topics, problems, and issues can be organised, represented, and adapted to the diverse interests and needs of learners, and then presented for instruction. PCK exists at the *intersection of content and pedagogy*. It goes beyond a simple consideration of content or pedagogy alone, in isolation from one another, and considers them together. PCK is the knowledge that allows teachers to apply what they know about teaching to what they know about the subject they are teaching so that students can learn.

Figure 2.1. Content knowledge and pedagogical knowledge



Learning activity 1

1. Can you think of an example of the type of PCK you would need to know for each of the basic education modules? For example, PCK of Physical Education might mean that for a lesson on football, you would possess both knowledge of the sport – including the rules and skills required – and of teaching strategies to effectively coach students through a number of drills so that they can improve their skills.

Review questions

1. Summarise the concept of pedagogical content knowledge.

2.2. What is Pedagogical Theory and Practice?

Pedagogical theories shape our understanding of how people learn and influence the strategies that we use to teach students. In this sub-unit, you will begin thinking about types of teaching and learning strategies that you might select to effectively teach different subjects and different ages of children.

2.2.1. Thinking about pedagogical theory and practice

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe teaching and learning strategies.

Pedagogical theory

Pedagogical theory or learning theory, helps us understand how concepts and topics should be taught and how we can help individuals to learn. Pedagogical theories are often based on learning theory that is interested in how we learn, in part by understanding student's backgrounds, interests, and individual learning needs. From a practical perspective, pedagogical theories are closely linked to pedagogic strategy and practice.

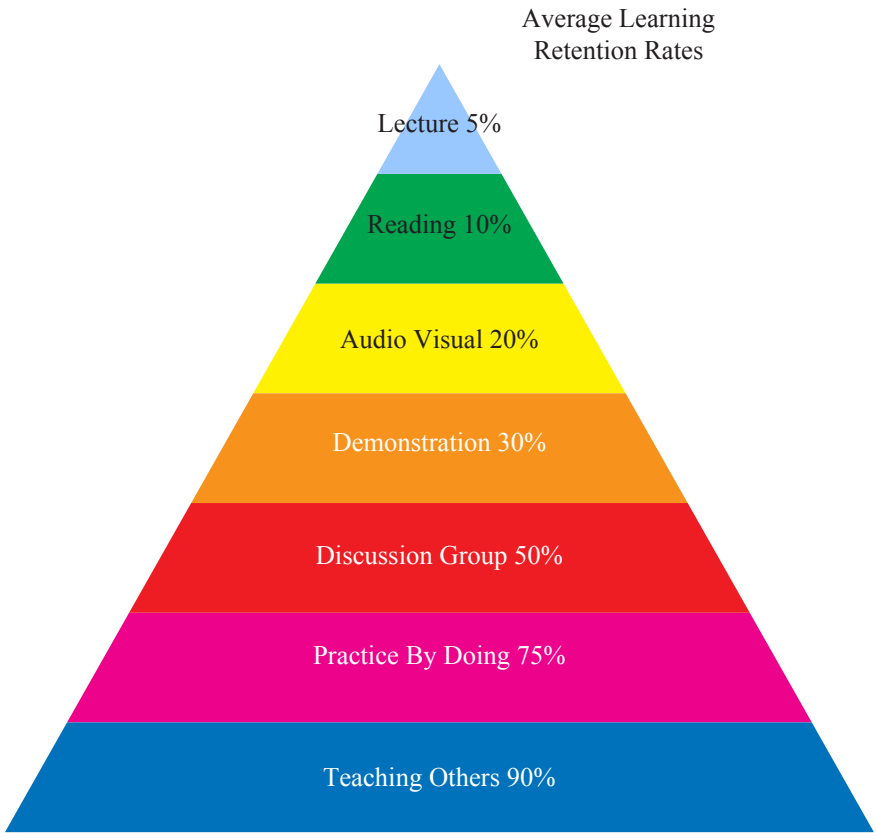
According to IGI Global, pedagogical practice is the strategies that teachers use to teach students. Strategies are selected according to the beliefs of the teacher, the needs of the learner, and the demands of the task. Pedagogical practice can also be defined as the style of instruction and the learning activities that support the unit of content, including the instructional approach (such as active learning, the constructivist model, student-to-student engagement or teaching to multiple learning styles). Throughout this unit, you will be learning more about aspects of pedagogical practice.

To start thinking about the teaching and learning strategies you might use in a lesson, it can be helpful to consider 'passive' and 'active' learning. In passive learning, students receive instruction from the teacher and internalise it. For this reason, passive teaching strategies include lecture, reading, and demonstration. Active learning, on the other hand, means that students are actively engaging with the material, participating in class, and collaborating with each other. Active teaching strategies include activities such as group discussion, practice-by-doing, and students teaching other students.

The 'Learning Pyramid,' from the National Training Laboratories, Bethel, Maine, is often used to suggest that passive teaching strategies (lecture, reading, audio-visual, demonstration) result in far lower learning retention rates than active teaching strategies (group discussion, practice by doing, and teaching others). However, the Learning Pyramid has a number of critics who argue that there is no scientific basis to the findings captured in the pyramid– depending on the context, they say, the entire strategies included can potentially be effective.

[9] Pedagogical Theory. Retrieved on 13 August 2018 from http://edutechwiki.unige.ch/en/Pedagogical_theory

Figure 2.2. Learning pyramid

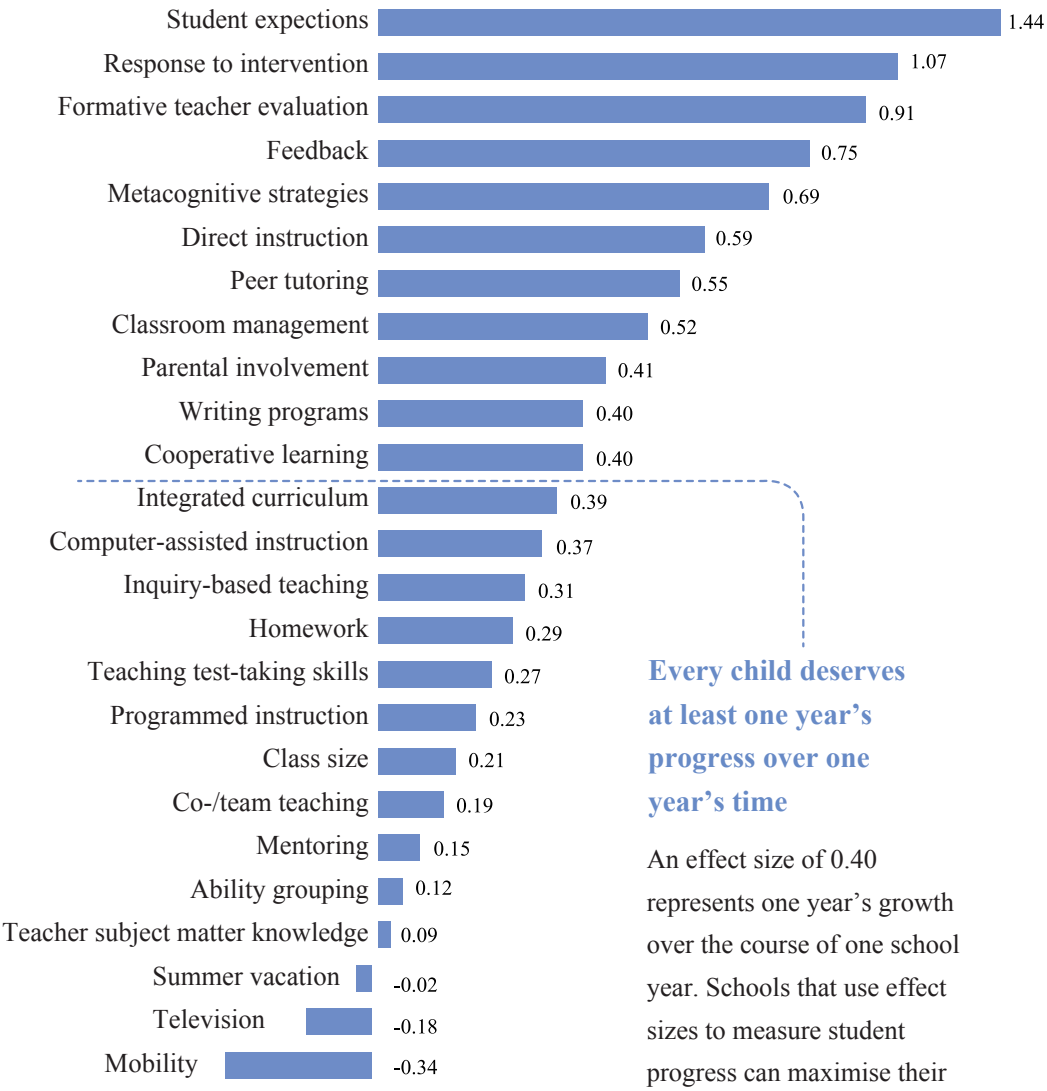


Source: National Training Laboratories, Bethel, Maine

Most likely, you will use a mix of passive and active teaching strategies in your classroom. While experts disagree about the validity of the 'Learning Pyramid,' they do tend to agree that instruction needs to be designed for the specific context (the cultural background, age, and ability levels of your students) and the content you are teaching.

There is a growing body of research that examines what teaching strategies work best in terms of improving student learning results. John Hattie is a well-known contemporary researcher who synthesised over 50,000 research studies on student achievement in his book, *Visible Learning (2009)*. This research provides an evidence base to help teachers select teaching strategies that have been proven to work in many different contexts.

Figure 2.3. Different strategies and students' growth



No one teaching strategy will work for every student, all the time. As a teacher, you will need to be aware of the impact that the strategies you use are having on your students and adjust accordingly. However, according to Hattie, the research base on student achievement indicates that some of the highest impact teaching strategies include the following:[10]

[10] These are not ranked here by effect size – all strategies positively impacted student achievement.

Direct instruction

Hattie uses the term ‘direct instruction’ to mean active learning in class where the teacher: ensures that students understand the desired learning outcomes and the success criteria for their performance; builds student commitment and engagement in the learning; presents the lesson; and provides opportunities for guided practice and independent practice.

For example, in a Maths class, informing students that they will be learning to add single digit numbers, demonstrating how to do this operation with everyday objects such as rocks or shoes, and then letting students practice would be some of the steps involved in ‘direct instruction’.

Note-taking and other study skills

This means teaching students to take good notes and summarise materials and to be able to self-manage their learning, including strategies and monitoring of their own learning.

For example, in a Social Studies lesson, asking students to read information about Anawrahta, summarise the main reasons why he was a good leader, and tell what they have learned from him that is important in their own lives is encouraging ‘note-taking and other study skills’.

Spaced practice

This means spacing the practice of skills over a long period of time, rather than expecting students to quickly learn (or memorise) something and then moving on to the next topic. In spaced practice, students are repeatedly exposed to ideas or topics over time.

For example, in an English class, practicing reading ‘sight word’ lists aloud for a few minutes every day for a whole school year is an example of ‘spaced practice’.

Feedback

This means providing timely and regular input to help your students understand what they do not know, what they do know, and where they are going with their learning.

For example, if students are doing an exercise to identify plants during a Science lesson, the teacher can circulate the room and quickly check if they have identified the plants correctly.

The teacher can provide 'feedback' in many ways – he or she might ask how the students can recognise which plant is which, give hints or ask leading questions if they are confused or ask students why they think it is important to know about different kinds of plants.

Teaching metacognitive skills

This means teaching students how to 'think about thinking', including how to self-question, plan an approach to a task, and evaluate their own progress.

For example, in Science class, asking students 'Why can birds fly?' and having them plan on how they will find the answer (by reading a book, asking an adult or looking on the Internet) is helping to 'teach metacognitive skills'.

Teaching problem-solving skills

This means teaching students to determine the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; designing an intervention plan; and evaluating the outcome.

For example, asking students the following word problem in Maths class is teaching 'problem-solving skills' because they must think about the problem and find a way to solve it, either through logic or counting or an arithmetic operation: Su Su had 12 pieces of candy, but she gave seven pieces away to her friends. She promised her brother she would give him four pieces of candy. Does Su Su have enough candy left to keep her promise to her brother?

Reciprocal teaching

This means the teacher teaches strategies for learning such as summarising, questioning, clarifying, and predicting. There is dialogue between the teacher and students, and students are given the opportunity to 'teach' as well.

For example, in a Myanmar lesson, taking time while reading a story to ask students to summarise what has happened so far, predict what will happen next or present to the class on what they learned is an example of 'reciprocal teaching'.

Mastery learning

This means expecting all students to 'master' the material before moving on. This is done through extra work and retests for those who do not pass initially. The key to success with mastery learning is providing extensive feedback on small units of study with clear expected outcomes.

For example, in Maths class, allowing students to retake a quiz that they did poorly on is an example of using 'mastery learning'.

Concept mapping

This involves developing graphs and visuals to show the conceptual structure of what is being learned. The importance of concept mapping is that it helps students to summarise main ideas, synthesise information, identify themes, and inter-relationships.

For example, having students draw a family tree in a Social Studies lesson to illustrate the relationships between different family members is an example of 'concept mapping'.

Worked examples

In this strategy, a teacher demonstrates success for students by breaking down a problem into smaller steps. This allows students to focus on the processes that lead to the correct answer.

For example, in a Life Skills lesson, breaking down hand-washing into smaller steps (first you wet your hands, then you get some soap…) and then demonstrating the process is using 'worked examples'.

Hattie's findings highlight the important role of teachers in student learning. Despite your students' home life, socio-economic status or other background factors, Hattie's research shows that teacher actions make a difference.

Learning activity 1

Pick any lesson topic out of a primary school textbook. Can you think of how you might use any of the above strategies to teach primary school students about that topic? The examples provided with each strategy above can help you get started.

Review questions

1. How many of Hattie's teaching strategies can you remember? Can you describe the strategies? Can you give an example?

2.3. Foundational Learning Theories and Learning Theorists

In this sub-unit, you will be introduced to the three main learning theories that influence much of what goes on in classrooms today, and some of the key theorists whose research helped to develop these theories. In understanding the basics of behaviourism, cognitivism, and constructivism, you will be equipped to analyse the styles of teaching and learning that you have experienced and observed and will continue to shape your own personal teaching philosophy.

2.3.1. Important learning theories and theorists

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify foundational learning theories and learning theorists.

Foundational learning theories

Learning theories organised sets of principles explaining how individuals acquire, retain, and recall knowledge. These principles are based on research by education psychologists. By studying and knowing the different learning theories, teachers can better understand how learning occurs. The principles of the theories can be used as guidelines to help select instructional tools, techniques, and strategies that promote learning. It is rare that a teacher will use only one learning theory to guide his or her teaching; more commonly, teachers draw on key elements from each of the three major learning theories.

These three major learning theories include: behaviourism, cognitivism, and constructivism.

Behaviourism

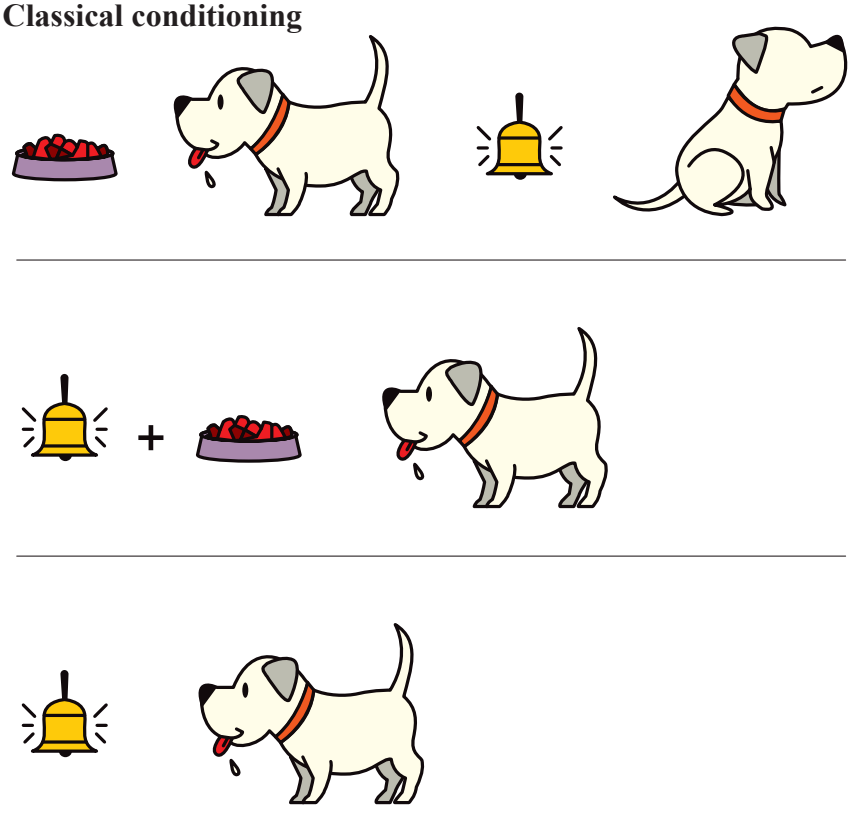
Behaviourism holds that learning is behavioural changes. According to behaviourism, new behaviour or changes in behaviour, are acquired through associations between stimuli and response. As it sounds, behaviourism emphasises *behaviour* and not mental activities or processes. According to behaviourism, learning is not innate but instead depends on experience – particularly the feedback we receive from the environment. Early research in this area focused on the effects of outside stimuli on reflexive behaviour.

Important behaviourism theorists

The most well-known behaviourists include Ivan Pavlov, E.L. Thorndike, and B.F. Skinner.

Ivan Pavlov's research contributed to the important behaviourist idea of classical conditioning. This refers to a process of repeatedly associating a previously neutral stimulus – for example, a bell (a stimulus that elicits no particular response) – with an unconditioned stimulus – for example, meat (a stimulus that naturally evokes a particular response). If a bell is rung while meat is offered repeatedly over time, the bell will evoke a conditioned response of hunger or salivation.

Figure 2.4. Classical conditioning



E.L. Thorndike is remembered for his 'Law of Effect' theory. This law states that an act that is followed by a favourable effect is likely to be repeated in similar situations, and an act that is followed by an unfavourable effect is less likely to be repeated. This law emphasises the important role of the consequences to present behaviour to determine future behaviour.

B.F. Skinner developed the operant conditioning theory, which focusing on the use of unpleasant consequences to control the occurrence of behaviour. This can include the idea of shaping students' behaviour by reinforcers and punishers as well as through timely feedback on each step of a task.

Behaviourism in the classroom

In education, behaviourism often means that the teacher uses positive and negative reinforcement – including rewards and praise and punishments and negative consequences, respectively – to shape students' behaviour. Examples and applications of behaviourist learning theory in the classroom include:[11]

[11] Classroom examples have been drawn from http://thepeakperformancecentre.com/educational-learning/learning/theories/

- Drill or rote learning exercises;
- Repetitive practice;
- Bonus points (which provide an incentive for students to do more);
- Participation points (which provide an incentive for students to participate more);
- Verbal reinforcement (such as saying ‘good job’ to reward positive behaviour); and
- Establishing rules.

Cognitivism

Cognitivism emphasises that learning occurs through the internal processing of information. Cognitivism is focused on how people perceive information, think, remember, and solve problems – the mental processes that lead to learning.

Important Cognitivism Theorists

Two famous cognitivists in education are Jean Piaget and David P. Ausible.

Jean Piaget emphasised that the self-adaptation process, where an individual acquires experience from interaction with other people and things in the environment, is an important factor in cognitive development and learning.

Jean Piaget’s cognitive learning theory is most known for promoting the belief that learning content should be arranged in accordance with the child’s level of cognitive development. This means that, as a child physically and mentally develops, learning activities should move from concrete to abstract; from nearby to distant situations; from existing experience to new experience; and from elementary (basic) to be sophisticated.

There are several key implications for teaching that we can draw from Piaget’s theory:

- Focus should be placed on the process of children’s thinking, not just on end products.
- Education needs to be developmentally appropriate, meaning that the environment, curriculum, materials, and instruction are suitable for students’ physical and cognitive abilities and their social and emotional needs.

- Individual differences as part of the development process should be acknowledged and accepted.
- Children's self-initiated, active involvement in learning activities plays a key role in learning.

David Ausible emphasised the importance of activating students' existing cognitive knowledge and understanding. Ausible believed that learning can take place through discovery learning. However, given time constraints, in a school setting, Ausible believed that learning should be logically and systematically arranged and presented using exploration, demonstration, narration or lecture. Students will then eventually be able to integrate new information with their existing knowledge.

Cognitivism in the Classroom

In education, cognitivism often means that the teacher uses learning activities that ask students to problem-solve and find their own solutions. Examples and applications of cognitive learning theory in the classroom include:

- Classifying or chunking information;
- Linking concepts (associate a new concept with something already known);
- Providing structure (organising lectures in efficient and meaningful ways);
- Real world examples;
- Discussions;
- Problem-solving;
- Providing pictures; and
- Using mnemonic devices to help memory.

Constructivism

According to constructivism, we construct our knowledge of the world based on individual experiences. Constructivist theory assumes that knowledge will not exist outside the mind, but that it can be created in the mind based on actual experiences.

Important constructivism theorists

The theory of Constructivism originated from Jean Piaget's cognitive development theory. **Lev Vygotsky** is also a prominent Constructivist theorist, best known for his ideas on the Zone of Proximal Development (ZPD).

According to Vygotsky, the ZPD is the difference between what a learner can do without help and what he or she can do with help. The idea of the ZPD emphasises the need to scaffold and support students' learning. It is the support of educated adults, teachers or peers that enables students to make further progress in the zone of proximal development, progress that they would not be able to achieve on their own.

Constructivism in the classroom

According to the theory of constructivism, the teacher plays the role as facilitator and planner. It is the students, however, that play the main role in learning. In constructivism, students are assisted in using their already acquired knowledge to learn new knowledge. Constructivism emphasises the importance of students' intrinsic motivation for learning; in a constructivist classroom, students are encouraged to use their critical and creative thinking skill to solve problems.

Examples and applications of constructivist learning theory in the classroom include:

- Case studies;
- Research projects;
- Problem-based learning;
- Brainstorming;
- Collaborative learning and group work;
- Discovery learning; and
- Simulations.

Figure 2.5. Learning theories and teaching strategies

Constructivism

Behaviourism

Cognitivism

What we believe about how students learn based on various learning theories, shapes what goes on in the classroom. However, no single learning theory can address the requirements of every teaching and learning situation. You will most likely find that drawing from a combination of perspectives and theories will be the most effective approach to teaching in your future classrooms.

Learning activity 1

1. In your own words, can you describe each of the three major learning theories? How did the famous educational theorists mentioned in this sub-unit contribute to each of these theories? Based on your personal experiences with education, what theory makes most sense to you?

Review questions

1. Name three key learning theorists and describe their learning theory.
2. What learning theory do you find most helpful to explain the purpose and process of teaching and learning?

2.4. How Children Learn

Children are natural learners, born with a sense of inquiry and exploration that helps them to grow and learn about the world. Harnessing these natural inclinations in early education is the most effective and nurturing way to support children's holistic development. Through this unit, you will gain some ideas of how you might support young children's natural tendency towards learning through play.

2.4.1. Children as natural learners

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain how children naturally learn.

How do young children learn?

Children are born explorers and great discoverers. As the Billabong International School puts it, 'Even as infants, they come to us with all the necessary equipment to be great discoverers: inquisitive eyes, nose, mouth, tongue, lips, ears, fingers and toes.' From the time they are born, babies and children begin learning and making sense of the world through:

- Tasting, touching, seeing, hearing, and smelling;
- Watching and copying people close to them; and
- Playing.

Children also have a strong natural drive or curiosity to put their senses to good use. You have probably watched young children as they try to find out about their surroundings – they are constantly poking, biting, chewing, licking, rubbing, and staring at every object or situation in their path.

Figure 2.6. Learning through play

Children learn best when what they are learning has relevance to their own interests and concerns. Learning comes naturally when children are thoroughly engaged in the process – this can often happen outdoors when their natural curiosity is activated. According to Humphreys,[12] for younger children, experiential learning through direct contact with situations and things is a primary mode of inquiry.

Questions and responses can trigger the cognitive thinking processes in children. Open-ended sensory questions are the most valuable as they encourage children to use their senses to explore new things. Some examples of sample sensory questions include:

- What does this look like to you? (Sight)
- What does it feel like to you? (Touch)
- What does it smell like? (Smell)

[12] Cited in Beaty, J. (2012). Skills for Preschool Teachers (9th ed.). New York: Pearson.

- What does it taste like? (Taste)
- What does it sound like to you when you tap it? (Sound)
- How does it move or balance? (Vestibular sense – balance and movement)
- Can you change its position or move it? (Proprioceptive sense – body position and muscle control)

The answers to open-ended questions like these are never right or wrong. Learning should be fun at this age, and children should not be pushed too hard. It also helps children's cognitive and language skills if you talk to them a lot about everyday things, show them how things work, and answer their many questions.

Play-based learning

Simply by playing is one of the main ways that children learn. For example:

- By playing in sand and water children can learn that water is fluid, not solid, and that it can be measured in different sized containers. This is an early introduction to science and maths.
- Playing with dough, drawing and painting pictures, dressing up, and playing with dolls can encourage children's creativity, imagination, and expression of feeling.
- Playing ball games, dancing, running, and climbing help to develop body movement, strength, flexibility, and coordination skills.
- Building blocks, jigsaws, and shape sorters can help children recognise different shapes and sizes and develop logic.
- Games help children to learn to take turns, share, and socialise with others.
- Singing and playing simple music instruments can help children to develop rhythm and listening skills.

Young children learn and develop quickly as they play and experiment with the world around them. From a young age, they are also starting to get a sense of their own identity, and how they may be different from others; for example, noticing boys and girls. Some children benefit from being at a nursery or playgroup at a young age as organised activities can help them learn in a positive, enjoyable, informal setting.

Learning activity 1

What is your earliest memory of learning? Did it involve any of the five senses? Think about how you might encourage young children to learn through their five senses and through play.

Learning activity 2

Can you come up with example lesson activities for pre-school-aged children that would help them learn something about the world through each of their senses (sight, smell, touch, hearing, and taste) in a fun, playful way?

Review questions

1. Give some examples of play-based learning.

2.5. Bloom's Taxonomy

'Bloom's Taxonomy' is an influential framework for thinking about the objectives of education and how to teach. This sub-unit will introduce you to the three domains of learning included in the taxonomy – cognitive, affective, and psychomotor – and the levels within each domain. As a teacher, you can think about how to encourage your students to move up the levels, from simple tasks to increasingly complex ones, through the lesson objectives and learning activities that you design.

2.5.1. The three domains of learning in Bloom's Taxonomy

Expected learning outcomes

By the end of the lesson, you will be able to:

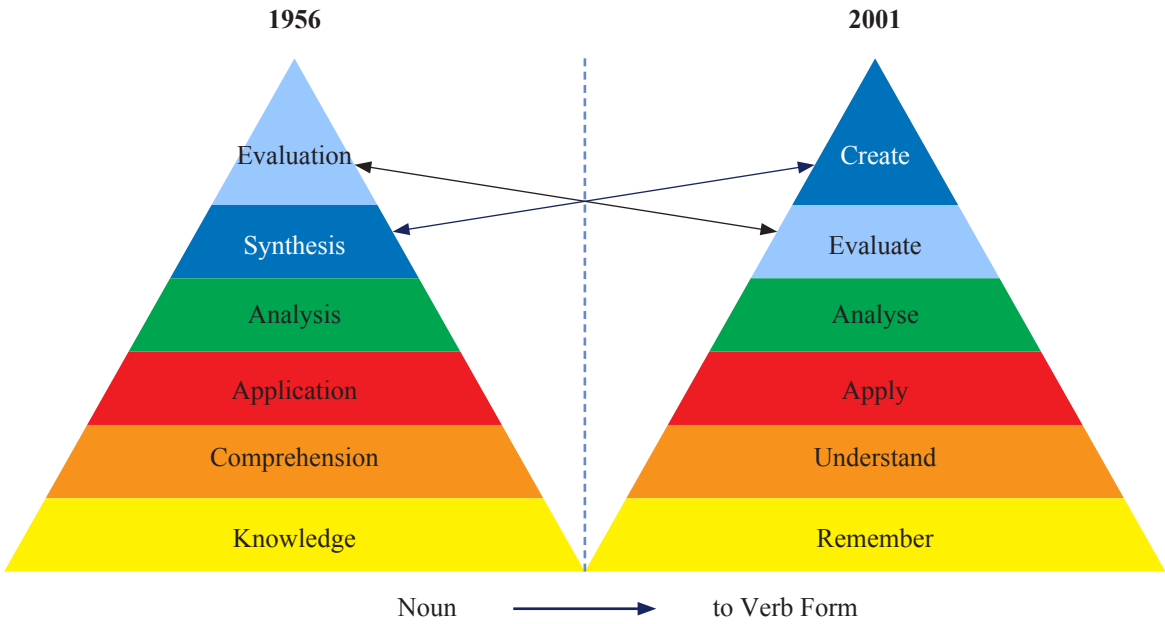
- Identify the action verbs for Bloom's Taxonomy's three domains of learning.

Bloom's Taxonomy

In 1956, Benjamin Bloom and some fellow researchers published a taxonomy of educational objectives that we now know as 'Bloom's Taxonomy.'

It is important to understand that Bloom's Taxonomy has evolved over the decades since 1956. To this day, you still find Bloom's Taxonomy that uses nouns rather than verbs. You also find slightly different categories of classification. Overall, many scholarly articles have been written about Bloom's Taxonomy, the framework, and how it needs to evolve as new findings emerge from educational psychology and pedagogy. Instead of memorising, Bloom's Taxonomy and the different categories and associated verbs provided, it is much more important to understand the idea conceptually.

Figure 2.7. Original and revised versions of Bloom's Taxonomy



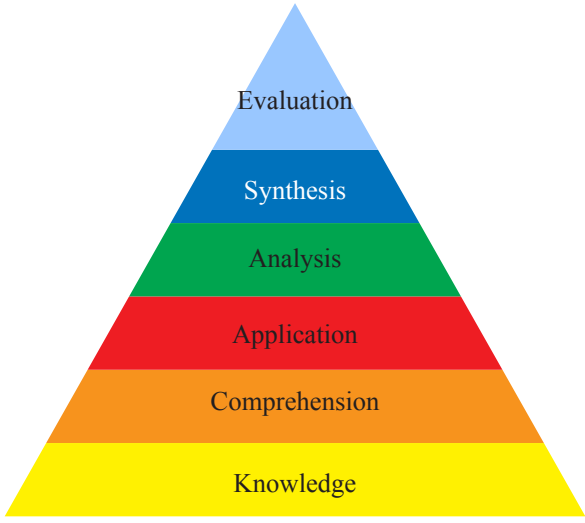
Besides shifting from nouns to verbs to inform action-oriented learning objectives that then can be assessed, there was also a shift in thinking about what the highest form of thinking would look like. With a deeper appreciation for the multiple intelligences 'to create something new' is now seen as the highest level and it encompasses all of the levels below. Analysis, synthesis, and evaluation are now often grouped together as the second highest category.

As a student educator new to Bloom's Taxonomy, it is important to realise that there is still a lot of debate about how we learn and what constitutes deepest learning and mastery. Take for instance the verb 'create' as the highest category now. It simply means to 'make something new.' The challenge lies in the interpretation of what it takes to make something new. A new creation can be done in various ways that depict a range of skills and understanding. For example, if you create a painting or a house – it is the level of how much thinking, understanding, skill and creativity went into it defines if that 'create' was at the highest level of Bloom's or not. Simply to say that something was created new is not sufficient. The new creation has to be built upon and demonstrate 'mastery' of all the lower levels of Bloom's Taxonomy. So, when you study Bloom's Taxonomy and apply the verbs, always keep in mind that the interpretation of that verb lies also within the context you provide and that will ultimately define the level of difficulty.

But let us start simple and remember that originally, Bloom's Taxonomy was created as a classification system to assist the development of assessments of different categories of learning. With the final assessments in mind, the level of difficulty of Bloom's action verbs guides the design of the lesson. It is through discussions with your teachers and peers and a lot of practice and reflection, that you will get better in applying Bloom's Taxonomy in its true intent.

In this unit, you will get an introduction to how you can use Bloom's Taxonomy as a key theoretical framework for learning that categorizes learning objectives from simple to complex or from factual to conceptual across **three domains of learning – cognitive, affective, and psychomotor.**

Figure 2.8. Taxonomy of educational objectives: Cognitive domain (Bloom et al..1984)



1. **Cognitive domain:** Skills in the cognitive domain revolve around knowledge, comprehension, and critical thinking about a particular subject. Bloom divides the cognitive domain into six levels which move from the lowest level, simply recalling facts, to more complex and abstract levels.

For each level in the cognitive domain, a set of verbs helps us recognise the type of intellectual activity involved:

a. **Knowledge:** Learning objectives at the knowledge level require the students to remember or recall information such as facts, terminology, problem-solving strategies, and rules. Action verbs used to describe the learning outcomes expected of students at the knowledge level include: *define, describe, identify, label, list, match, name, outline, choose, recall, recite, state, select.*

b. **Comprehension:** At the comprehension level, some degree of understanding of concepts or ideas is required. Action verbs used to describe the learning outcomes expected of students at the comprehension level include: *convert, defend, discriminate, distinguish, interpret, extend, estimate, explain, extend, generalise, summarise, illustrate, infer, paraphrase, predict, summarise, rephrase, relate, and outline.*

c. **Application:** The application level requires students to use previously acquired information in a setting other than the one in which it was learned. Application objectives differ from comprehension objectives in that application requires the presentation of a problem in a different and often applied context. Action verbs used to describe the learning outcomes expected of students at the application level include: *change, compute, demonstrate, develop, modify, operate organise, prepare, relate, solve, transfer, and use.*

d. **Analysis:** The analysis level asks students to identify logical errors or to differentiate among facts, opinions, assumptions, hypotheses, and conclusions. Students are expected to draw relationships among ideas and to compare and contrast. Action verbs used to describe the learning outcomes expected of students at the analysis level include: *Break down, deduce, diagram, differentiate, analyse, compare, contrast, distinguish, illustrate, infer, outline, categorise, classify, point out, relate, separate out, subdivide, and select.*

e. **Synthesis:** At the synthesis level, students must produce something unique or original. They are expected to solve some unfamiliar problems in a unique way or to combine parts to form a unique or novel solution and to compile information together in a different way by combining elements in a new pattern or proposing alternative solutions. Action verbs used to describe the learning outcomes expected of students at the synthesis level include: *Categorise, compile, compose, create, design, devise, plan, build, formulate, predict, produce, change, and modify.*

f. **Evaluation:** For the evaluation level, students must form judgments and make decisions about the value of methods, ideas, people or products that have a specific purpose. Students are expected to state the bases for their judgments (for example, the external criteria or principles they drew on to reach their conclusions). Action verbs used to describe the learning outcomes expected of students at the synthesis level include: *appraise, compare, contrast, criticize, defend, judge, justify, support, and validate.*

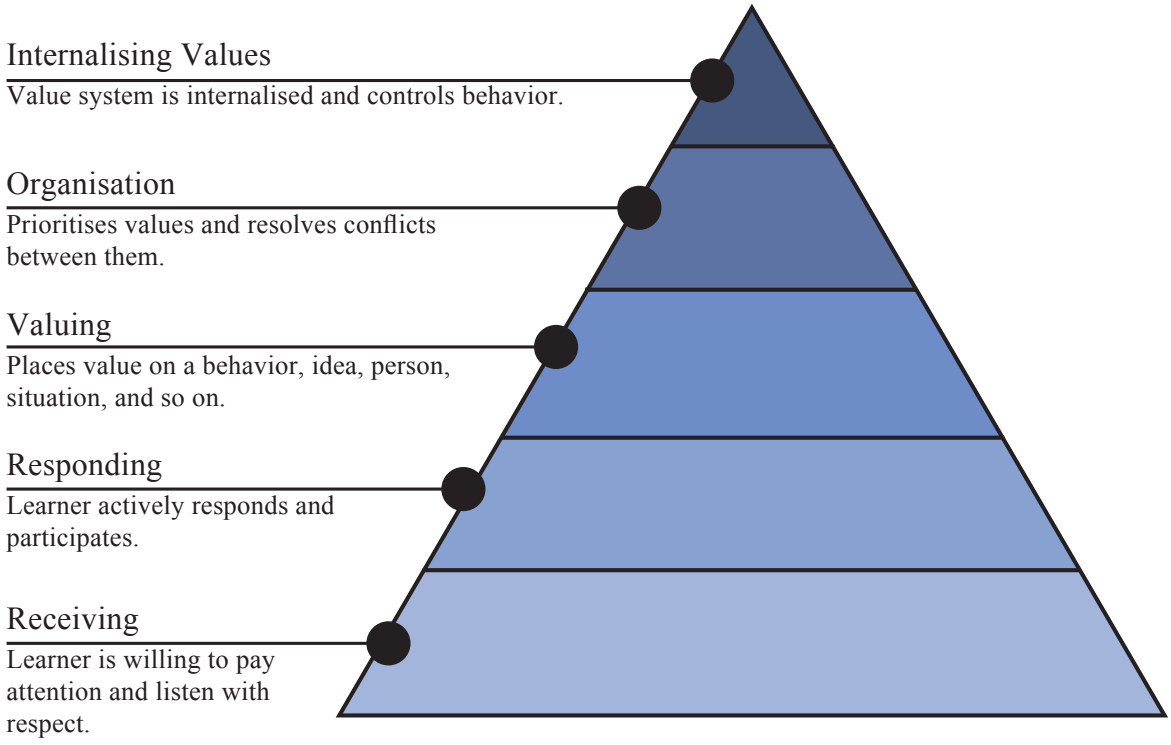
Learning activity 1

Write a learning outcome for each of the levels of the cognitive domain. You can use any task paired with one of the example action verbs used to describe what students know and can do at each level. To get you started, here is an example of a learning outcome for each level of the cognitive domain:

- **Knowledge:** Students will be able to recall the four major food groups, without error, by Friday.
- Comprehension: Students will be able to distinguish between the realists and naturalists, citing examples from the readings.
- **Application:** Students will be able to demonstrate for the class a real-life application of the law of conservation of energy.
- **Analysis:** During a presidential debate, students will be able to differentiate the positions that attack a candidate as an individual rather than criticise his or her policies.
- **Synthesis:** After reading a short story, students will be able to create a different, but plausible, ending.
- **Evaluation:** Given a description of a country's economic system, students will be able to defend it, basing arguments on principles of democracy.

2. **Affective domain:** The skills in the affective domain describe the way people react emotionally. They involve learning that happens at the behavioural level with objectives that aim to increase people's awareness and improve attitudes, emotions, and feelings. Bloom's Taxonomy describes five levels of affective behaviour, which increase in complexity from 'receiving' to 'characterisation.'

Figure 2.9. Taxonomy of educational objectives: Affective domain



a. **Receiving:** At this level, students are expected to simply listen and be attentive. Action verbs that describe learning outcomes at the receiving level include: attend, discern, look, be aware, hear, notice, control, listen, and share.

b. **Responding:** Students at this level are expected to obey, participate or respond willingly when asked or directed to do something. Action verbs that describe learning outcomes at the responding level include: applaud, comply, discuss, follow, obey, participate, play, practice, and volunteer.

c. **Valuing:** At the valuing level, students need to display behaviour consistent with a single belief or attitude in situations where he or she is neither forced nor asked to comply. Action verbs that describe learning outcomes at the valuing level include: act, argue, convince, debate, display, express, help organise, and prefer.

d. **Organisation:** Objectives at the organisation level require a commitment to a set of values. This level involves forming a reason why one values certain things and not others and making appropriate choices between things that are and are not valued. Action verbs that describe learning outcomes at the organisation level include: balance, compare, decide, define, formulate, select, systematise, and theorise.

e. **Characterisation:** At this level, students have not only acquired the behaviours represented by the preceding levels, but have also integrate their values into a complete and pervasive philosophy. Action verbs that describe learning outcomes at the organisation level include: display, exhibit, internalise, manage, require, resist, resolve, and revise.

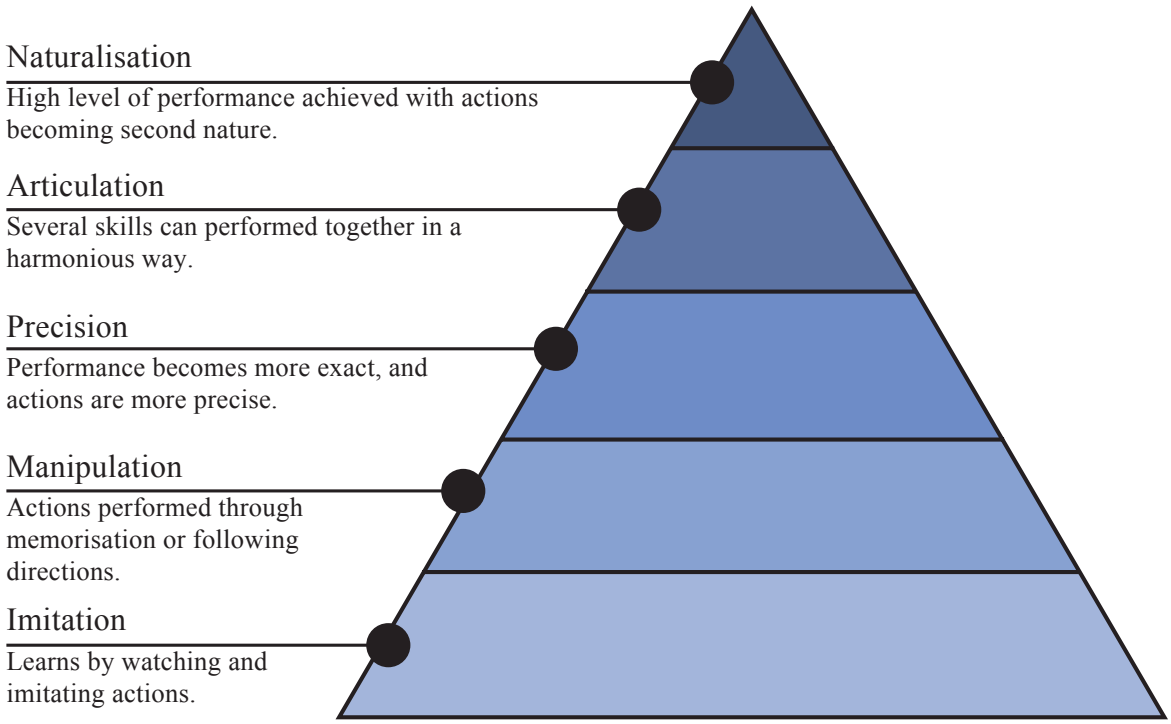
Learning activity 2

Can you write a learning outcome for each of the levels of the affective domain? You can use any task paired with one of the example action verbs used to describe what students know and can do at each level. To get you started, here is an example of a learning outcome for each level of the affective domain:

- **Receiving:** Students will listen to each other during classroom discussions.
- **Responding:** Students will practise a musical instrument when asked to do so.
- **Valuing:** Students will express an opinion about nuclear disarmament whenever national events raise the issue.
- **Organisation:** Students will be able to compare alternative strategies for environmental protection and decide which ones are compatible with their beliefs.
- **Characterisation:** Students will exhibit a helping and caring attitude toward students with disabilities by assisting with their mobility both in and out of classrooms.

3. **Psychomotor Domain:** The psychomotor domain deals with skill-based learning that involves the ability to bodily manipulate tools or instruments. Psychomotor objectives usually focus on changes in behaviour and skills. There are five levels of psychomotor behaviour ranging from the imitation level to the naturalisation level (simple to complex).

Figure 2.10. Taxonomy of educational objectives: Psychomotor domain



a. **Imitation:** At this level, students are expected to observe and be able to repeat (although imperfectly) the action being visually demonstrated. Action verbs to describe learning outcomes at the imitation level include: *copy, follow, replicate, and repeat.*

b. **Manipulation:** Objectives at the manipulation level require students to perform selected actions from written or verbal directions without the aid of a visual model or direct observation. Action verbs to describe learning outcomes at the manipulation level include: *re-create, build, perform, execute, and implement.*

c. **Precision:** At the precision level, students must perform an action independent of either a visual model or a written set of directions. Students are expected to reproduce the action with control and to reduce errors to a minimum. Expressions that describe learning outcomes at the precision level include: *performing the behaviours, accurately, independently, with control, without error, proficiently, and with balance.*

d. **Articulation:** Objectives at the articulation level require students to display coordination of a series of related acts by establishing the appropriate sequence and performing the acts accurately, with control as well as with speed and timing. Expressions that describe learning outcomes at the articulation level include: *performing the behaviours with confidence, coordination, harmony, integration, proportion, smoothness, speed, stability, and timing.*

e. **Naturalisation:** At the level of naturalisation, students have achieved automatic and unconscious mastery of the activity or skills. Expressions that describe learning outcomes at the naturalisation level include: *performing the behaviour automatically, effortlessly, naturally, professionally, routinely, spontaneously, with ease, with perfection, and with poise.*

Learning activity 3

Can you write a learning outcome for each of the levels of the psychomotor domain? You can use any relevant task paired with one of the example action verbs used to describe what students know and can do at each level. To get you started, here is an example of a learning outcome for each level of the psychomotor domain:

- **Imitation:** After being shown a drawing of a triangle, students will be able to reproduce the drawing.
- **Manipulation:** Following the instructions on the handout, students will be able to execute the experiment.
- **Precision:** Students will be able to write all the letters of the alphabet without error.
- **Articulation**: Students will be able to deliver the speech with confidence and timing.
- **Naturalisation:** Students will routinely undertake classroom clean-up at the end of each school day.

Understanding Bloom's Taxonomy can help you think about how you can help your students to progress simpler learning objectives to more complex levels of learning. The action verbs for each level of each domain can help you write learning outcomes for your lessons that target the appropriate level of knowledge and skills for where your students are at developmentally. In Unit 4 of this textbook, you will learn more about writing learning outcomes and learning objectives, drawing on what you have learned about Bloom's taxonomy.

Review questions

1. What was the original purpose of Bloom's Taxonomy?
2. How is Bloom's Taxonomy useful to you now?
3. What are the three domains of learning?

2.6. Learning Principles

While effective teaching depends greatly on the local context and individual student needs, there is also much we do know from research about the principles of quality teaching and learning. This unit guides you first to think about what we mean by 'effective' learning, arguing that effectiveness is closely tied to relevance for today's world. It then presents six research-based principles for effective learning as guidance on what's important to help students learn in meaningful and authentic ways.

2.6.1. Learning principles for effective learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Relate learning principles to effective learning.

Understanding the research-based principles that underpin effective learning is a first step towards understanding what works and does not work to promote effective student learning. Here, when we talk about 'effective' learning, we mean learning that is relevant for the context in which education is taking place and the end learning goals. We know that in today's world, the knowledge base in society is increasing rapidly. Through technology, information is available to many more people than it was in the past. Today, employment is often based on the ability to enhance and transfer learning. Because of this, the goals of learning have shifted to focus less on knowledge acquisition by individuals, and more on knowledge-generation with others. Effective learners are versatile and can actively use

different strategies and approaches for different contexts and purposes. This means, for example, being able to:

- Independently gain understanding from texts and information sources;
- Create knowledge with others by undertaking a project; and
- Engage in dialogue with people who might have different perspectives or points-of-view.

In this context, effective learning involves making connections between ideas, gaining new complexities of understanding, and increasing levels of engagement, self-direction, and reflection. Effective learning for today's world is often characterised by active learning, including the real-life application of knowledge and skills; collaboration; and ownership of one's own learning.

The characteristics of effective learning suggest that the effective learner is:

- Active and strategic;
- Skilled in cooperation, dialogue, and creating knowledge with others;
- Able to develop goals and plans; and
- Able to monitor his or her own learning across contexts.

Figure 2.11. Effective learning

To facilitate the development of effective learners in our classrooms, we need to understand and apply the following research- and theory-based principles of learning:[13]

Learning Principle 1: Students' prior knowledge and experiences affects their learning

All students bring with them the knowledge, attitudes, and beliefs that they have gained in other classes and through their daily lives. These prior experiences influence how they make sense of what they are learning in your class. If a student's prior knowledge is accurate and appropriate, it can provide a strong foundation for building new knowledge and skills. However, if it is inaccurate or inappropriate for his or her development level, it can get in the way of new learning. As a teacher, it is important to recognise the background that your students are bringing with them into class so that you can either build on their knowledge and experiences or seek to remediate, as necessary.

Learning Principle 2: The way students organise knowledge affects how they learn and apply what they know

Students naturally look to make connections between pieces of knowledge. If you want your students to be able to apply their knowledge effectively, you need to foster connections between ideas and topics accurately and in a way that helps students make meaning of their world. If connections between ideas and topics are random or inaccurate, it will be difficult for students to apply their knowledge appropriately and accurately.

Learning Principle 3: Students' motivation makes a difference in how they learn

Motivation plays a critical role in student engagement. When students find positive value in a learning goal or activity and when they feel supported by you, as the teacher, and their classmates, they are likely to be positively motivated to learn.

[13] The Learning Principles highlighted in this unit have been adapted from Eberly Centre, Carnegie Melon University. Principles of Teaching and Learning. Retrieved on 10 September 2018 from https://www.cmu.edu/teaching/principles/

Learning Principle 4: To develop true mastery, students must learn a combination of skills, practice using them, and understand when to apply what they have learned

Students need to both develop the necessary range of skills and knowledge to perform complex tasks and must also have opportunity to put these knowledge and skills into real-world practice. In other words, students need to know when and how to apply the skills and knowledge they learn in real life.

Learning Principle 5: Goal-directed practice, together with targeted feedback, improves the quality of students' learning

For quality learning, students need to understand the goal of the learning and be given enough time and support to meet the success criteria. Your feedback during the learning process is crucial for student success. In order to succeed, students need to be provided with timely feedback that clearly addresses what they need to do to meet the criteria and supports them to be able to so.

Learning Principle 6: The social, intellectual, and emotional climate of the classroom affects student learning

Students are not only intellectual but also social and emotional beings. As a teacher, you can shape the intellectual, social, emotional, and physical aspects of your classroom environment to support their holistic development. A negative classroom environment may impede student learning and performance, while a positive climate – where students feel supported, safe, empowered, and encouraged – can energise students' learning.

Learning Principle 7: Students need to be able to monitor and adjust their own approaches to learning in order to become self-directed learners

One of the most important ways you can help your students is by teaching them to take control of their own learning. This means teaching metacognitive processes so that they can assess the task at hand, evaluate their own strengths and weaknesses, plan their approach, apply and monitor various strategies, and reflect on the degree to which their current approach is working. When students develop the skills to engage these processes, they gain intellectual habits that not only improve their performance but also their effectiveness as learners, a lifelong skill.

Learning activity 1

What does effective learning mean to you? Can you give an example of what each of these learning principles might look like in the classroom? You can discuss your ideas with a classmate.

Review questions

1. What are some characteristics of an effective learner?

2.7. Learning Styles

Your classroom will be made up of individual students, each with his or her unique background, personality, and strength and weakness. Thinking about different learning styles can help us be mindful to not treat our classes of students as a whole, but rather to shape our lesson so that each student can meaningfully learn. In this unit, you will be introduced to a key learning styles theory, and will think about how it might influence your teaching and your future students' learning.

2.7.1. Understanding and appreciating different learning styles

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain different learning styles and their impact on students' learning.

Learning style is a distinctive way that an individual processes, interprets, and acquires information, knowledge or a desired skill. An individual's learning style can be shaped by different factors such as personality, physical and emotional condition and other influences such as family inheritance, social interaction and the environment, including relationships with parents, community culture, and the values and practices encountered in schools. In most cases, individuals learn better when they receive and process information in their preferred learning styles.

Consideration of diverse learning styles of learners can lead to more inclusive, equity-based and personalised learning, by fostering active engagement and participation of the learners involved in the process. UNESCO-IBE (2017) suggests that 'for learning to be personalised, the knowledge, competencies, behaviours and approaches to be learnt should be presented to the learner in such a way that they make sense, can be understood, are relevant and make the learner want to find out more. It is not an easy thing and requires strategies, dedication, careful reflection, constant re-evaluation and an eye for detail. It can be done with few resources and with large numbers of students' (p. 4).

It is also important to note that reflecting on different learning styles of learners in developing curricula, lesson plans and learning activities as well as in selecting pedagogies in classroom practices, certainly promotes their learning processes, which eventually leads to achieving learning outcomes.

Learning activity 1

Reflect on these questions below and write your reflection on a notebook.

1. How do you learn best?
2. How do learners learn best?
3. What are the examples of different learning styles and how do each learning style support learning of the students?
4. How does understanding the disparity in learning styles help teachers cater the needs of the students?

Review questions

1. What is a learning style?
2. How do different learning styles impact on the students' learning process and outcomes?

2.8. Basic Learning Models and Teaching Strategy

A learning model is a framework that describes, step-by-step, the processes that go on in a classroom. This sub-unit covers three basic learning models – the Mastery Learning Model, Inquiry-based Learning Model, and Problem-based Learning Model – that you can draw on in your teaching. In this sub-unit, you will also continue thinking about different teaching methods, based on the learning models, which you can use in your classroom.

2.8.1. Learning about learning models

Expected learning outcomes

By the end of the lesson, you will be able to:

- Relate a basic learning model to local contexts.

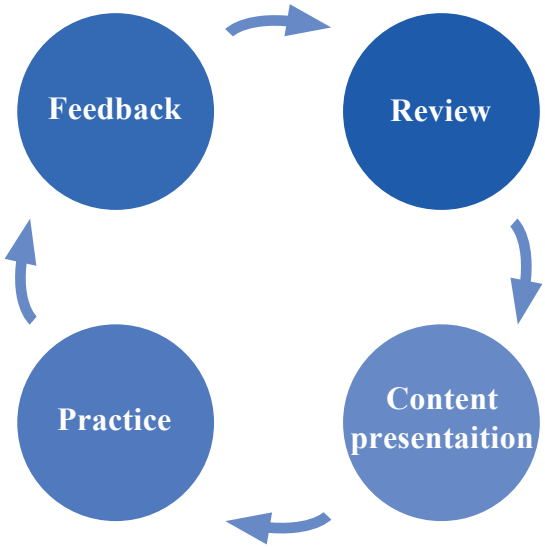
Learning models attempt to systematically describe the process of teaching and learning. They provide a framework for what goes on in the classroom. Three of the most famous learning models include the Mastery Learning Model, Inquiry-based Learning Model, and Problem-based Learning Model.

Mastery Learning Model

The Mastery Learning Model, which was developed by Benjamin Bloom in 1968, is based on the principle that all of the students can attain the lesson and unit objectives when there are appropriate instructions and sufficient time for them to learn. In other words, all students, regardless of background and ability, can 'master' the desired knowledge and skills if given enough support. Mastery learning emphasises the need for the principles of tutoring and individualised instruction to be brought into group learning so that everyone can succeed.

To implement the Mastery Learning Model in the classroom, it is very important that the objective(s) of the unit is clearly stated and they are divided into lessons, each with their own objectives and assessment. Each unit or lesson would start with a brief diagnostic test or formative assessment of what students know and do not know about the topic. The results of these diagnostic tests are used to provide instruction and corrective activities.

Figure 2.12. Mastery-based cycle of learning

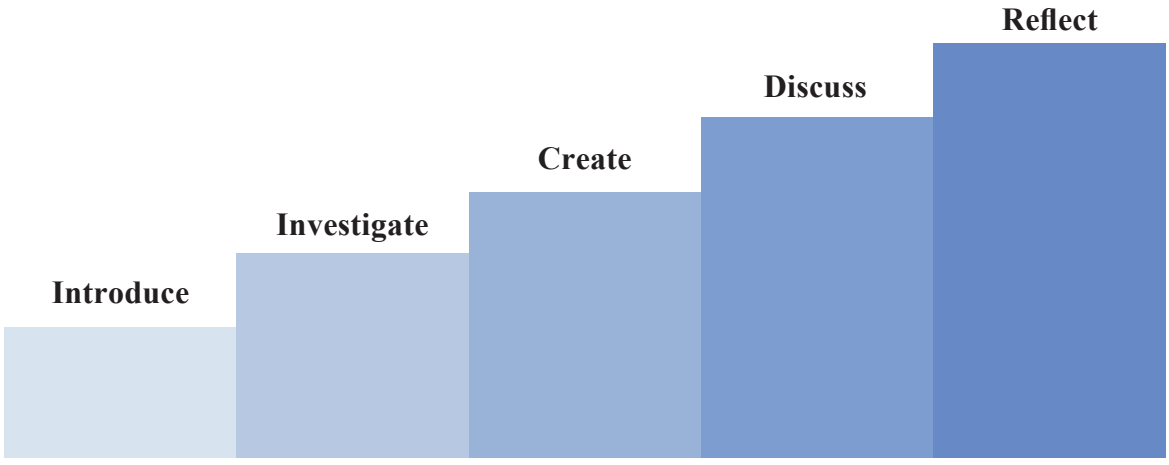


In a Mastery-based classroom, activities follow a routine cycle of: review, content presentation, practice, and feedback. Firstly, this cycle is used with the whole class and then repeated, as needed, with the whole class or individuals until everyone successfully achieves the objective. No student proceeds to new material until the basic material is fully mastered.

Inquiry-based Learning Model

In the Inquiry-based Learning Model, the students identify problems, brainstorm solutions, formulate questions, investigate, analyse and interpret results, discuss, reflect, make conclusions, and present results.[14]

Figure 2.13. Steps for Inquiry-based learning



The following steps are typically followed in inquiry-based model:

1. **Introduce:** To promote the desire to discover, the teacher begins by raising questions and inviting students to plan the inquiry procedures and presentation of findings. The teacher encourages students to raise questions of their own and to plan their next steps.
2. **Investigate:** Students are asked to recall prior knowledge or experiences related to the question and brainstorm possible methods of investigating it, identifying resources and designing and carrying out a plan of action.
3. **Create:** When sufficient information has been gathered, students are asked to begin thinking critically about the relationship between information (evidence) and their question (appropriateness of their question or hypothesis), redefine their questions and / or construct new ones, and decide whether to gather more data. A chart synthesising the information collected or an oral presentation that summarises progress is expected.

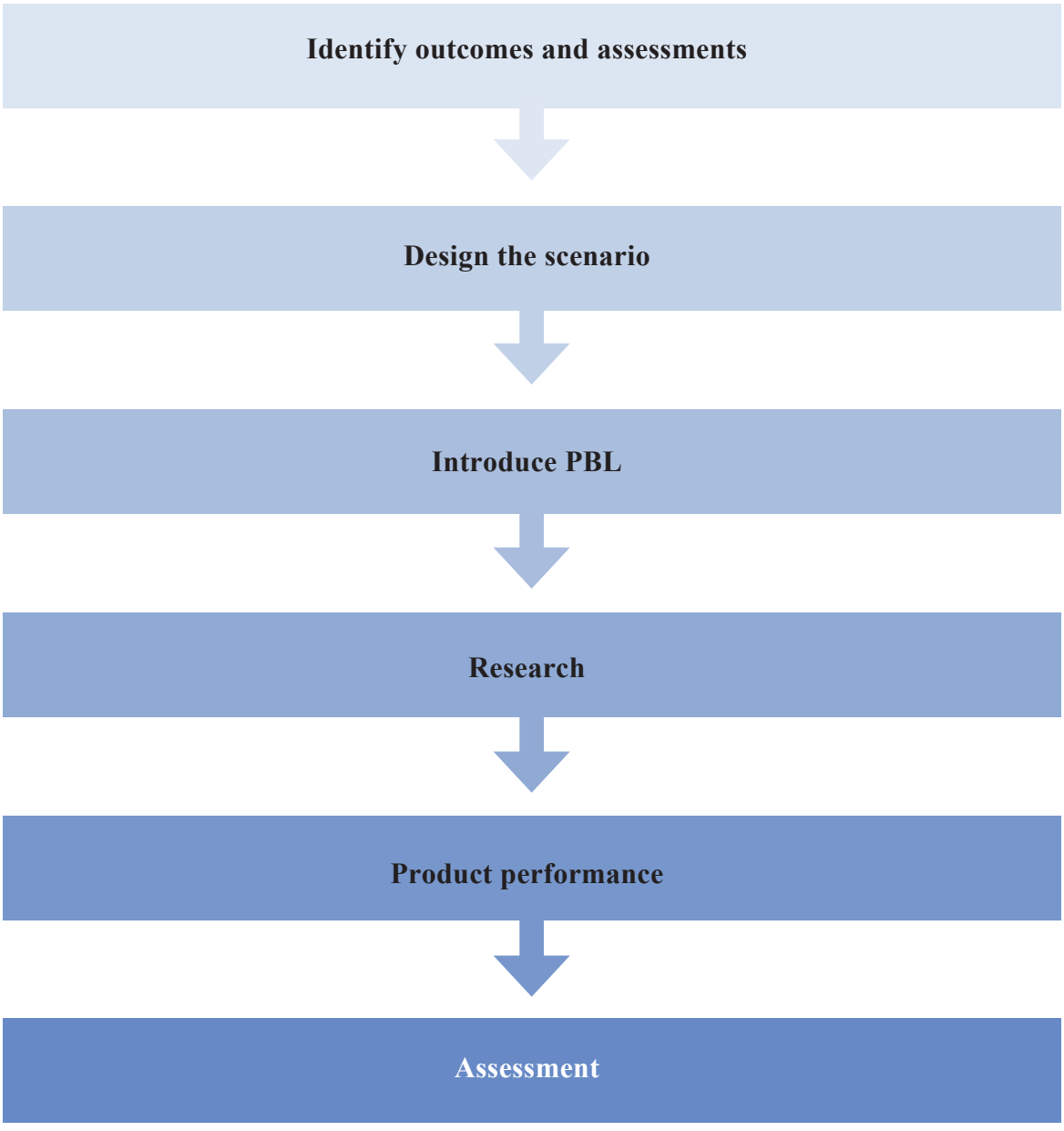
[14] Bruner, 2004, cited in *Effective Teaching Method,* p.275

4. **Discuss**: At this stage, students discuss their findings, new ideas, and experiences with one another. Students share their experiences and investigations in their learning community, which can be a collaborative group or the entire class. When a small group format is used, different groups may use the inquiry process to answer different questions that may have evolved from steps 2 and 3. The task at this stage may include comparing notes, discussing conclusions, and sharing experiences across groups.
5. **Reflect:** In this final step, students critique and communicate their results to their learning community (group or class), during which students are expected to reflect on their newly acquired knowledge. The tasks include reflecting on the appropriateness of their question, their methods of investigation, and the accuracy of their conclusions.

Problem-based Learning Model (PBL)

Problem-based Learning (PBL) is a student-centred, inquiry-based model in which learners engage with an authentic problem that requires further research. Through collaboration and inquiry, students are able to gain problem-solving and metacognitive skills as they actively engage with learning. PBL requires the intrinsic motivation of students to be successful.

Figure 2.14. Problem-based learning model



Like the Inquiry-based Model, PBL follows some typical steps:

1. **Identify outcomes and assessments:** PBL lends itself to process-oriented learning outcomes that emphasise collaboration, research, and problem-solving. It can also help students to acquire content or conceptual knowledge or to develop disciplinary habits such as writing or communication. After determining the learning outcomes, formative and summative assessments need to be developed to measure student learning. Self and peer evaluation forms, learning reflections, writing samples, and rubrics[15] are all potential PBL assessments.
2. **Design the scenario:** To do this, think of a real, complex issue related to the course content. The scenario needs to have an embedded problem that will emerge through student brainstorming.[16]
3. **Introduce PBL:** During this step, the teacher introduces the assignment expectations, rubrics, and timelines and puts students in groups to undertake their research.
4. **Research:** PBL research begins with small-group brainstorming sessions.
5. **Product performance:** After researching the question or topic, the students create products like research posters and presentations that synthesize their research, solutions, and learning.
6. **Assessment:** The groups' products and performances will be evaluated using rubrics to determine whether students have clearly communicated about the problem and to decide whether all group members participated meaningfully.

Learning activity 1

Draw a visual/graphic organiser of the key steps in the three learning models. You can include illustrations or examples in your graphic organiser to help making the steps of each model more concrete.

[15] A rubric is a scoring guide that is used to evaluate student work. Rubrics usually contain the criteria for evaluation (for example 'Subject Knowledge'), levels of achievement (for example, ranging from 'Excellent' to 'Poor'), and definitions of what the student must do to achieve that level (for example, 'demonstrate deep and accurate knowledge of the content').

[16] There are many websites that provide examples of PBL problems and scenarios; a science example can be found at www.facultyfocus.com/

Teaching and learning strategies

Whether or not you are basing your unit or lesson on one of the above learning models, as the teacher, you will need to pick the teaching methodology that you will use to make sure your students achieve the learning outcomes. Before deciding which method(s) to use in a lesson, it is important to establish what students should take away from the lesson and how they will be assessed. You will focus more on this process in Unit 4.

Based on what you want your students to know and be able to do at the end of the lesson, you can decide what activities you need to help them get there. It is usually a good idea to vary the methods that you use so that you can keep students interested and meet the variety of learning needs that will be present in your classroom. You can also think about what methods you can use to gradually increase the level of difficulty, ownership, and autonomy that students have of their learning. The types of methods you use most will depend on a number of factors, including the age and ability level of students.

There are many different teaching methods that can be effectively used to teach students. The Part of what makes teaching challenging and rewarding is putting these methods together to design lessons that help all of the unique students in your classroom to learn. Some of the best known and most widely used teaching and learning strategies include:

Direct/traditional lecture (teacher-centred): In this method, the teacher assumes the role of an expert and provides all the points of a specific lesson to students, while they listen and respond to the lecture. It is the teacher's responsibility in this model to keep the students' attention and to convey the main learning points of the lesson. The teacher must be aware of how long their students can pay attention and not exceed that time limit. While lectures can be easy to prepare, they tend to be less appropriate for younger students who cannot take notes. This teaching method can be especially beneficial before tests as teachers can highlight the main topics that students need to study.

Demonstration: Many teachers rely on demonstrations or modeling, to help their students comprehend material, as many individuals tend to benefit from demonstration, regardless of learning styles. When it comes to mathematics, particularly primary school-aged children need supported practice, and it is often effective for teachers to model a new concept several times and then take the students through guided practice. Once guided practice has been completed, students can begin practicing independently.

Hands-on/Inquiry (student-centred): Primary students tend to learn best from hands-on activities. This type of student-centred activity creates experimentation, exploration, self-discovery, and helps engage learners in a more active classroom. Hands-on lesson plans are often developed as 'experiments,' such as multi-day (or week) projects or various 'learning centres' throughout the classroom. For example, an elementary science teacher might use a hands-on hypothesis-experiment lesson to help students understanding of soil erosion, allowing students to see and experience the change rather than reading about them from a book. Hands-on lessons can be somewhat chaotic. Teachers need to be focused on the end goal for learning and check in with students to make sure that they are taking away the desired knowledge and skills. Teachers who use an inquiry-based method must also be extraordinarily organised and plan lessons well in advance as the learning activities stretch over longer time periods.

Collaborative/Cooperative (shared-centred): Collaborative or cooperative methods are a great way to get the students to interact with their peers. This style encourages problem-solving, communication skills, and interactive learning. Cooperative lesson plans include projects that involve group work, pair learning, and teacher-student work. This method can be extremely beneficial for struggling students; it also gives the teacher the ability to identify and target students that need extra attention. Collaboration is also helpful in determining which areas certain students need assistance in and in which areas they are stronger. Collaboration should be followed by a group discussion where students can converse about their perceptions and findings. However, it is important to keep in mind that not all students respond positively to group work. Early primary teachers often find that enforcing positive group skills can be more difficult than ensuring a project is completed. Secondly, having one-on-one time between a student and teacher can be time-consuming and need to be managed so that no student feels left out. Assessment of group work can also be challenging in terms of fairness to individual students.

Choosing which teaching method will be most appropriate for your lesson is something you will grow in as you gain teaching experience and come to know the students in your classroom. Combining different learning models and methods can help to ensure that all students, no matter their learning style or background, can benefit from a meaningful classroom experience.[17]

Learning activity 2

With a partner, talk about which teaching method you might use to teach different subjects or lesson topics and age levels. What was your reasoning for selecting the different teaching methods?

Review questions

1. Name and describe any of the four teaching and learning strategies studied in this unit.

[17] This section on teaching and learning strategies draws on 'Elementary Teaching Methods' from Teach Elementary; retrieved from www.teachelementary.org on 23 September 2018.

2.9. The 'Input-Process-Output' Process

IPO or 'input-process-output', is one way to systematically analyse about the different components of a system and their effects. In education, we can think about the IPO process for the entire education system or for a school or classroom system. By identifying the inputs, process, and outputs of learning, as you will do in this unit, we can make adjustments to continuously try to improve the results.

2.9.1. What is IPO?

Expected learning outcomes

By the end of the lesson, you will be able to:

- Draw an IPO process diagram with examples.

IPO: Linking the components of the system

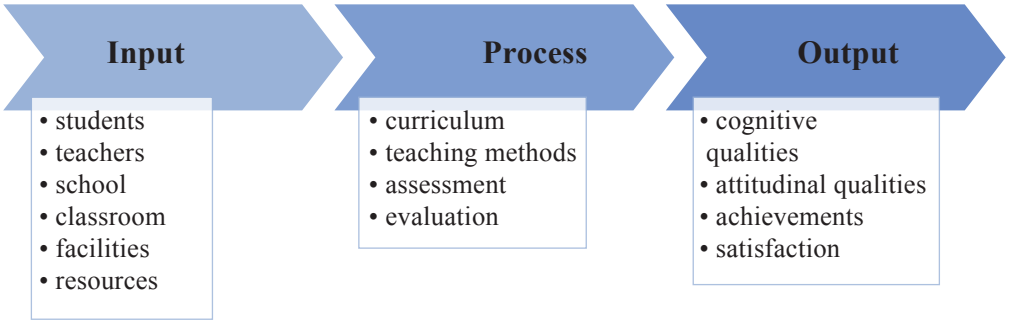
According to Mukhopadhyay (2005), 'input-process-output' (IPO) is a way to think about the components of a system – for our purposes, the education or the school system. Thinking about the IPO model can help us to identify the inputs and processing tasks needed to produce the desired outputs. The elements of IPO are inter-linked and inter-dependent on one another within a system framework.

In education, the 'inputs' are all of the things going into the education system. If we just think about school-level, this would include the students' characteristics, including their backgrounds, ability-levels, prior education experiences, the teachers' characteristics and quality, the school facilities and equipment, instructional materials and resources, and the school and classroom culture.

The 'process' is everything that goes on in delivering education. These are things like the implementation of the curriculum, including teaching methods used, and the way that students are evaluated and assessed.

The 'outputs' are the end result of education within the system or school. This includes things like the quality and number of graduates, including their cognitive and attitudinal qualities and skills as well the achievement and satisfaction of the students.

Figure 2.15. An IPO model



When we evaluate the desired goals of education or of a school, we can look at the inputs, processes, and outputs to see what is working and the thing does not. If the goal is not being achieved, the parts of the system, especially the inputs and processes, can be adjusted until desired results are achieved.

It can be helpful for teachers to think about teaching and learning as an instructional system with inputs, processes, and outputs. The purpose of the instructional system is to bring about learning and to produce students with the desired qualities.

The components of the system include the learners, the teacher, the instructional materials, and the learning environment. These components interact in order to achieve the goal. For example, the teacher reviews sample problems in the textbook with the students in a quiet classroom. To determine whether learning is taking place, the students take a test. The teacher, students, and textbooks are the inputs; the process is the review activities, and the output is the performance on the test. If the students' performance on the test is not satisfactory, then changes must be enacted to make the system more effective and to bring about the desired learning outcomes.

The benefit of using a 'systems view' of teaching and learning is the ability to see the important role of all the components in the instructional process. All components must interact effectively in order to bring about the desired outcomes. There must be both an assessment of the system effectiveness in bringing about learning, and a mechanism to make changes if learning fails to occur.

Learning activity

Answer the following questions and then draw a diagram of the IPO process, with examples:

1. What are the components of the instructional system in a classroom?
2. What qualities or goals do we want to produce or achieve? (Outputs)
3. How can we produce the qualified students that we want? (Process)
4. What requirements are needed to achieve the products? (Inputs)

Review questions

1. Briefly describe the inputs, processes and outputs in an education system.

2.10. Child Development

To design learning experiences which are developmentally appropriate for your students, you need to know something about the way that children develop, physically, linguistically, intellectually, socially, emotionally, and morally. This unit will provide you with an understanding of the basic progression of child development and what you can expect from children at various ages and stages.

2.10.1. Important stages in child development

Expected learning outcomes

By the end of the lesson, you will be able to:

- Demonstrate the knowledge of how young learners learn according to their developmental stage; and
- Explain the concepts and theories of: growth and development, nature and nurture, developmental domains and milestones, brain development, developmentally appropriate tasks, the uniqueness of a child, and the child as a whole.

Nature or nurture?

The term ‘child development’ encompasses a large and many-faceted area of study. Child development looks at the way in which children gain skills and abilities. It also examines processes such as language and thinking. There is a range of factors that underpin development. These factors include growth, diet, love and affection, sleep, stimulation, environment, medical conditions, and illness. Having a working knowledge of child development is essential when working with children and young people. It will help you to understand children’s behaviour and to think about the ways you might plan to meet their developmental needs.

Child development theories focus on explaining how children change and grow over the course of childhood. Such theories centre on aspects of development including social, emotional, and cognitive growth.

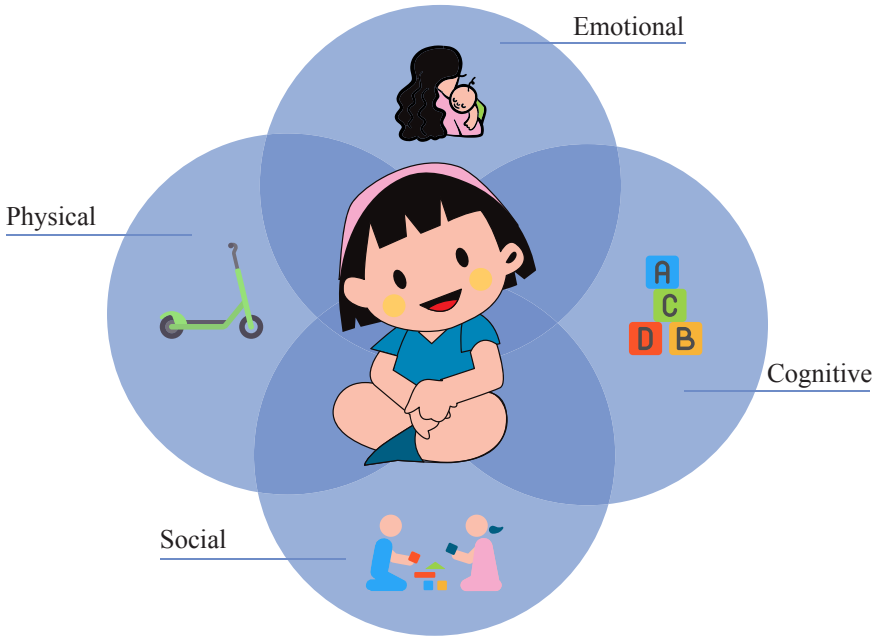
From the time we are born, we are growing. ‘Growth’ is the process by which cells subdivide, and it is extremely important to the development process. The term ‘development’ refers to the skills that a child is able to do, and it is closely linked with growth. For example, babies cannot walk until their bones are long and strong enough to handle their weight. Another example of the way in which growth affects development is linked to speech: the growth of teeth in the jaw makes a difference to speech production and the ability to eat.

In discussions about child development, there are often debates about the role of ‘nature’ versus ‘nurture,’ where nature is determined by genetic inheritance and other biological factors and nurture is the influence of external factors after conception. At its heart, the ‘nature vs. nurture’ debate is a discussion about the extent to which human behaviour is determined by a person’s genes versus the extent it is determined by the environment. In reality, most people think and believe that both nature and nurture are powerful influences on children’s development and work in tandem to shape development. For example, in brain development: While babies are born with key structures already in place (nature), they also need to be touched, spoken to, and stimulated (nurture) in order to fully develop.

Domains of development

Development is usually subdivided into four domains of development, including: 1) physical development; 2) communication and language development; 3) intellectual development; and 4) social, emotional, moral, and behavioural development. However, it is important to understand that these domains of development are interlinked. For example, a child who wants to play football will need not only physical skill, but also cognitive skills so that strategically play the game. The child will also need social skills to participate as a team member, and communication and language skills to interpret what other teammates are saying.

Figure 2.16. Domains of development



In general, **physical development** refers to the physical movements – for example, walking, drawing, and cutting with a knife – which most children will gradually learn. Physical development is closely related with becoming independent.

Communication and language development concern the ability to talk, understand what others are saying, and interpret facial expressions and body gestures. It also includes the skills of reading and writing. Communication and language development is linked to cognitive development because more sophisticated communication involves thinking about what others are trying to convey as well as thinking about what you are trying to express.

Intellectual development is a broad area of development that also includes cognitive development. Intellectual development encompasses the way in which we think and learn, and is responsible for reasoning and behaviour. Intellectual development includes understanding of abstract concepts such as time as well as the ability to remember things.

People need the skills included in s**ocial, emotional, and behavioural development** in order to live together and understand each other as social beings. Emotional development refers to the ability to recognise, express, and manage feelings at different stages of life and to have empathy for the feelings of others. The development of these emotions, which include both positive and negative emotions, is largely affected by relationships with parents, siblings, and peers. It involves learning to recognise and express feelings, understanding how and why they happen, recognising one's own feelings and those of others, developing effective ways of managing them, and having self-confidence.[18] Children begin developing their social and emotional skills in early childhood. This influences their mental health and well-being into the future.

The uniqueness of every child

Every child is an individual, with special social, emotional, intellectual, and physical qualities. They are individuals and no two children are alike: physically, emotionally, socially, and intellectually. They will have different personalities – some will be shy, some will be confident, some outgoing, some quiet. They will each have their own life experiences and feelings about themselves. They will have different likes and dislikes, interests and needs.

Every child is special, with unique combinations of abilities and needs that affect their learning.[19] All children deserve the opportunity to learn in the ways that make the most of their strengths and help them overcome their weaknesses. Teachers and parents must understand in their uniqueness and respect their individuality. It will be your job, as a teacher, to prepare teaching and learning activities that respond to and reflect the individual needs of the children in your class. By inventing many different ways to explore a subject and giving children many ways to express themselves, all children in your class can be given the chance to learn.

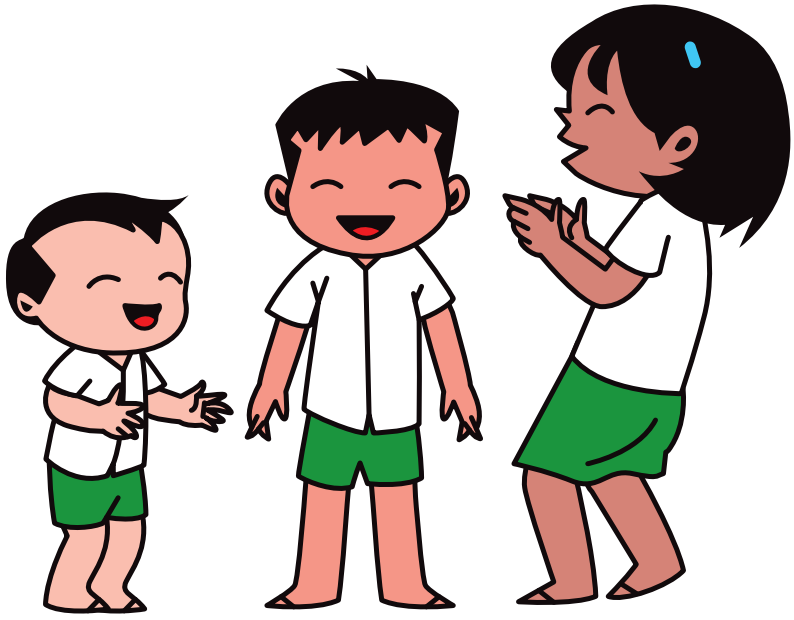
[18] See Kids Matter's information on Emotional development at https://www.kidsmatter.edu.au/mental-health-matters/social-and-emotional-learning/emotional-development

[19] UNICEF. (2001). Many Pathways of Learning. Retrieved on 19 September 2018 from www.unicef.org/teachers/learner/paths.htm

Milestones in the development of a child

While each child is unique, there are some generalised developmental milestones that can be expected for different age groups. Understanding these milestones can help you make sure that what goes on in your classroom is developmentally appropriate for the age group you are teaching.

Figure 2.17. Milestones of a child



Ages 5-6: In previous years, development in all areas has been rapid. From this point through until puberty, development is often described as 'steady.' The key changes that take place from ages five to six are the refinement of existing skills. A good example of this is using scissors; while previously children were able to roughly cut, in these years, children should refine this skill and be able to cut on a straight line. In the same way, there is increasing coordination of the larger movements so that children can run, swerve, and dodge more easily than before; for example, when playing games of chase.

At this stage, children will be established in school and will be learning to read and write. This is a long process requiring considerable effort to decode simple words. As well as learning to read and write, children will also be exposed to new concepts; for example, learning about numbers.

Socially, most children in this age group have developed some strong friendships based on shared interests.

Ages 7-9: During this period, children make enormous strides in cognitive development. First, children start to logically reason which translates into more complex play and the ability to mathematically reason. Games for this age group have more complex rules, and children understand the need for rules even if they change them to suit the situation.

At this stage, reading for most children becomes easier, and many will not need to follow the words using a finger or read aloud.

Children also become more physically skilful, which results in them being able to do tasks more quickly, confidently, and easily. For example, they may cut around a shape without effort or be able to accurately draw simple pictures.

Friendships are still important and becoming more stable, with some children having 'best friends.' While children may bicker with each other, they often show a keen desire to resolve conflict.

Most children in this age range will be in school, and it is an important period for children to gain confidence. It has a major influence on their emotional development as children begin to compare their achievements with those of others.

Ages 10-12: This period in children's lives marks the start of their growing independence. Friendships become more special and based on personality, rather than just shared interest. This is the start of a process that will see young people confiding more in their friends than in their close family members.

At this age, children may feel 'grown up' as they will be the older children in a school. It does not last though, as children are likely to face a major transition as they move from a primary to a secondary school. For most, this is an exciting time but it can also be nerve-racking. Instead of having a single teacher for most of the day, there are several changes in a day, and they need to cope with these changes. Children are also expected to be more organised and take on responsibility for following a timetable. These challenges can lead to

gain in confidence although some children will need additional support and time to adjust. Cognitively, development continues with reasoning and problem-solving skills becoming more sophisticated. Children are also likely to be competent in their interesting areas such as sports, computers or drawing. During this period, puberty often begins for girls with a growth spurt and the first physical changes.

Ages 13-16: During these years, young people face many changes as they move from childhood towards adulthood. Young people may express a desire to be seen as an individual, separate from their family unit. They may try to make their own mark through fashion, music choices, and behaviours, often resulting in conflicts with their parents.

During this time, friendships are a source of support and a way of gaining identity. Young people are likely to mix in groups which have their own identity, standards, and codes of behaviour. At this stage, young people start to make decisions that will affect their future and, as a consequence, they often feel under pressure.

Young people are also experiencing change in their bodies; puberty is well-established for girls but it just tends to be starting for boys. These physical changes can affect self-esteem in both boys and girls who are worrying about their attractiveness and whether they are 'normal.' Some young people will also begin to take an interest in the other sex and may start to form early relationships.

Piaget's Theory of Cognitive Development

One of the best-known theories of cognitive development was hypothesised by Jean Piaget, who you will remember from earlier in this unit as an important cognitive theorist. According to Piaget, the cognitive development of children normally goes through four stages according to their ages:

- Sensorimotor (0-2 years);
- Preoperational (2-7 years);
- Concrete operational (7-12 years); and
- Formal operational (after 12 years).

According to Flavell and Muller[20] Piaget's theory, it can help us to understand how children develop cognitively in accordance with their ages, with implications for how they learn in accordance with their age and developmental stage. For example, younger children (ages 4-5) think very concretely, so they will have a difficult time thinking of something like the abstract idea of change. As a primary school teacher, you can facilitate younger students' learning more effectively if you use concrete materials that allow them to see abstract concepts and operations in action. By the time children are between 7-11 years old, they likely have the ability to think logically about concrete objects and will be able to conserve, classify, and take alternate perspectives. With an understanding of this developmental progression, you can better plan learning experiences for students of all ages and stages of development.

Do not worry if Piaget's theory is still a bit unclear to you, you will learn more about it in Semester 2.

Brain development

The nervous system is the body's information-gathering, storage, and control system.[21] Its headquarters is the central nervous system, which is made up of the brain and the spinal cord. Information is sent to the central nervous system from the sense organs via nerves that diverge through the entire body. As a result of the information, the central nervous system sends out instructions to muscles (including muscles controlling speech), glands, and internal organs.

In some cases, you are conscious and under the control of these instructions; for example, when you are hungry, you may decide to go get a snack. At other times, instructions are made involuntarily (without conscious thought); for example, flinching when you are hurt. When babies are born, they show a number of involuntary movements and reflexes but they are able to interpret information and remember responses. This means that more voluntary control is gained.

[20] Cited in Slavin, R.E. (2006). *Educational Psychology: Theory and Practice, 8th Ed.* New York: Prentice Hall.
[21] Tassoni, P and Beith, K. (2002).: Heinemann *Diploma in Child Care and Education*. Oxford Educational Publishers.

The maturation of the central nervous system takes time, and it is linked to brain growth and development. In terms of physical development, from this kind of growth, it affects the development of gross and fine motor skills. As a good example, it can be seen in children between the ages of 6 and 8 years, when there is significant neural growth. This helps children's fine motor skills and improves the fluidity of their movements. It can also be seen in the way that children find handwriting easier and start to enjoy more demanding sporting games.

Whole child development

A child's well-being, learning, growth, socio-emotional, physical, creative, and cognitive capacities are all intertwined and important. We now acknowledge that children's own thoughts, needs, and rights as individuals are important. Children are eager to learn and participate and should be considered citizens from the moment of birth. Maintaining the early childhood characteristics of playfulness, curiosity, and experimentation throughout schooling is critical for children to develop collaboration, problem-solving, and goal-setting skills.

According to Thomsen and Ackermann, nurturing this innate desire to learn and providing avenues for children and to experiment with ideas is at the heart of a 'whole child approach' that values all aspects of development.[22] Research suggests that 'whole child development' empowers children as creative and engaged citizens who can strengthen the well-being of a whole society. It is crucial to nurture children's creative abilities to express themselves, understand others, and make sense of information so that they will be confident problem-solvers in today's world.

One way that the teachers can support the needs of the whole child are to use time and space flexibly, allowing some movement in the classroom and pacing based on learning needs. Teachers can also create many opportunities for peer collaboration; for example, using meaningful group projects to build teamwork skills. Nurturing a respectful relationship among teachers and students, where dialogue and inquiry is encouraged, is also key to fostering whole child development.

[22] Thomsen, S. and Ackermann, E. (2015). Whole Child Development Matters. Retrieved from https://www.edutopia.org/blog/changemakers-whole-child-development-undervalued-bo-stjerne-thomsen-edith-ackermann

Learning activity 1

Draw a timeline to illustrate key ideas and stages of child development. What are the typical characteristics, physically, mentally, emotionally, and socially, which we would expect to see during each age group?

Review questions

1. What is the basic principle of Piaget's Theory of Cognitive Development?
2. How can Piaget's theory be useful to us as teachers in the 21st century?

Unit Summary

Key messages

- Pedagogy is the study of the theory and practice of education. It is concerned with the underlying values and principles that influence our approaches to learning, teaching and assessment. Pedagogical content knowledge (PCK) represents the blending of content and pedagogy into an understanding of how particular aspects of subject matter are organised, adapted and represented for instruction.

- Pedagogical theory or learning theory, helps us understand how concepts and topics should be taught and how we can help individuals to learn. Pedagogical practice is the strategies that teachers use to teach students.

- Teachers often draw on key elements from each of the three major learning theories:
  - **Behaviourism,** which says that learning is behavioural changes.
  - **Cognitivism,** which emphasises that learning occurs through the internal processing of information.
  - **Constructivism,** which says that we construct our knowledge of the world based on individual experiences.

- Children are born explorers and great discoverers. They naturally learn through their five senses. Children learn best when what they are learning has relevance to their own interests and concerns. They also learn by watching and copying adults and other children. Learning comes naturally when children are thoroughly engaged in the process.

- Bloom's Taxonomy in a key theoretical framework for learning that categorises learning objectives from simple to complex or from factual to conceptual across three domains of learning – cognitive, affective, and psychomotor.

- Learning style is a term used to describe the typical way that an individual processes, interprets, and acquires information, knowledge or a desired skill.

- Howard Gardner, a psychologist and professor at Harvard University, observed that every human is endowed with different levels of natural potential. According to Gardner's Theory of Multiple Intelligences, human potential consists of eight forms of intelligence, namely: linguistic, logical-mathematical, visual-spatial, musical, bodily-kinaesthetic, naturalistic, interpersonal (social) and intrapersonal (self).

- A learning model is a framework that describes, step-by-step, the processes that go on in a classroom:

    - **The Mastery-based Learning Model** is based on the principle that all students can attain the lesson and unit objectives when there is appropriate instruction and sufficient time for them to learn. Activities follow a routine cycle of: review, content presentation, practice, and feedback. This cycle is used first with the whole class and then repeated, as needed, with the whole class or individuals until everyone successfully achieves the objective. No student proceeds to new material until the basic material is fully mastered.
    - In the **Inquiry-based Learning Model,** students identify problems, brainstorm solutions, formulate questions, investigate, analyse and interpret results, discuss, reflect, make conclusions, and present results.
    - **Problem-based Learning (PBL)** is a student-centred, inquiry-based model in which learners engage with an authentic problem that requires further research.

- There are many different teaching methods that can be effectively used to teach students. Some of the best known and most widely used teaching and learning strategies include:

    - Direct/traditional lecture (teacher-centred);
    - Demonstration;
    - Hands-on/Inquiry (student-centred); and
    - Collaborative/Cooperative (shared-centred).

- ‘Input-process-output’ is a way to think about the components of a system – for our purposes, the education or school system. Thinking about the IPO model can help us to identify the inputs and processing tasks needed to produce the desired outputs. The elements of IPO are inter-linked and inter-dependent on one another within a system framework.

The term ‘child development’ encompasses a large and many-faceted area of study. Child development theories focus on explaining how children change and grow over the course of childhood. Such theories centre on aspects of development including social, emotional, and cognitive growth.

Unit reflection

Strategies are selected according to the beliefs of the teacher, the needs of the students and the demands of the task. No one who is teaching strategy will work for every student, all the time. As a teacher, you will need to be aware of the impact that the methods you use are having on your students and adjust accordingly.

Understanding the research-based principles that underpin effective learning is a first step towards understanding what works and does not work to promote effective student learning:

- Students’ prior knowledge and experiences affect their learning.
- The way students organise knowledge affects how they learn and apply what they know.
- Students’ motivation makes a difference in how they learn.
- To develop true mastery, students must learn a combination of skills, practice using them, and understand when to apply what they have learned.
- Goal-directed practice, together with targeted feedback, improves the quality of students’ learning.
- The social, intellectual and emotional climate of the classroom affects student learning.
- Students need to be able to monitor and adjust their own approaches to learning in order to become self-directed learners.

An individual's learning style is the product of factors such as sex, age and personality, as well as other influences likely family inheritance and the environment, including relationships with parents, community culture, and the values and practices encountered in schools. People often have a preferred learning style, and it is important to build activities into your teaching that approach tasks with a variety of learning styles in your mind.

Look again at the range of teaching styles. Which of these styles do you recognise in your teacher educators? Which style works best for you as a learner? In which style do you think you would be most comfortable teaching? Do you think different teaching styles might work more effectively in certain subjects or with certain age groups?

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Unit 3

Strategies for Effective Learning

This unit covers many of the inter-related practices that are critical for quality teaching. Some of these important practices include using questions, clear communication, and feedback to support student learning. In this unit, you will also learn about how to implement active, interactive, and cooperative learning in your classroom; how to use differentiation to meet diverse student needs; and how to promote your students' motivation and engagement with their own learning. Throughout Unit 3, you will find practical tips for implementing strategies that will help ensure all of the students in your classroom can learn effectively.

Expected learning outcomes

By the end of this unit, you will be able to:

- Discuss the leading role of the teacher for supporting students to meet learning outcomes;
- Develop different levels of questioning by using Bloom's Taxonomy;
- Discuss how the teacher can communicate clearly and accurately to students;
- Examine the importance of the teacher listening to students;
- Discuss how to provide feedback to students that enhances their learning;
- Describe techniques for engaging students in effective learning;
- Compare and contrast the differences between teacher-centred and learner-centred approaches to learning;
- Apply adjustment mechanisms in teaching and learning situations;
- Provide positive feedback to each other in demonstration;
- Identify the advantages of motivation for effective learning; and
- Explain the importance of student engagement.

3.1. Questioning and leading learning

Questions can be an important tool for learning in the classroom. As a teacher, you can use questions to engage students at the beginning of the lesson, to ask them to connect to prior learning, to spark new ideas, and to check for understanding. In this sub-unit, you will learn how you can support or scaffold, your students' understanding through questions based on Bloom's Taxonomy.

3.1.1. How to lead learning by using questions

Expected learning outcomes

By the end of the lesson, you will be able to:

- Discuss the leading role of the teacher for supporting students to meet learning outcomes; and
- Develop different levels of questioning by using Bloom's Taxonomy.

Questioning for learning

Questions play an important role in the classroom. Questions can introduce a lesson, make connections to prior learning, spark new ideas, and push a student to new limits. Questions can also be used to check for understanding.[23] Ultimately, the goal of questioning is to improve student learning. Thus, a teacher must become a master at developing questions and using them in the classroom. This includes understanding the structure of different types of questions and the cognitive processes that each type demands. It also means knowing strategies for when and how to ask different types of questions.

[23] Cotton, K. (1988). "Classroom questioning". *School Improvement Research Series - Research you can use.* North West Regional Educational Laboratory. Retrieved from https://educationnorthwest.org/sites/default/files/ClassroomQuestioning.pdf.

Scaffolding

In order to develop questions that promote student learning, a teacher must know where a student currently is in his or her knowledge and where he or she needs to go to reach the goals established in the curriculum. Scaffolding, a term used by Jerome Bruner and his colleagues, is the support given by a teacher that allows students to focus on a specific skill they are trying to learn.[24, 25]

Scaffolding builds on Igor Vygotsky's concept of the Zone of Proximal Development which was introduced in Unit 2. Vygotsky's theory recognises that there is a gap between what a student can do on his or her own and what they can potentially do with collaboration and teacher support.[26, 27]

In other words, a teacher can lessen the difficulty of a task by offering guidance or additional tools to the student while the student is learning a new skill. Then, little by little, the teacher removes this guidance and demands from the student to help him or her to truly master the new skill. In order to lead a student's learning in this way, it is important that the teacher know the curriculum well and understand the steps needed for students to be able to achieve the expected learning outcomes.

To 'scaffold' student learning, teachers also need to know their students well. Individual students will have different learning needs. The idea of 'scaffolding' is important in thinking about how you can adjust or adapt your teaching and learning activities to make sure that all students, regardless of their backgrounds or ability levels, can learn. This is often referred to as the practice of 'differentiation' – the adaptions used by teachers to make sure that diverse students within the same classroom can learn. For example, in a Myanmar class, a teacher might differentiate instruction by having students set individual reading goals – on the number of pages they will read – that are achievable for each student, given different reading levels. Alternatively, a teacher might set up times to meet one-on-one with students who need extra support in Maths. Another example of scaffolding or differentiation, would be if a teacher lets students choose from several project options in Social Studies class. You will learn more about differentiation in Unit 3.

[24] Bruner, J. S. (1978). The role of dialogue in language acquisition. In A. Sinclair, R., J. Jarvelle, and W. J.M. Levelt (eds.) The Child's Concept of Language. New York: Springer-Verlag.

[25] McLeod, S. A. (2008). Bruner. Simply Psychology. Retrieved from https://www.simplypsychology.org/bruner.html.

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[27] Shabani,K., Khatib,M., & Ebadi,S. (2010).Vygotsky's zone of proximal development: Instructional implications and teachers' professional development. English Language Teaching, 3(4), 237-248.

Bloom's Taxonomy

Bloom's Taxonomy, which you will remember from Unit 2, provides a useful framework for understanding how learners approach and process knowledge, from simple to complex: Remember, Understand, Apply, Analyse, Evaluate, Create.[28]

You can use Bloom's Taxonomy to scaffold a student's learning through questioning. The first step is to review the unit or lesson that you will be teaching and identify the learning objectives or the expected learning outcomes. If you are developing the learning outcomes, you can think about Bloom's Taxonomy, and the verbs used to describe questions and tasks at the different levels of difficulty.

For example, consider a Social Studies class with the learning objective: 'Students will understand how the Constitution responds to the conflicts in the country's past.' This is a complex learning objective that requires scaffolding. The table below presents an example of a question or task for this learning objective at each level of Bloom's Taxonomy.

Table 3.1. Sample learning objectives using Bloom's Taxonomy

Create	**Propose** a change or amendment to the Constitution.
Evaluate	**Argue** for or against an article of the constitution.
Analyse	**Compare** the Constitutions of two countries, how do the histories of these countries impact the resulting constitutions?
Apply	**Represent** visually the key ideas of the Constitution.
Understand	**Explain** why a constitution is important to a country.
Remember	**Define** constitution.

[28] *Armstrong, P. (n.d.). Bloom's Taxonomy. Vanderbilt University Centre for Teaching.* Retrieved from https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/

Putting it all together

It is the teacher's responsibility to ensure all students learn and that all students receive the necessary support in order to be successful. One way to support students is through questioning that progressively demands higher-level thinking throughout the learning experience but that grows in difficulty as they are ready for it.

Questioning is not just for evaluating a student's knowledge at the end of a unit or lesson. Questions can also be used to help students construct knowledge as part of the learning process. Bloom's Taxonomy can be a guide for developing a bank of questions that you can use throughout the unit or lesson. These questions can be used as part of lesson introductions, collaborative activities and games or other individual assignments. They can help stimulate and stretch students' thinking. You can also think about the different levels of Bloom's taxonomy when you develop formative and summative evaluations so that you can identify where a student is at with his or her learning in order to intervene if necessary. If you are a teacher who is well-versed in implementing scaffolded questioning, you will be able to teach the diverse students in your classroom well.

Learning activity 1

Pick a simple lesson topic from a basic education textbook. Write a 'question bank' of possible questions that you might ask your students using action verbs from each level of Bloom's Taxonomy.

Review questions

1. List some of the purposes of questioning in the classroom.
2. Name the six levels of Bloom's Taxonomy and provide 2 additional action verbs for each level that are not provided in this unit.
3. Explain 'scaffolding' and how it relates to questioning in the classroom.
4. Do you agree with the six levels proposed in the revised version of Bloom's Taxonomy? In other words, do you agree that each level is a prerequisite for the next level or levels?

3.2. Communicating with Students

For each student in a classroom to learn well requires clear communication, where the teacher delivers messages in a way that each student can easily understand, and where listening is valued on both sides of the relationship. It will be your job, as the teacher, to manage these lines of communication and to model effective practices. In this unit, you will learn some effective communication strategies, including ones that can help you set clear goals and provide the feedback that your students need in order to learn.

3.2.1. Effective communication in the classroom

Expected learning outcomes

By the end of the lesson, you will be able to:

- Discuss how the teacher can communicate clearly and accurately to students;
- Examine the importance of the teacher listening to students; and
- Discuss how to provide feedback to students that enhances their learning.

Communication in the classroom

Student learning depends on successful communication in the classroom. Communication is the act of one person (the sender) creating and delivering an idea (the message) to a second person (the receiver). In the classroom, hundreds of messages are communicated in just one lesson. These messages take place between teacher and student and between student and student. The quality of these messages will determine how well each student is able to master the learning objectives.

Messages can be communicated orally, in writing (both in words and pictures) and through the use of body language. It is important to be aware of all the ways in which we communicate so that we can use communication to help, and not hinder learning. It is also important to model effective communication for students. This will help them to adopt good communication practices that allow them to actively participate in their learning and to help everyone in the classroom avoid sending unintentional messages. Successful communication promotes a safe and inviting environment for all learners and allows the teacher to monitor and support the learning of all students.[29]

Elements of effective delivery

Time with students is limited. Because of this, it is important that a teacher communicate effectively. The following are some key elements of effective communication; these are not ranked in order of importance – they are all important parts of communication:

1. **Clarity:** A message that is clear:
   a. is focused on the key messages and avoids distracting details;
   b. is well-paced so that it can be delivered in the time available;
   c. is audible so that all listeners can hear; and
   d. uses language that can be easily understood by the age and level of students.

2. **Accuracy:** A message is accurate when it is correct. It is important that teachers prepare well for class and present information free of errors. Sometimes, students may ask questions to which the teacher does not know the answer. In this case, rather than give

[29] You can learn more about communication skills in Reflective Practice and Essential Skills.

inaccurate information, it is better for the teacher to either invite the student to investigate the answer and share his or her findings in the next class or to offer to provide the answer to the student's question in the next class.

3. **Balance of talking and listening:** A key part of communication is making sure the message has been received. In a classroom, for example, the teacher should seek confirmation from students that they have heard and understood. This may happen without prompting or the teacher may have to ask follow-up questions to make sure the student or students, understood the message.

4. **Body language and tone:** Body language and the tone of one's voice also serve to communicate messages. Consider the comment: 'I see you are working hard.' This could be a very motivating comment if complemented by an upbeat tone and a smile or a hand on the shoulder. This comment, however, also has the potential to be terribly sarcastic if said with a negative tone or a rolling of the eyes. This element of communication is particularly important because sometimes one is not aware of his or her tone or body language. If possible, it is a good idea for a teacher to videotape a lesson every once in a while to check for positive body language and tone, along with the other characteristics of effective communication.

5. **Use of other aids**: Everyone processes information differently. For this reason, a teacher should seek other channels for communicating messages beyond speaking. This might be writing the message on the board or creating a PowerPoint, a graphic organiser or other visual to communicate the same ideas that are being spoken.

You may also have students in your class with speech or language issues who need to find ways other than speaking to communicate. There are many types of Augmentative and Alternative Communication (AAC) that can allow these students to share ideas without talking. AAC might include 'unaided' communication, where only a person's body is needed to communicate through gestures, body language, facial expressions or sign language. AAC might also include 'aided' communication that uses a tool or device – from simple pen and paper to more complex technology-enabled devices – to help students communicate.

These elements of communication can be useful to consider when planning a lesson but they must go deeper than that to be part of a teacher's being. Teachers need to be aware of their communication at all times. Teachers model behaviour for their students and students copy them. Because of this, it is important to be aware of these elements of communication in all interactions with students, not just when presenting new material.

It is particularly important to model good communication when dealing with conflict or misbehaviour. Students need to see that the adult in the classroom can stay calm and use effective communication to find solutions to conflict. By calmly dealing with conflict through communication, students can begin to understand that conflict is a natural part of our life and that there is a correct way to manage it. Managing conflict is addressed in more detail in the unit on classroom environment.

Figure 3.1. Effective delivery

Elements of effective listening

Listening is listed as a key element of message delivery; however, listening deserves special emphasis because how well teachers listen to their students often greatly impacts student motivation and learning. In the classroom, teachers find themselves juggling many tasks such as taking attendance, checking homework organising materials for lesson activities, and presenting new material. The number of different tasks a teacher must do can be challenging and can distract from the most important thing in the classroom – the students.

Students need to be able to ask questions and participate actively in their learning. This will allow the teacher to see if they understand and to identify any areas that require re-teaching. For a teacher to do this requires actively listening to students in a way that encourages them and lets them feel heard. Some ways to model effective listening include:

Eye contact and body language: When a student is speaking, it is important to provide them with undivided attention. This means looking at them and showing them with your body that what they are saying matters. For younger students, this may mean crouching or kneeling down to be at the same level of the student. Walking away from the student, turning one's back, tapping a foot or a finger, and looking at one's watch are some examples of body language that can make a child feel that he or she is not being heard.

Paraphrasing: One way to make sure you understand what a student is saying is to follow up the message with a paraphrase. A common way to paraphrase is the sentence starter: 'So what you are saying is…' or 'So what you want to better understand is…'. By repeating the message to the student in a different way, the teacher can help the student to hear his or her own thinking. It also confirms that the teacher understood the message and gives the student the opportunity to clarify.

Follow-up questions: Sometimes students communicate messages that do not include all the details needed to answer their question or respond to their concern. After paraphrasing, asking additional questions can be a way to better help the student.

These listening strategies help a teacher to develop rapport with a student. Over time, this rapport will develop into trust, a key element in a successful student-teacher relationship that promotes student learning.

You can also use these listening strategies to check if your students are listening and understanding. You might ask students to paraphrase or put something in their own words or you might ask follow-up questions to check their understanding. In addition to the above strategies, you can use other teaching resources, such as samples or pictures, to check if students have heard and understood. Samples or pictures can be a useful questioning prompt; they can also be a visual reminder that reinforces what you have said.

Feed up, feedback, feed forward

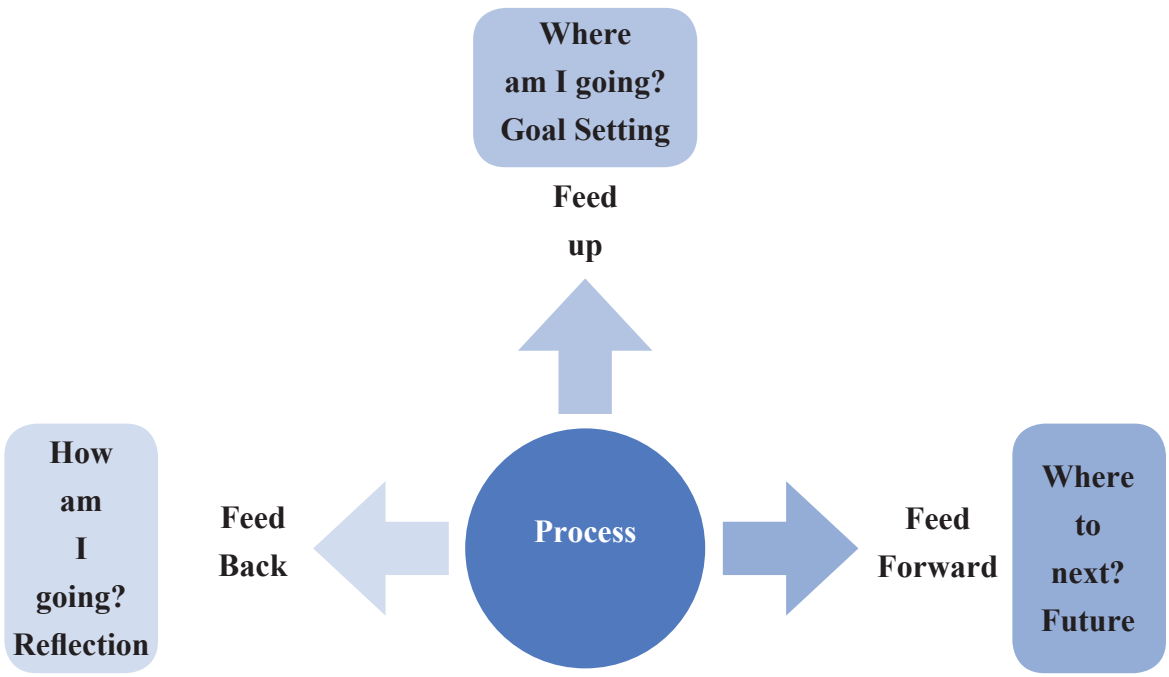
Good teaching is all about good teacher response to the needs of each student in the classroom. Teacher response depends on good communication. Fisher and Frey explain that feedback consists of three components: 'Feed up, feedback and feed forward':[30]

Feed up is the teachers' ability to communicate a clear message about the learning goal. When students know what is expected of them, they can work towards that goal.

Feedback is the teacher's ability to recognise a student's progress towards the established goal or goals. This means giving the student information on what is being done well and what needs to be adjusted in order to reach the goal. Here, both listening and speaking are needed.

Feed forward is the teacher's response to the needs of the students. This might mean adjusting lesson plans in order to review or re-teach a difficult concept. Communication is critical in this process both for the student and for the teacher to advance the learning process.

Figure 3.2. The process of Feed up, Feedback and Feed forward



[30] Fisher, D., & Frey, N. (2009). Feed up, back, forward. *Educational Leadership*. November 2009, Vol. 67, Number 3 Multiple Measures Pages 20-25. Retrieved from http://www.ascd.org/publications/educational-leadership/nov09/vol67/num03/Feed-Up,-Back,-Forward.aspx

In order for students to learn, there must be clear lines of communication between them and the teacher. Clear communication is also needed with parents, as they have an important role to play in their child's learning. Parents can be involved in the 'feed up, feedback, and feed forward' cycle. It is important that they also understand the learning goals for their child and how they can support their child's progression.

It is the teacher's job to manage these lines of communication and model effective practices. Effective communication consists of both speaking and listening. In the classroom, effective communication means making sure students understand the learning goals and receive feedback along the way to help them achieve these goals.

Learning activity 1

Look back on the sections on effective delivery and listening at the beginning of this unit. Which communication skills come easily to you, and which ones do you need more practice on in order to master? In your Reflective Practice and Essential Skills module, you will have the chance to make a 'Personal Action Plan' to help you improve your communication skills.

Review questions

1. What are the elements of effective communication?
2. Why is it important that a teacher listen to his or her students?
3. What is the difference between feed up, feedback and feed forward?
4. What is an example of effective feedback? What is an example of ineffective feedback?

3.3. Active, Interactive, and Cooperative Learning

To help students develop important skills and make connections between ideas, teachers often use active, interactive and cooperative learning strategies. This sub-unit provides you with a 'toolbox' of strategies that you can use to promote active, interactive, and cooperative learning in your classroom.

3.3.1. Designing active, interactive, and cooperative learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe techniques for engaging students in effective learning.

Good teaching pushes students and helps them to develop higher-order thinking skills such as debating, evaluating and creating new ideas. This is not to say that lecturing or direct instruction have no place in the classroom; however, to push students to think critically and to take ownership of their own learning, lecturing cannot be the only method that a teacher uses in the classroom. In the 21st century there is great emphasis on active, interactive, and cooperative learning.

Active learning

Active learning is the implementation of strategies 'which engage students as active participants in their learning during class time with their instructor'.[31] These strategies may include working in small groups, individual work, and opportunities for reflection.

Research shows that active learning has a positive impact on student learning due to motivation, the development of interpersonal skills, and the push towards more complex cognitive processes that allow students to make connections and transfer knowledge. These are things that do not take place during passive learning.[32, 33]

When using active learning in the classroom, it is important to do so through meaningful activities that help students work towards a learning goal or expected learning outcome. You may use active learning activities to help students prepare for an upcoming test or to help them to better understand the main idea of the lesson. If students are not used to active learning, you may wish to explain to them why they are practicing in class or why they might be working in pairs or groups.

It is also important that the teacher remain active during the lesson as well. While students may be working hard and talking to their group members, it is still important to monitor and facilitate this process. This means first planning the details of each activity, particularly the instructions that will be given to the students. During the activity, the teacher can help to keep students on task by asking clarifying questions or reminding them of the goal of the activity. At the end of the lesson, it is good to bring the class back together to summarise the learning. This could mean asking students to share their work or to write reflections about their learning. The end of the lesson is also a chance for the teacher to highlight or emphasise any important points that came up during the activity.[34]

[31] University of Minnesota. (n.d.) Active Learning. *Centre for Educational Innovation.* Retrieved from: https://cei.umn.edu/active-learning.
[32] Ibid.
[33] Prince, M. (2004) Does active learning work? A review of the research. *Journal of Engineering Education* 93 (3) 223-231. https://doi.org/10.1002/j.2168-9830.2004.tb00809.x
[34] University of Minnesota. (n.d.) Active Learning. *Centre for Educational Innovation.* Retrieved from: https://cei.umn.edu/active-learning.

There are many strategies for promoting active learning. Here are a few ideas:

Quick write: After teaching a concept or skill, have students silently write a response to a question about the lesson. Alternatively, you could have them summarise what they have heard or ask any questions that they still have. By requiring them to think and write, they are invited to reflect on the lesson, reviewing it and making additional connections.

Think-pair-share: Just as with the quick write, this strategy gives students time to first recall information on their own. This can be through thinking about a question posed by the teacher, writing an answer to the question or drawing a picture to represent their answer. This first step is important because it requires each student to make his or her own connections.

The second step, 'pair,' allows students to compare answers among themselves. Students are social and enjoy talking with their peers. They also do not enjoy being called on when they are unsure of an answer. This strategy provides everyone the chance to learn and share and be ready to participate as a group.

In the final step, 'share,' the teacher calls on a few individuals to share their ideas with the entire class.

Carousel: This activity requires students to work in groups. Each group gets a piece of flipchart paper with a different concept and different colour marker. The teacher gives instructions such as, 'write the definition.' Each group follows the instructions and then passes their poster to the next group. The teacher then asks the groups to look at the work of the other group and make any necessary corrections.

The teacher next gives another set of instructions such as, 'draw a symbol to represent the concept.' Each time the group finishes, they pass the poster to the next group, who then revises the work and completes the next set of instructions. At the end, the students may be given time to walk around and review all the posters that they have created or to share each poster.

Gallery walk: After students complete an activity in groups where they create a poster (such as Carousel), the work is hung on the wall or left on the floor or on tables. The teacher can then invite students to silently walk around the room and read each poster.

Chalk talk: On large pieces of flipchart paper, write questions about the concept being studied. Invite students to move around the room and answer questions by writing their thoughts directly on the poster. They can 'discuss' with each other by writing signs of agreement such as checks or smiley faces or signs of disagreement such as an X. They can also write comments. This is another great way to get everyone involved, moving, and learning from each other. A modification of this activity could be an advanced gallery walk where students are invited to write comments or feedback on the work of other groups.

Idea line-up or four corners: Create an imaginary or physical line in the classroom or outside the classroom. This line represents a spectrum. One side could be 'agree' and the other end 'disagree,' or another set of opposing responses. The teacher asks a question and the students show their answer by standing somewhere along the line. In some cases, for example, a student may be in the middle because they neither agree nor disagree. After each question, once the students find their places, the teacher should call on a few students to explain or justify their responses.

A modification of this activity is called 'four corners'. In four corners, the teacher labels each corner of the room with a different answer. This could be A, B, C, and D to represent answers to multiple choice questions or answers such as strongly agree, agree, disagree, strongly disagree. Again, once students answer the question by placing themselves in the corresponding corners; the teacher should then ask a few students to explain or justify their answers.

Fishbowl: This is a protocol in which some students complete an activity while others observe, and then provide feedback. An example in a Maths class is to have two students look at a problem; one is the 'student' and one is the 'teacher.' The third student observes as the 'teacher' explains to the 'student' how to solve the problem. When they are finished, the observer gives feedback on how well the 'teacher' did or did not explain the task.

Jigsaw: Jigsaw is a useful reading or investigation strategy. To complete a jigsaw, students are assigned a home group. In the home group, they are labeled A, B, C and D. The students then disperse and organise themselves so that all the As are together, all the Bs together, all the Cs are together and all the Ds are together. Each group is given something to read. This could be a different paragraph, a page of the same reading or four different articles about a similar topic. After each group has read, they discuss the most important ideas from the reading. The students then return to their home groups and each person is responsible for teaching the others in the group about the topic that they read. This helps to develop both leadership and ownership for learning among all the students in the classroom.[35, 36]

Figure 3.3. Engaging learning activity

[35] UC Berkeley. (n.d.). Active Learning Strategies. Berkely Centre for Teaching and Learning. Retrieved from: https://teaching.berkeley.edu/active-learning-strategies.

[36] Slavin, R. (2010). 'Co-operative learning: What makes group-work work?' The Nature of Learning: Using Research to Inspire Practice. Paris: OECD Publishing. 161–178. Retrieved from http://dx.doi.org/10.1787/9789264086487-9-en.

Interactive learning

Interactive learning is sometimes used interchangeably with active learning; however, some definitions consider interactive learning to include the use of computer technology and electronic media. Examples of interactive learning include:

Kahoot and other polling software: Kahoot, and other online options such as Google Forms, allows teachers to develop surveys or quizzes for students. Kahoot is a free option that allows students to connect from a smartphone or laptop. There are also many quizzes already designed, related to many different topics. Points are given for different correct answers, and after each question the top responders are posted. Students enjoy the friendly competition. The teacher may want to provide small rewards to the winners, such as being the first to get into line for lunch or the right to have a small trophy on their desk until the next competition.

Polls can also be used to gather student feedback on the lesson and what they are learning. For example, a quick poll might ask, 'How are you feeling about this topic?' and students can respond: A) Great, I'm ready for the quiz, B) Okay, but I'd like to practice a bit more or C) I need you to explain this concept to me again. When the teacher gets back the results, he or she can determine the correct course of action to respond to the needs of the students.

Khan Academy: Khan Academy is another free online program that allows students to watch video lessons about different topics. They can then answer practice problems and they receive real-time feedback and explanations when they get a problem incorrect. This can be a great tool for differentiating instruction or for when students finish an assignment early.

Blogging: Creating a class blog or having students creating individual blogs, is a great way to get students communicating about their learning. In their blogs, they can write about what they are doing in class. There are a variety of free online blogging options available (Guido, 2017; Gregory & Kaufeldt, 2012).[37, 38]

[37] Guido, M. (2017). 25 Easy Ways to Use Technology in the Classroom [+ Downloadable List]. Prodigy. Retrieved from: https://www.prodigygame.com/blog/ways-to-use-technology-in-the-classroom/

[38] Gregory, G., & Kaufeldt, M. (2012). *Think big, start small: How to differentiate instruction in a brain-friendly classroom.* Bloomington, IN: Solution Tree Press.

Figure 3.4. Interactive learning activity

Cooperative learning

Students may be working in groups in active and interactive learning activities but this does not mean it is necessarily cooperative learning. Cooperative learning increases student motivation because it creates the opportunity for positive social interactions with between students. Cooperative learning is an important skill for the Twenty-first century. The two key elements of cooperative learning that are consistent across many different definitions are: positive interdependence and individual accountability.[39]

Positive interdependence: Positive interdependence refers to students working together towards a shared goal. As they work together, each student is committed to supporting the learning of all the other members of the team while also taking responsibility for his or her own learning. For this to happen, a teacher needs to develop assignments that are well-structure, which means they have clear goals and roles.

[39] Dean, C. B., Hubbell, E. R., Pitler, H., & Stone, B. (2012). *Classroom instruction that works: Research-based strategies for increasing student achievement.* 2nd ed. Alexandria, VA: ASCD.

Clear goals establish the expectations for the assignment; everyone needs to know what it is they have to do. Clear instructions include how much time they have and what the final product should be. Students are more inclined to work well together if everyone knows the goal and feels they can reach it. Assigning roles to each student within a group can also help to ensure successful cooperation. Some common roles include: facilitator, timekeeper, reporter, recorder and resource manager. It is important the students never feel locked into one role. For example, it should never just be girls with pretty handwriting assuming the role of recorder or the top student in class assuming the role of facilitator. Students need to know that they can be given any role at any time. Because of this, teachers should assign the roles instead of having the students decide within their groups. Some teachers develop group and job boards which allow them to quickly shuffle around student names and place them on the board so that students know who they will be working with and what their role will be. When they see the teacher shuffling the names and assigning groups randomly, they realise that the teacher believes every one of them is capable of each role.

Individual accountability: Clear goals and clear roles will motivate students to stay on task and to work together. It is important, however, that each student understands that he or she will be held accountable for the work. Cooperative learning gives students the chance to learn from each other and to build on each other's ideas. Cooperative learning, however, does not allow the teacher to evaluate each individual's learning.

Cooperative learning tasks can be reviewed, and the group can be given feedback; however, there must also be formative and summative evaluations that allow each student to demonstrate their understanding independent of their peers. Students need to understand that working with others is a great opportunity to learn more; it is not an opportunity to take a break and let others do all the work. It is a teacher's responsibility to set a positive tone, but also to make sure students know that they will all be held individually accountable for the learning.[40,41,42,43]

[40] Slavin, R. (2010). 'Co-operative learning: What makes group-work work?' *The Nature of Learning: Using Research to Inspire Practice*. Paris: OECD Publishing. 161–178. Retrieved from http://dx.doi.org/10.1787/9789264086487-9-en.

[41] Gregory, G., & Kaufeldt, M. (2012). *Think big, start small: How to differentiate instruction in a brain-friendly classroom.* Bloomington, IN: Solution Tree Press.

[42] Boaler, J. (2016). *Mathematical mindsets*. San Francisco, CA: John Wiley & Sons, Inc.

[43] Dean, C. B., Hubbell, E. R., Pitler, H., & Stone, B. (2012). *Classroom instruction that works: Research-based strategies for increasing student achievement.* 2nd ed. Alexandria, VA: ASCD.

Figure 3.5. Cooperative learning activity

Active, interactive and cooperative learning strategies allow students to work with each other and interact with the material in way that passive learning does not. These strategies allow them to develop important skills that go beyond the content and to make connections that help them to better retain, recall and transfer the knowledge in the future.

The strategies presented in this unit represent just a small sample of all the different strategies that a teacher can implement in the classroom. The key is to find ways for student to participate in their learning, which means getting them moving, thinking, and talking. These strategies are a good place to begin when one is new to teaching; however, a teacher should continuously be exploring and developing new strategies.

Learning activity 1

Of the active, interactive and cooperative learning strategies listed in this unit, which ones do you think would work best with primary school students in Myanmar? Are there any that you do not think would work in the contexts you will be teaching? Which strategies are you most excited to try out with your future students?

Review questions

1. What is active learning?
2. What is interactive learning?
3. What is cooperative learning?
4. Choose a topic and propose an active learning strategy that could be used to help students better understand or explore the topic.
5. Choose a topic and propose an interactive learning strategy that could be used to help students better understand or explore the topic.
6. Choose a topic and propose a cooperative learning strategy that could be used to help students better understand or explore the topic.
7. What are the benefits of incorporating active, interactive and cooperative learning strategies in the classroom?

3.4. Developing Autonomy and Student-led Learning

In today's world, teachers are no longer solely dispensers of knowledge but must serve as guides or facilitators, of their students' efforts to think critically about, and apply, the massive amounts of information available to them. It is increasingly important that teachers are able to teach students the skills needed to be autonomous, self-directed learners. This unit will help you to think about how you can foster student autonomy as you revisit the advantages and the disadvantages of teacher-centred and student-centred approaches to teaching and learning.

3.4.1. The importance of autonomy and student ownership in learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Compare and contrast the differences between teacher-centred and learner-centred approaches to learning.

The best approach?

In the education world, there is a great deal of discourse focused on student-centred learning and its importance for individual development in the 21st century. The ultimate goal of teaching is that all students learn and master the objectives of the curriculum. In today's world, however, the curriculum goes beyond content-based learning objectives and also seeks to develop 21st century skills. While you will be learning many student-centred strategies in your Education College programme, this unit examines both teacher-centred and student-centred approaches. A good teacher must know the strengths and weaknesses of both approaches in order to choose a course of action that responds to the needs of all students. The best approach to teaching is often a balanced approach that employs both teacher-centred and learner-centred methods, as appropriate.

Teacher-centred classrooms

Reference to a teacher-centred approach or a teacher-centred classroom often conjures up images of the traditional classroom with the teacher as the authoritarian leader in front. Students sit in rows, silently taking notes and only speaking when called upon. In this concept of teacher-centred classroom, the teacher creates the rules and the consequences with no input from the students. The teacher transmits his or her knowledge to the students. The students cannot learn without the teacher.[44] Today, we consider this scenario to be outdated, especially as anyone can access information on the internet. Nowadays, teachers need to be prepared to help students navigate the wealth of knowledge available by helping them develop skills.

There is, however, evidence to suggest that a teacher-centred approach can be useful and appropriate. You learned about John Hattie's famous meta-analysis study of effective teaching strategies in Unit 2. In this study, direct instruction, which is teacher-centred, had the greatest effect on student learning. In direct instruction, a teacher explicitly teaches the material.[45]

[44] Garrett, T. (2008). 'Student-Centred and Teacher-Centred Classroom Management: A Case Study of Three Elementary Teachers'. *Journal of Classroom Interaction, ISSN 0749-4025. Vol 43.1, pp. 34 - 47.* Retrieved from: https://files.eric.ed.gov/fulltext/EJ829018.pdf

[45] from: http://www.evidencebasedteaching.org.au/direct-instruction-facts-myths/

Direct instruction can be motivating for students because they can quickly see the relationship between what is being taught and the progress in their learning. Additionally, direct instruction ensures that key ideas or skills are transmitted to all the students; this can be difficult to do if students are learning at their own pace or working on different material. With direct instruction, there may also be opportunities for students to learn discipline through clear structure, note-taking, and independence.[46,47] Direct instruction can and should also be active, with students engaged and participating in the lesson.

To make the most of direction instruction, teachers need to have a clear structure to the lesson that includes:

- a connection to prior learning;
- a clear goal;
- a brief introduction to new material that explicitly models new skills; and
- opportunities for guided practice as well as individual practice that allow students to get timely and specific feedback.

Direct instruction can be a particularly valuable strategy for teachers who are new to the classroom. Instead of trying to manage groups working on various activities, direct instruction allows the teacher to focus on delivering one set of instructions and examples clearly. Direct instruction gives the teacher more control over the environment and student behaviour. Over time, new teachers can then develop additional strategies, for example, implementing cooperative work and differentiation.[48,49,50]

Figure 3.6. Teacher-centred instruction

[46] The Room 241 Team. (2012). Teacher-centred vs. student-centred education? *A blog by Concordia University-Portland*. Online. Retrieved from: https://education.cu-portland.edu/blog/classroom-resources/which-is-best-teacher-centred-or-student-centred-education/

[47] Schug, M.C. (2003). Teacher-centred instruction. In J. Leming, L. Ellington, & K. PorterMagee (Eds,) Where did social studies go wrong? (pp. 94-110). Washington DC: Thomas B. Fordham Foundation. Retrieved from: http://lexiconic.net/pedagogy/TeacherCentredSocialStudies.pdf

[48] Schug, ibid.

[49] Killian, ibid.

[50] Hattie, J. (2009). *Visible Learning: A Synthesis of 800 Meta-Analyses Relating to Achievement*. Routledge.

Student-centred classrooms

There are also good reasons to promote student-centred instruction. In a classroom, there are content-based goals that a teacher must teach but there are also goals that go beyond the module material, particularly those skills essential for success in the 21st century. These skills include communication, collaboration, critical thinking, and creativity.[51] Students develop many of these skills through opportunities for group work and for self-direction.

Surprisingly, in Hattie's research, student-centred instruction does not appear to have a positive effect on student learning.[52] This is most probably due to the fact that student-centred instruction is complex. If is not designed well and implemented effectively, it can result in wasted time and limited progress. However, when done well, student-centred instruction can be powerful. In addition to developing 21st century skills, effective student-centred teaching allows students to learn from their peers and to move at a pace that is right for the individual. In general, student-centred learning differentiates instruction to meet the individual needs of each student.[53]

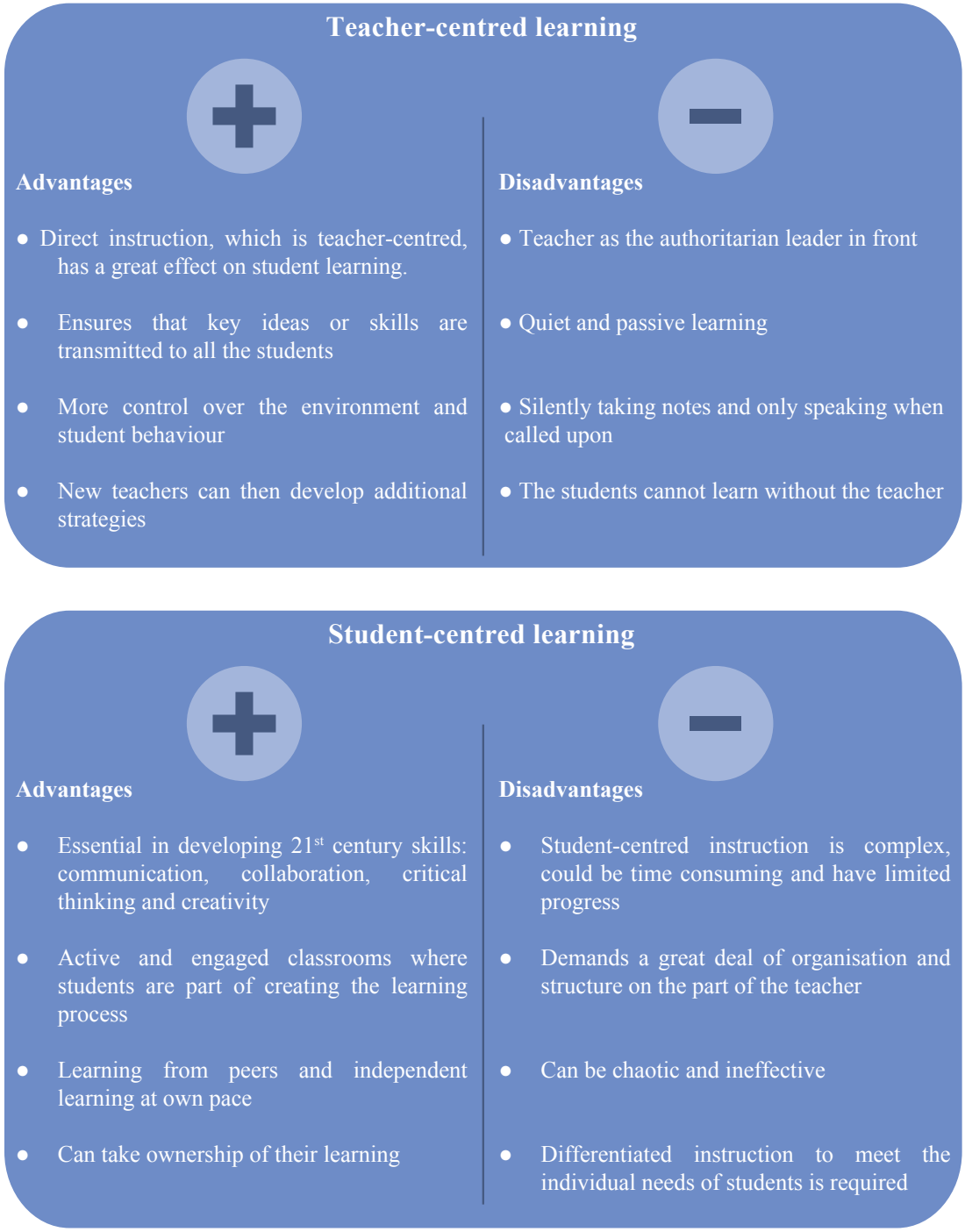
To successfully use a student-centred approach in the classroom, a teacher must be familiar with many other concepts in this unit including: active, interactive, and cooperative learning; differentiation; and effective communication and feedback. Additionally, a teacher must develop a classroom management style with a positive relationship between the teacher and student and consequences that respond to the individual differences of each student. Additionally, a student-centred approach allows students to share management responsibilities with the teacher and to take ownership of their own learning and the learning of others in their class.

Student-centred instruction brings students to the front and centre, making decisions about their learning, sharing with each other, and reflecting on the process. It also demands a great deal of organisation and structure on the part of the teacher. Without the correct amount of forethought and preparation, student-led learning can be chaotic and ineffective.[54,55]

[51] P21. (n.d.). Framework for 21st century learning. P21 Partnernship for 21st century Learning. Online. Retrieved from: http://www.p21.org/our-work/p21-framework.
[52] Hattie, ibid.
[53] The Room 241 Team, ibid.
[54] Ibid.
[55] Killian, ibid.

There are valuable elements in both teacher-led and student-led instruction. The key is finding the correct balance between the two so that all children can both learn the content and develop the skills needed to successfully contribute to society.

Figure 3.7. Teacher-centred learning and student-centred learning



The importance of developing autonomy

One of the greatest arguments for shifting to a student-centred approach is the need to develop autonomy in students. Henri Holec's definition of autonomy is 'the ability to take charge of one's learning'.[56] In this information-rich world, teachers are no longer the keeper of knowledge. Students can easily access information beyond a textbook and beyond a teacher's lesson. There are videos, free online curricula, and educational games.

With all this available information, there is also a lot of misinformation to be found. Thus, the teacher's role is shifting along with the approach in the classroom. Teachers are now guides or facilitators of learning who must teach students how to take advantage of the plethora of resources available and to filter out the good from the bad. Teachers must also give students the skills to make sense of this information - to read, to interpret and to apply what they find. You can learn more about developing your skills to select trustworthy resources in Reflective Practice and Essential Skills.

When students are able to work autonomously their belief in their abilities improves. They see a relationship between their effort and their learning, and they strengthen their critical thinking and problem-solving skills.[57] To develop autonomy requires intentionally planning classes that provide the following elements:

Clear goals: For students to work autonomously, they must have a clear picture of what they are trying to accomplish. The teacher must provide clear learning goals so that a student working independently can determine what he or she needs to do and can recognise when the goal has been reached.

Metacognition: Metacognition is how one thinks about his or her thinking. For students to become autonomous, they must develop strategies for monitoring their learning and understanding. A student must learn how to identify his or her strengths and weaknesses so that he or she can make adjustments and seek help when needed. Some effective strategies for promoting metacognition include: self-assessment and peer-assessment, use of signals to communicate need for assistance, and use of resources for verification.

[56] Cited in Nunan, D. (2003). Nine steps to learner autonomy. *Symposium, 2003*, 193–204.
[57] Boyadzhieva, E. (2016). Learner-centred teaching and learner autonomy. Procedia - Social and Behavioral Sciences. Vol. 232, 14 October 2016, Pages 35-40. Online. Retrieved from: https://www.sciencedirect.com/science/journal/18770428.

Self- and peer-assessments provide students with rubrics or checklists of statements about what they should be learning or should be able to do, through an assignment or project. This helps students understand the learning goal and important parts of the assignment. It lets them track their progress towards the goal. Peer assessment gives students the chance to learn from the work of others. It also helps students to practice applying the established goals to evaluate the work of their classmates and their own work. Teachers can create space and time for students to complete self-assessment and peer-assessment, especially when students are learning how to use these tools and to think metacognitively.

Another strategy for helping students monitor their understanding is through the use of signals to communicate their need for assistance. There are various versions of this strategy; for example, using the traffic signal colours of red, yellow, and green. In this example, each student or each group has either a red, yellow, and green cups or pieces of paper. They display the colour to communicate how they are feeling about the work. When green is displayed, the signal to the teacher is that the student or group, is making progress and does not need assistance. Yellow communicates that the student or group, is struggling and has some doubts that they would like the teacher to resolve. Finally, red communicates the individual or group, is stuck and cannot move forward; immediate intervention from the teacher is needed. This strategy invites students to be independent, but also gives them support when they decide it is needed.

A third strategy is to create resources that can help students to verify answers or understanding. One popular strategy is to have students seek assistance from their peers before they can ask the teacher. This lets students think twice about if they really need assistance or if they can figure out the answer themselves. It also teaches students to consider all the resources available to them and not to see the teacher as the only source of knowledge. This is a valuable lesson for developing autonomy and independence.

Another strategy in providing additional resources is to have resource files or answer keys available for the students. Teachers who have technology available in the classroom may wish to create an online folder or webpage that students can reference for extra help. The reference files may be word documents with answers and explanations or they may be videos or other resources related to the students' work.

Choice: Teachers can also help to develop autonomy in their students by offering them choices. This can be as simple as presenting two different problems and allowing each student to choose the one he or she would like to answer. This might also be a menu of activities that aligns to a particular learning goal and allows students to choose the option that best suits their personal interests or needs. This helps students to develop decision-making skills and autonomy by helping them to see that they have the criteria to choose which option is best for them. [58,59,60]

Autonomy is necessary in today's world. Teachers need to create opportunities for students develop autonomy, along with other skills needed in the 21st century. In designing learning activities, teachers need to consider the goal of the unit or lesson and choose the approach to learning that will best meet the goals. In some cases, a teacher-centred approach will achieve the desired outcomes; in other cases, a student-centred approach will be more suited to the task. As a teacher, you will need to be able to make these important decisions and have the strategies to execute them effectively.

Learning activity 1

Make a list or chart of the 'pros' (the strengths or points in favour) and 'cons' (the drawbacks) of a teacher-centred approach and of a student-centred approach to classroom teaching.
While a mix of both types of strategies is recommended, do you lead more towards one approach over the other? Why?

Review questions

1. What are the differences between a teacher-centred approach and a student-centred approach?
2. What are the advantages and disadvantages of each approach?
3. What is autonomy?
4. Why is the development of autonomy in today's students so important?
5. What are some ways the teacher can develop autonomy in students?
6. Is a teacher-centreed approach or a student-centred approach better for developing the autonomy of students? Explain.
7. What are ways that a teacher can get to know his or her students? Why is this important?

[58] Nunan, D. (2003). Nine steps to learner autonomy. *Symposium, 2003*, 193–204.
[59] Hockett, J. & Doubet, K. (2017). '6 strategies for promoting student autonomy'. Edutopia. Retrieved from: https://www.edutopia.org/article/6-strategies-promoting-student-autonomy
[60] Boaler, J. (2016). *Mathematical mindsets.* San Francisco, CA: John Wiley & Sons, Inc.

3.5. Responding to Need and Adapting to Circumstances

Each student in your classroom is unique. For all students to be able to learn, you will need to get to know each child as an individual and to ensure that the curriculum and classroom environment allows each child to succeed. This sub-unit provides practical tips for you to better understand the students in your class, adapt the curriculum as needed, and provide a classroom climate that is conducive to learning.

3.5.1. Meeting individual student needs

Expected learning outcomes

By the end of the lesson, you will be able to:

- Apply adjustment mechanisms in teaching and learning situations.

Getting to know your students

In the classroom, not all students are alike. In fact, each student comes to the classroom with different abilities, prior experiences, interests, and life situations. To ensure that every student achieves the learning goals, teachers must respond to the uniqueness of each child. Thus, the teacher must get to know each student. There are many strategies for getting to know students, including: reviewing available student data, collecting information about students' interests, preferences, and abilities through a variety of planned activities throughout the school year; and engaging with students outside of the classroom.

In some cases, schools have a wealth of data about students. This data may include basic demographic information and students' academic record (for example, grades and standardised test scores). These records may offer insights about students' academic strengths and weaknesses, physical or cognitive disabilities, and general information about their academic performance. This information can help teachers to get a sense of their students' prior academic experiences before the school year begins.

Students themselves can also provide valuable information. Teachers can create opportunities for students to share information about themselves. This information can include hobbies, interests, preferences, and how students learn best. Some teachers design games that allow students to share this information with the whole class so that it also becomes a community-building activity. Another approach is asking students to write a letter at the beginning of the year that shares three things that they would like the teacher to know or to complete a survey about their learning preferences. Every one of these strategies will provide additional information to help the teacher better understand the diversity in the classroom and to make decisions about how to help each learner.

Figure 3.8. Getting to know the students

A third recommendation for getting to know students is to engage with them outside of the classroom. When you are a teacher, you may sit with students at lunch and talk with them. You can ask them questions about their lives during break time. Or you may stay after school and support students in their sports competitions or other events.

When teachers take the time to get to know their students, they are better equipped to respond to the needs of each student. When they know their students well, they can make adjustments in class that result in greater achievement of all students.

Adjusting the curriculum

Today's classrooms are extremely diverse, however, there is a great deal of brain research available to help us understand how learning takes place. We now understand that we all approach learning a bit differently based on our interests, experiences and abilities. We also now know that the brain is powerful. The brain adapts and grows when given the right stimulus. Teachers, therefore, need strategies to respond to this need and variety in the classroom.

Carol Ann Tomlinson is well-known for her work on how to adapt or differentiate instruction to meet the needs of each student. She explains that differentiation is a way to provide different options and pathways for students to make sense of ideas so that each student can learn effectively.[61] This can be done by adapting the content itself, the process of learning or the product you are asking students to create.

Universal Design for Learning or UDL, is another well-known approach to adapting the curriculum to respond to individual student's situations.[62] It recognises that students come to the classroom with different interests, strengths, and weaknesses. According to UDL, the curriculum content, the process of learning, and what teachers ask students to do can be adapted or changed, so that each student can learn.

The first step in adapting the curriculum is to identify clear learning goals for the students. A teacher must know what it is that he or she would like the students to understand, know, and be able to do. The teacher can then identify if any student is likely to face barriers to mastering the established learning goals. Based on UDL, the teacher would then think about how to present the material or lesson, is a way that even children facing these barriers can understand. This might mean presenting material in multiple ways; for example, through video, pictures, drawings or other visual models, readings, and/or hands-on discovery activities.

[61] Tomlinson, C. A. (2005). *How to differentiate instruction in mixed-ability classrooms*. Upper Saddle River, NJ.
[62] Cast, Inc. (2018). *Until learning has no limits.* Retrieved from http://www.cast.org/

Once the new material has been introduced to the students, they will need time to interact with it. UDL calls this action and expression. Tomlinson calls this process and product. The teacher must consider multiple ways that the students can practise so they can make sense of the concepts. The teacher also needs to think of multiple ways that the students can demonstrate their learning. For example, not all students do well on exams. If the only chance they get to prove their learning is on an exam, neither the teacher nor the student is likely to realise how much has actually been learned.

There are many strategies for adapting curriculum. Here are a few ideas for how to differentiate when you present new material and when you ask students to demonstrate their learning:

Compacting: At the beginning of a unit, assess what students know and do not know. For students who already have mastered many of the learning goals, you can have them skip some learning activities and assign more challenging tasks that will help them to further develop the knowledge and skills.

Varying reading selections and resources: Students do not necessarily need to read the same thing if they can share what they are learning with each other. You can select readings and other resources that respond to the readiness or interests of each student. Here may be a good place to make use of the jigsaw strategy mentioned in Unit 3.4.

Mini-lesson: After teaching a concept to the whole class, you can build in time to re-teach the concept to a smaller group of students who may need extra support. During this time of re-teaching, you can allow the other students to practice in small groups or independently.

Choice: Choice develops self-direction and autonomy in students. It also responds to the differing needs of students. Creating various activities that meet the same learning goal is a great way to allow students to work at their own level and progress at their own pace.

Two ways to organise choice activities are through centres and tiered assignments. In centres, the teacher designs several different activities and places them at stations or centres, that allow students to sit with others who are working on the same activity. In this way, when students encounter a challenge, they have other classmates to ask for help.

Tiered activities offer a menu of activities or tasks, at scaffolded levels aligned to learning goals. Again, students can choose the activities that they find most interesting or most aligned with their personal style. Another term for tiered activities is layered curriculum.

Various points of entry: in addition to having choice, students need to experience ideas in different ways. The teacher should design a variety of activities that support the same learning goal but from different points of entry. Some ways to vary activities include incorporating technology, incorporating movement or using manipulative so that students can understand a concept concretely. Activities can also incorporate music, drawings, drama and many other actions that go beyond simply reading and writing.

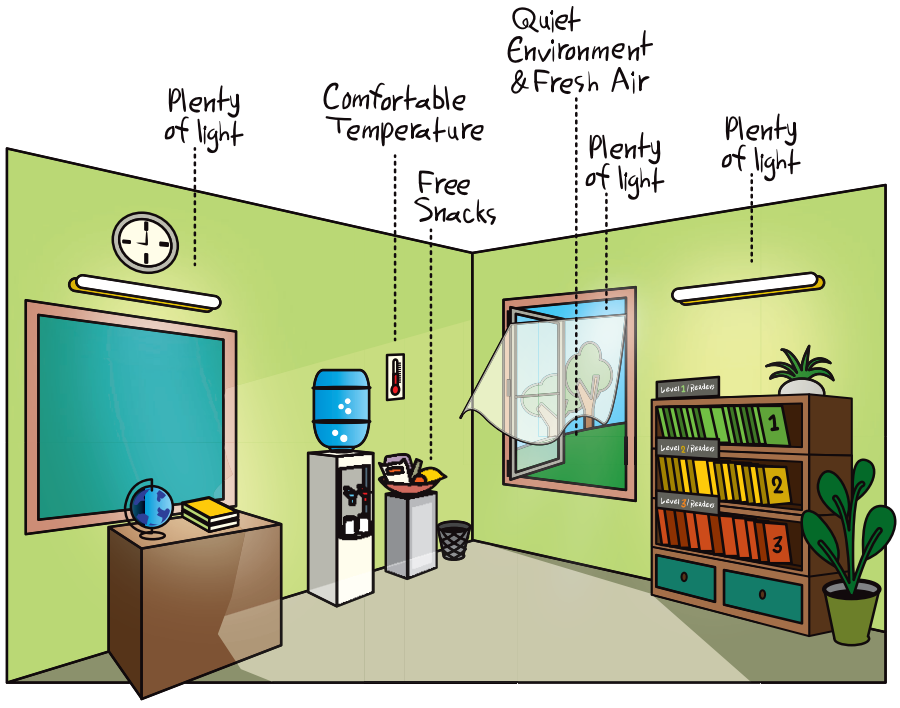
Adjusting the classroom environment

Adapting the curriculum will only impact the learning of all students if students come to school with their basic needs met or if the school helps to meet these basic needs. If a student is cold, hungry, tired, sick, scared or stressed, the likelihood of successful learning is diminished.

Gregory and Kaufeldt suggest that a teacher must make the environment 'brain-compatible'.[63] A brain-compatible environment sets the stage for learning. It includes the physical environment and the basic needs of the students to feel cared for and safe. Depending on the setting, a teacher may need to consider variables in the classroom such as light, temperature, air quality, and external noise levels that may impact students' ability to focus. A teacher may also need to consider if a student is hungry, thirsty, tired or stressed. A teacher needs to be an advocate for students. If a teacher feels that any of these factors are impacting a student's ability to learn, action should be taken to find creative solutions. For example, in a hot classroom, a teacher may hold a class outside in the shade one day. If students are coming to school hungry, a teacher may keep snacks stored in the classroom. For students who are stressed or have other emotional challenges, the teacher also needs to find strategies for supporting these children so that the classroom becomes a safe place for them. These are not simple challenges, but they are important and require a dedicated adult who will work to overcome them.

[63] Gregory, G., & Kaufeldt, M. (2012). *Think big, start small: How to differentiate instruction in a brain-friendly classroom*. Bloomington, IN: Solution Tree Press.

Figure 3.9. The learning environment



For all students to learn, a teacher must get to know all the students and prepare to make adaptations to both the curriculum and the learning environment to ensure that each child can succeed.

Learning activity 1

Based on what you learned in this unit and your own ideas, what are the some ways you can:

- Get to know your students?
- Adapt what and how you teach in order for all students to learn?
- Make sure your classroom environment is a place where all students can learn?

Review questions

1. What are ways that a teacher can get to know his or her students? Why is this important?
2. What is differentiation? How can the curriculum be differentiated?
3. What are some factors to consider when adapting the classroom environment?
4. What are some of the challenges to adapting the teaching and learning situation? What makes it worth the effort?

3.6. Providing Positive Feedback

Feedback that affirms a student's worth and potential while also encouraging growth can be a powerful tool and motivator for learning! This unit introduces the idea of using feedback to promote a 'growth mindset' and provides practical tips for making sure that the feedback you offer students can positively effective their learning.

3.6.1. Offering positive feedback to promote learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Provide positive feedback to each other in demonstration.

Recognising the strengths in students

Diversity in the classroom is a reality. In a classroom of 30 students, each one student will have his or her own strengths and areas for improvement. For a teacher to make sure each student learns, he or she needs to reach each student. Unit 3.5 provided ideas for adjusting curriculum and the classroom environment to reach each student. Just as students need to experience learning in a variety of ways, students need teachers who can recognise what they are doing well and what they need to work on.

Good teachers make each student feel valued by recognising their strengths and pushing them to do more. Reinforcing effort and recognising students helps them to develop a belief in their own abilities and self-motivation.[64] A good teacher knows this and knows that getting to know students goes much further than planning better lessons. It is about building relationships with students and pushing them to be the best version of themselves.

Growth mindset

The type of messaging that students receive from teachers and parents can impact their beliefs about their identity, who they are. In her book *Mindset,* Carol Dweck talks about the ideas of 'fixed' mindset and 'growth' mindset.[65] She explains that fixed mindset is the belief that we have a set of established characteristics that we cannot change. Growth mindset, on the other hand, is the belief that we are capable of continuously growing and changing through conscious effort and hard work.

For example, a child who continuously receives message about how smart she is may avoid challenging herself because she does not want to fail or sees no need to push herself. This is a fixed mindset. On the other hand, a child who is congratulated for working hard and for learning from his mistakes will believe that there is value in trying and that with hard work he can do anything. This is a growth mindset.

To foster a growth mindset in students, in their feedback, teachers need to focus on the value of hard work and effort.[66]

Providing positive feedback that promotes hard work

When providing feedback, it is important to carefully select language that both recognises the strengths of the students and provides encouragement for them to improve further. When students excel, it may be tempting to provide them with feedback such as 'Excellent' or 'Perfect!' However, this feedback, although positive, may result in the student working for approval instead of for a love for learning. It can also foster the belief that excellence is when things are easy or can be done quickly.

[64] Dean, C. B., Hubbell, E. R., Pitler, H., & Stone, B. (2012). *Classroom instruction that works: Research-based strategies for increasing student achievement*. 2nd ed. Alexandria, VA: ASCD.
[65] Dweck, C. S. (2008) *Mindset: The new psychology of success.* New York, NY: Ballantine Books.
[66] Dean, ibid.

When students fail, it is also important for teachers to be aware of messaging. Some teachers try to comfort students by saying, 'I know math is not your strength, so do not worry.' Others may reprimand the child for a poor performance: 'You are clearly not trying.' The first example may leave a student feeling that her efforts are sufficient because she is no good at math. The second may have the same effect, especially if the student did study, but is really struggling; he may decide there is no use in trying because the teacher thinks he is lazy or irresponsible.

Figure 3.10. Providing positive feedback

In contrast, messaging that promotes a growth mindset recognises the efforts of the student and prompts them to go a bit further with clear steps on how to do so.[67,68] The teacher might do this by asking questions about the students' learning or connecting the work to other concepts.

[67] Ibid.
[68] Dweck, ibid.

For example, for a student who is excelling and easily accomplished the task for writing a complete paragraph with a main idea, three supporting sentences and a conclusion. The teacher might say, 'I see that you have the parts of the paragraph that we discussed. How did you choose your three supporting sentences? Are there others that you could have used? Tell me about your thinking.' This response recognises that the student is meeting the learning goal but it also promotes the idea that there is always room to grow and expand one's thinking. Students who become accustomed to this form of feedback will connect good grades with hard work and effort.

If a student is struggling to write the paragraph, the teacher might say, 'I see that you have written a main idea. Remember that you now need three supporting sentences. What might be some details that support your first sentence? There is no rush. Take your time to create a list of ideas and then choose the three that you like best. You can do this, but you have to stick with it. If you want, we can choose the three ideas together, once you have written your list.' This type of response provides support while encouraging the student to not give up.

Other tips for effective feedback

In addition to developing feedback that is positive and promotes a growth mindset, it is important that feedback is timely, specific and criterion-referenced, and clear:

Timely: Students are able to better improve their learning when they receive feedback on work that they can remember. Thus, the best idea is to give immediate feedback in class while students are working on a skill. When giving feedback on written formative or summative evaluations, a teacher should review and turn back an assessment in as few days as possible so that the student still remembers the work.

Specific and criterion-referenced: Feedback should be aligned to objectives that students know they are working towards. Focusing on established learning goals helps students to focus on their own progress in comparison to the goal, instead of in comparison to others' performance.[69] Feedback may include a rubric but regardless it needs to explain what the student is doing to meet the learning goal and how he or she can improve in mastering the goal.

[69] Dean, ibid.

Clear: Students must understand the feedback that is being provided to them. A teacher needs to make sure that the language used is accurate and is at the right level for the students.[70]

There is an art to providing feedback that both values where students are at the moment and also encourages them to keep working. Many teachers grew up in an environment that celebrated 'intelligence' over effort, so changing this way of thinking can be a challenge. Teachers need to take the time to analyse the feedback that they are providing and think about if the language promotes a growth mindset. By reviewing and adjusting language, growth mindset messaging will turn into a habit over time, positively impacting student learning and effort.

Learning activity 1

With a partner, brainstorm and try out examples of feedback that encourages a 'growth mindset.'

Review questions

1. What is the difference between a fixed mindset and a growth mindset?
2. Write three examples of feedback that promote a fixed mindset and explain how each of these comments might hinder the learning of the student.
3. What some other important elements of feedback that a teacher should remember? Why are they important?

[70] Pollack, J.E. (2007). *Improving student learning one teacher at a time.* Alexandria, VA: ASCD.

3.7. The Importance of Motivation for Effective Learning

Student motivation is an important part of student learning. Students are unlikely to learn if they are not motivated, either through intrinsic or extrinsic means. This unit will help you think through ways you can capture students' interest, respond to their emotions, and emphasise the importance of learning, empowering them to take ownership of their learning.

3.7.1. Motivating students for effective learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify the advantages of motivation for effective learning.

Motivation for effective learning

There is a positive relationship between student motivation and student achievement.[71] Understanding what motivates students, as well as how to motivate them, is important for classroom teachers. According to Gredler, Broussard and Garrison, motivation is 'the attribute that moves us to do or not to do something'.[72] Motivation is closely related to engagement and with attention, interest, effort, enthusiasm, participation and involvement.[73]

[71] Dean, C. B., Hubbell, E. R., Pitler, H., & Stone, B. (2012). *Classroom instruction that works:* Research-based strategies for increasing student achievement. 2nd ed. Alexandria, VA: ASCD.

[72] Cited in Lai, E.R. (2011). *Motivation: A literature review.* Pearson. Retrieved from https://images.pearsonassessments.com/images/tmrs/Motivation_Review_final.pdf.

[73] Marzano, R.J. & Pickering, D. (2011). *The Highly Engaged Classroom*. Bloomington, IN: Solution Tree Press.

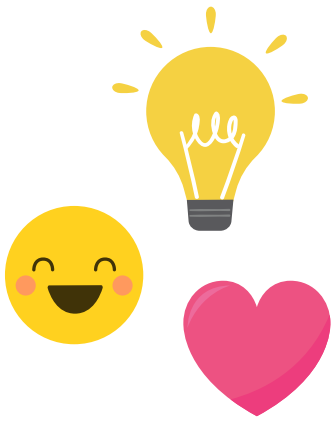
Students will likely have different levels of motivation. Motivation is deeply connected to one's values, experiences, beliefs and perceptions. There are two types of motivation: extrinsic motivation and intrinsic motivation. Extrinsic motivation is when an individual is motivated to perform an activity to earn a reward or avoid a punishment. Intrinsic motivation, on the other hand, is when an individual is motivated to perform an activity for its own sake and personal rewards.

Consider this example: Phyu Phyu and Kaung Myat are students in the same biology class. Phyu Phyu loves nature, especially animals. She wants to be a veterinarian when she grows up. Kaung Myat does not find science particularly interesting, but his parents have told him that if he gets top marks in all his classes this term, he will get the video game he has been wanting. The Biology unit they are studying is about biodiversity and conservation. Phyu Phyu comes home in the evening and investigates threats to biodiversity. She thinks about what she can do to make a difference where she lives. Kaung Myat decides to just study his notes carefully before each quiz. Both students will get good marks, but what is motivating each one to do well?

Phyu Phyu is intrinsically motivated. She is driven by her personal or internal, desire to learn. She would take time to learn about nature and wildlife and other related topics whether or not she was evaluated on it. Kaung Myat is extrinsically motivated. He is drive by external factors that prompt him to study. If there were no quiz or no promise of a video game, he might not study or make an effort to learn the material.

Figure 3.11.

Extrinsic motivators



Intrinsic motivators

In the classroom, teachers often use extrinsic rewards and consequences to influence desired behaviours. While rewards may result in the desired outcome, they do not result in long-term impacts on student motivation. When the extrinsic motivator is removed, student commitment to the goal may decrease or cease to exist.

It is desirable to develop intrinsic motivation in students; however, this is more complex and takes time. Additionally, not all students will be intrinsically motivated by school or learning. Thus, a combination of both intrinsic and extrinsic rewards are considered the best approach in the classroom.[74,75]

Strategies for motivating students

The following strategies, from the work of Marzano and Pickering,[76] can be used to promote student motivation and student engagement (which you will focus on in the next unit).

Using emotions: A teacher can work to incite emotions that motivate students. Marzano and Pickering explain that how a student feels is connected to his or her energy level, the

[74] Lai, ibid.
[75] Walkgrove Limited. (2015). *Engagement and Motivation: Improving learning outcomes.* Retrieved from https://www.walkgrove.co.uk/assets/resources/ Engagement-and-motivation.pdf.
[76] Marzano & Pickering, ibid.

teacher's attitude or presentation, and the degree to which a student feels connected to his or her peers. Some strategies for fostering positive emotions include:

- **Movement:** When students are low energy, teachers can use movement to get the blood flowing - bringing oxygen to the brain. Movement also helps with memory. Movement can be used for a simple stretch break. It can also be incorporated into other learning activities such as gallery walks, chalk talks, four corners, and other activities highlighted previously.

- **Joy, humour, and enthusiasm:** Doug Lemouv refers to this as the joy factor. If students are having fun, they are going to learn more. Laughing creates community and increases blood flow to brain.[78] Strategies for bringing joy to the classroom include having a joke-a-day, using humorous pictures to start a discussion, and using song and dance in the classroom.

- **Connections:** Students need to feel that they are a part of a community or a family. They also need to feel that the teacher cares for them. Taking the time to build relationships with the students and for students to show care for one another can actually help learning. Simple strategies include leaving a note for a student when he or she is absent or having another student leave the note. It is also a good habit to include activities where the students can help each other such as in collaborative activities.[79,80,81]

Fostering interest: Interest refers to gaining and maintaining students' attention. As discussed in Unit 3.5, teachers need to know their students to know what sparks their interest. Then teachers can build on their students' existing interests and generate new interest. Gregory and Kaufeldt explain that, depending on age, a student will have the ability to stay focused on the same topic or activity for between five and 15 minutes.[82] Because of these relatively short attention spans, teachers must maintain interest through novelty and changes that elicit curiosity.

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[77] Lemouv, D. (2010). Teach like a champion: 49 techniques that put students on the path to college. San Francisco, CA: Jossey-Bass.
[78] Gregory, G., & Kaufeldt, M. (2012). *Think big, start small: How to differentiate instruction in a brain-friendly classroom*. Bloomington, IN: Solution Tree Press.
[79] Silver, H.F. & Perini, M. (2010). The 8 C's of engagement: How learning styles and instructional design increase student commitment to learning. In R. Marzano (Ed.) *On excellence in teaching* (pp. 319-344). Bloomington, IN: Solution Tree Press.
[80] Gregory & Kaufeldt, ibid.
[81] Bailey, R. (2001). Conscious Discipline. Oviedo, FL.: Loving Guidance.
[82] Gregory & Kaufeldt, ibid.

You can include the following elements in your lessons to foster student interest:

- **Curiosity:** Develop hooks such as questions, funny videos or stories to make students wonder about what is going to come next or how the hook relates to the lesson topic.
- **Controversy:** Present information that generates debate and allow students to react and discuss among themselves.
- **Competition:** Friendly competition amongst students will engage students in the work. These games should never have a grade or other serious consequence attached, but may have an inconsequential prize such as being the first to go to lunch or receiving a certificate or a silly award.[83,84]

Promoting perceived importance: Perceived importance refers to the teacher's ability to create activities that allow students to make direct connections between the tasks in the classroom and their larger goals.[85] These goals should have real-world connections, showing the students how the learning will be applied in the future.

Building perceptions of efficacy: To motivate students, a teacher should incorporate strategies that develop students' sense that they are able to achieve the goal or complete the task. To do this requires many of the strategies already discussed in this unit, including feedback and promoting a growth mindset. For students to develop a belief in themselves requires meta-cognition. Teachers can help with this by using clear systems for tracking progress that allow students to both self-evaluate and peer-evaluate.

Figure 3.12. Motivated students in the classroom

[83] Ibid.
[84] Marzano & Pickering, ibid.
[85] Marzano & Pickering, ibid.

Developing lessons that motivate students requires continuous effort on the part of the teacher. While in a perfect world, all students would come to school intrinsically motivated, this is not the reality, and teachers need to implement strategies that motivate their students to learn.

Learning activity 1

You will have many different student profiles and personalities in your classroom. Think about how you might motivate different types of students using strategies suggested in this unit:

- What strategies would you use to motivate a bright but somewhat lazy student?
- What about the student who seems to always fall asleep in class?
- How would you motivate a student who finds the work very difficult?
- What strategies would you use to motivate the high energy student who has trouble focusing?

Review questions

1. What is the difference between motivation and engagement?
2. How does Maslow's hierarchy of needs relate to motivation and engagement in the classroom?
3. Provide an example of intrinsic and extrinsic motivation.

3.8. The Importance of Student Engagement

While motivation is the desire to achieve a learning goal, student engagement involves a focus on the *process* of getting to that goal. Ensuring that both are present for learners in the classroom is critical for their academic achievement. This unit will help you think about how you can engage your students, including ensuring that their basic needs are met so that they can focus on learning.

3.8.1. Engaging students in learning

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain the importance of student engagement.

What is student engagement?

Engagement or dedication to the task at hand, is related to motivation but an engaged learner is not necessarily a motivated learner. In turn, a motivated learner is not necessarily an engaged learner. A motivated learner is focused on the outcome; he or she wants to achieve a clear learning goal. Engaged learners are focused on the process, not only the outcome (Walkgrove Limited, 2015).

The ideal scenario is to have students who are both motivated, with a desire to achieve a clear goal, and engaged or interested in the process or task at hand. Developing engaging lessons and activities that are clearly aligned with learning goals will help to hook even the learners that are not motivated by the topic or by school, in general.

A great deal of research has been done to better understand factors that most directly impact engagement. Silver and Perini (2010) propose the eight 'C's' of engagement: Competition, challenge, curiosity, controversy, choice, creativity, cooperation and connections (cited in Gregory & Kaufeldt (2012). Introducing these 'C' elements in your lesson can help make them more engaging for students.

Marzano and Pickering divide these factors into four categories: 1) emotions, 2) interest, 3) perceived importance, and 4) perceptions of efficacy. These categories were used in Unit 3.7 to suggest strategies for motivating, as well as engaging, students.

Tomlinson (2001) puts it this way, 'We know students learn better if tasks are a close match for their skill and understanding of the topic (readiness), if tasks ignite curiosity or passion in a student (interest), and if the assignment encourages students to work in a preferred manner (student profile)'. In other words, to be engaged, students need to be ready for the lesson content and difficulty level. They need to have interest in the topic, and the lesson needs to address their preferred learning styles.

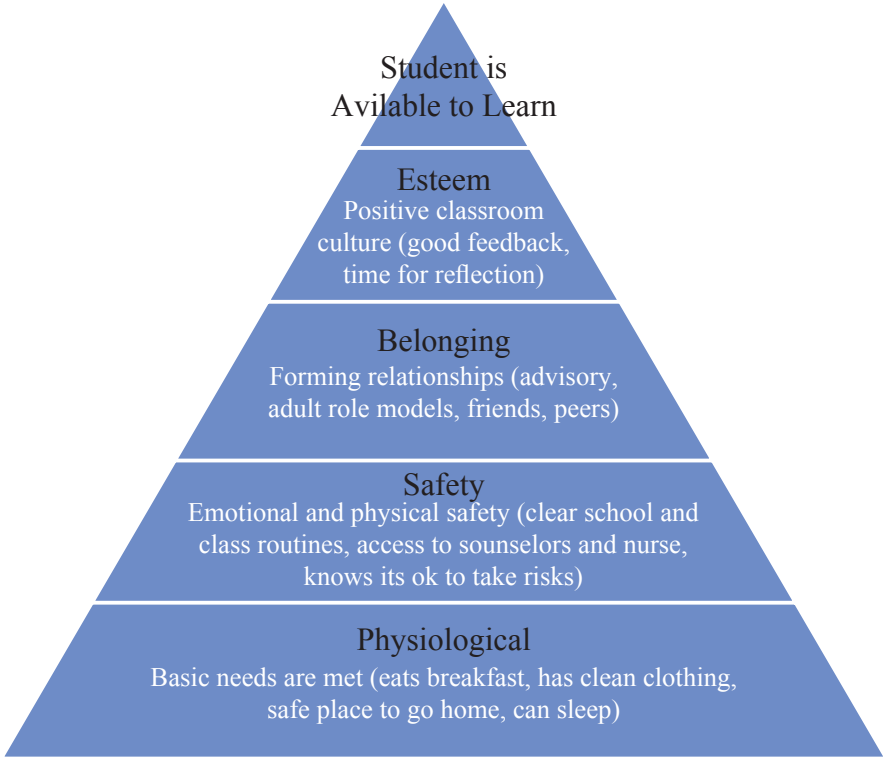
Maslow's Hierarchy of Needs

The emotional state of the learner plays a critical role in engagement, as well as motivation. In order to learn, students must first feel safe, loved and accepted. Maslow's Hierarchy of Needs asserts that in order to work towards higher levels of needs such as learning, one must first have other basic needs met that include physiological needs, safety and security needs, and loving and belonging needs.[86]

[86] Martin, D. & Joomis, K. (2007). Building Teachers: A Constructivist Approach to Introducing Education. Belmont, CA: Wadsworth. Retrieved from https://www.cengage.com/resource_uploads/downloads/0495570540_162121.pdf.

The information on 'brain-compatible' classrooms in Unit 3.5 directly relates to this belief. If a student is hungry or tired (physiological needs), scared (safety and security needs) or has been fighting with her friends (loving and belonging needs), she will not be arriving to the class with the motivation to learn or the ability to be engaged in learning. A teacher must have strategies to reach this student, so that she is ready to learn. This might be through making sure a student has enough to eat or is dressed appropriately, establishing a welcoming classroom with a 'no bullying' policy or taking steps to address inter-personal issues between students.

Figure 3.13. Maslow's hierarchy of needs and its application in school



The Conscious Discipline Brain State Model presents three 'brain-body states' that can help teachers to better understand where students are functioning at any given moment:

- The first state is the Survival State. Here a student is most concerned with if he or she is safe.
- The second state is the Emotional State. In this state, a student is most concerned with whether or not she is loved.

[87] Bailey, R. (2018). The Conscious Discipline Brain State Model. *Conscious Discipline.* Online. Retrieved from https://consciousdiscipline.com/methodology/brain-state-model/.

- The final state is the Executive State. Here the student is focused on what he or she can learn. In this state, a student is able to employ his or her executive functions and is thus able to work towards a goal and connect with a task.

Teachers need to be aware that they must help meet students' survival and emotional needs before students can reach the 'Executive State' where learning is possible.

You can use the strategies to motivate students in Unit 3.6 to also actively engage them in their learning. The strategies suggested throughout Unit 3 make up a package of strategies that promote effective learning.

The content in each unit of Unit 3 is inter-connected and you should be able to see many ways that the ideas presented in this unit – including questioning, communication, feedback, student-centred learning, active, interactive, and cooperative learning, differentiation, motivation and engagement – relate to each other and to helping students learn. Above all, they are all necessary elements of good teaching, which is teaching that responds to the needs of the students so that each individual can achieve.

Learning activity 1

Look back at the many topics and strategies covered in Unit 3. These include but are not limited to questioning, communication, feedback, student-centred learning, active, interactive and cooperative learning, differentiation, motivation, and engagement.

Can you make statements to show how the ideas are related to each other? For example, feedback needs to be clearly *communicated* to students. Or *active learning* strategies can be used to engage students.

Review questions

1. How do emotions impact motivation and engagement? What are strategies for inciting positive emotions in the classroom?
2. How does student interest play a role in motivation and engagement in the classroom? What are strategies that incorporate student interest?

Unit Summary

Key messages

- Questions are a powerful tool for scaffolding the learning of students. Scaffolding is the processing of building up students' ability to complete a task independently. The process begins by the teacher providing examples and modeling a task, then little by little taking away supports until the students can all complete the task alone. Bloom's taxonomy is a powerful tool that provides a structure to scaffolding through the use of action verbs that gradually require a higher level of cognitive processing.

- Effective communication is essential in the classroom. A teacher must develop messaging that is clear and accurate. When communicating, it is important to balance talking with listening to confirm that the message was received. In communication, body language and tone of voice must also be monitored, as they can be more powerful than the words themselves. Additional supports, such as written and visual aids, can strengthen communication.

- Cooperative, active and interactive learning allow students to develop important skills for the Twenty-first century such as a critical thinking, communication, collaboration and creativity. Cooperative learning provides a structure for students to learn positive interdependence and accountability as they work together towards a clear goal that requires them to take responsibility for their own learning as well as the learning of others. Active learning requires students to engage with the lesson objective or skill, as opposed to passively receiving information. Interactive learning, sometimes used synonymously with active learning, refers to the use of technology to engage students in their learning. All three approaches strengthen a student's ability to make sense of their learning.

- Teacher-centred instruction and student-centred instruction are two approaches to teaching. Student-centred instruction is encouraged for developing autonomous learners prepared for lifelong-learning, however, there are also arguments to be made for teacher-centred instruction strategies such as direct instruction, at times. A teacher needs to have clear criteria for determining the approach that will be met the needs of the students to master the proposed learning goal.

- Autonomy is developed in students by providing clear goals, structuring activities that promote metacognition and giving students' choices in the classroom.

- Every student brings to the classroom a unique set of interests, abilities, strengths and challenges. A teacher must take them time to get to know the makeup of each student, identify the barriers to learning that may present themselves and make adjustments to the curriculum and the physical environment in order to overcome these barriers and guarantee the success of each child. Differentiation is the conglomeration of decisions or adjustments, a teacher makes in the classroom to meet the needs of every student. There are many strategies for differentiation. Planning for the marginalised students in the classroom will generate a learning environment that better serves the entire group.

- Positive feedback should celebrate effort over innate ability. A growth mindset develops the belief that with hard work one can achieve any goal and promotes learners for life. Teachers should consider their messaging carefully. Positive feedback should be timely, clear, accurate, goal-oriented and always provide steps for further improvement. If a student is mastering a concept, the teacher should extend his or her learning and celebrate risk-taking and the welcoming of new challenges. If a student is struggling with a concept, the teacher should scaffold the learning and celebrate persistence.

- Motivation is a focus or interest in the outcome, the desire to achieve a clear learning goal. Engagement is a focus on the process or the task. Ensuring that both are present for learners in the classroom is critical for their academic achievement.

Unit reflection

Make sure you fully understand what is meant by positive feedback that promotes growth. Be aware of the type of feedback you hear used in your classes. We do not only give feedback to individuals in the classroom – we also give our family and friends informal feedback all the time on something well done or something we are not happy about. How can using positive feedback make you a better friend or family member?

What motivates you as Education College student teachers. Are you purely motivated by grades? Or do you work hard because you want to be a good teacher? How do the strategies for fostering motivation apply to your work as student teachers?

Think about some of the challenges you are likely to face in implementing the proposed solutions discussed in Lesson 3.8.1. This is one of the many reasons that teaching is a challenging job! How do you anticipate you will respond to these challenges?

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Unit 4

Planning and Preparation

Every teacher wants to have successful lessons. A key component of a successful lesson is the teacher's advance planning and preparation. At first, planning and preparing for lessons may take a long time. With experience you will get better and faster at planning and preparing for your lessons.

Planning and preparing for lessons involves the following 10 steps:

1. Teach yourself the main idea, related ideas and supporting details of the lesson content;
2. Anticipate what content students might already know, based on life experiences and previous learning. Anticipate what (on topic and off-topic) questions students may have, and how they will respond to both types of questions;
3. Determine one or more SMART learning outcomes for your lessons;
4. Determine success criteria;
5. Using your knowledge of activities and methods, and the importance of sequencing and variety, visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes;
6. Decide how much time to allow for each activity;
7. Determine teaching and learning materials (TLM) required for each activity;
8. Adapt existing TLM from the internet or create new ones;
9. Anticipate obstacles which may interfere with your lessons going as planned (for example, electricity outage may happen at time a teacher is are planning to show a video) and what you will do to keep the students moving forward toward the learning outcomes; and
10. Document your plans on lesson plan templates and keep copies and keep it for future use.

This unit will introduce you to planning lessons and to deciding what types of materials to look for or create as resources for the lesson. As you work through this unit, you will practice the steps needed to create an effective lesson plan. You will also practice finding and creating learning materials to help your students learn.

Expected learning outcomes

By the end of this unit, you will be able to:

- Identify the main concept and related idea of a reading;
- Explain the importance of learning objectives, outcomes and success criteria;
- Compare the differences between learning objectives, outcomes and success criteria;
- Construct SMART learning outcomes;
- Select teaching strategies based on the nature of the subject;
- Describe the importance of teaching aids and how to use them effectively in different circumstances;
- Describe what a learning activity is and explain the characteristics of a good learning activity by using a sample activity;
- Explain various types of teaching activities;
- Demonstrate knowledge of resources;
- Explain what should be considered to prepare a good lesson plan; and
- Draw a draft lesson plan and assess with criteria of good lesson planning.

4.1. How to Identify the Main Ideas, Related Ideas and Details of a Reading

Student textbooks are being developed to support the new Basic Education Curriculum. When you become a teacher, you will be using textbooks that are different than the ones that were used in primary school when you were young. In order to teach effectively, you must understand the textbook content and be able to distinguish the main idea, related ideas and supporting details. This is Step 1 of the 10 Step preparation and planning process. This unit presents some strategies you can use to teach yourself the content. These include looking in key places in the text (introduction, conclusion, headings and subheadings) for the main idea, identifying the type of text – process text, cycle text, story text, and so on and drawing a diagram which represents how the ideas are related. Step 2 of the 10 Step process is anticipating the questions students may have. You will never be able to anticipate all of the questions that naturally curious children will have but as you teach new content and encounter their questions, you will become better at imagining what types of questions may come up in the classroom about a text. The specific questions are not as important as the types of questions. There are on-topic questions and off-topic questions. Once you understand the main idea and related ideas of the text, you will be able to distinguish on-topic questions form off-topic questions and respond accordingly.

For the purposes of this textbook, ‘reading’ is the term used to refer to pieces of writing which may appear in student textbooks or in other student resources such as handouts, books or websites.

4.1.1. Identifying the main ideas, related ideas and details in readings

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify the main concept and related ideas of a reading.

What is a lesson?

A lesson is a purposeful, planned organised approach to teaching a main concept and developing your students' behaviours, attitudes and skills (including their thinking skills) that occurs within a specified time. For younger children, lessons are quite short because their attention spans are short. In higher grades, the content is more complex, and the children have longer attention spans, so the lessons are longer than in very early grades.

A speaking drill is not a lesson. A unit in a textbook is not a lesson. A game is not a lesson. These are activities and learning materials which may be incorporated into lessons. A lesson has a purpose and a structure. It may be helpful to compare lessons to stories. Just as there are many types of stories – funny stories, sad stories, mysteries, fables – there are many types of lessons. And just as all stories have a common basic structure – beginning, middle, and end – lessons have a common structure too.

Lessons and curriculum

As a teacher, you develop lessons based on the Basic Education Curriculum for the grade level you are teaching. The Basic Education Curriculum identifies what students need to learn in each subject at each grade level. Your lessons and homework assignments are the means by which students learn what the Ministry of Education (MoE) has identified they need to learn at their grade level.

Pre-planning: Learning the content

When you teach primary level lessons, you may be teaching concepts that you did not learn as a student or that you did learn but have since forgotten. Examples of concepts you may not have learned or may have forgotten which are taught in later primary years include *animal communication, how bees make honey, or the water cycle.*

An important strategy for preparing for lessons with unfamiliar content is to learn the content or refresh your knowledge of it. Before you introduce a reading to students in your classroom, you need to be confident that you understand it well. You need to learn the content. This might sound intimidating at first, so try to think of learning the content as teaching yourself. As a professionally-trained teacher, you need to have the competencies you need to teach yourself first before you teach your students.

How do I teach myself the content?

Teaching ourselves new concepts from text-based material requires some practice. One of the key skills that we need to practice is identifying the main idea or ideas, from the text. One helpful strategy is to draw a diagram to represent the information in the text.

The type of diagram we draw will depend on the nature of the information in the text. Is it a text about a process? It is a text about a cycle? Is it a text about a group of related behaviours, objects or ideas?

Many texts present a main idea and then present evidence, support or examples of the main idea. The main idea of a reading is the idea that the rest of the sentences are related to. Sometimes it is helpful to think about the main idea as the main message of the reading. In most readings, the main idea (message) is located near the beginning of the reading. In a short reading, the main idea is usually (but not always) presented in the first or second sentence.

To understand this idea better, read the following reading.[88] When you are finished, re-read the first paragraph:

What Do You Say?

Humans use language to communicate. Animals communicate, too.

Some animals use sound. Each penguin has a special call. Other penguins hear the sound and know who is calling.

Some animals light up. Jellyfish can make their bodies glow. They light up when a predator comes near. The light scares the predator away.

Some animals use movement. Fiddler crabs wave their claws in the air. They do this to attract a mate.

Some animals use colour. An octopus changes its colour. A light colour means the octopus is friendly. A dark colour means it is angry.

You will see that there are two sentences in the first paragraph. They are:

1. Humans use language to communicate.
2. Animals communicate, too.

To decide if either of these sentences contains the main idea, we need to consider the rest of the reading. Is the rest of the reading about humans using language to communicate? Or is the rest of the reading about animals communicating?

The rest of the reading is about animals communicating. Therefore, in this case, the main message is ‘Animals communicate.’ At higher primary grades, children can be expected to see that the main idea is that ‘different animals communicate in different ways,’ but, for younger children, identifying ‘animals communicate’ as the main idea is acceptable. The main idea is not ‘Animals communicate too’ because too is a word we use to compare one thing with another. Our reading is not about comparison. It is only about ways animals communicate. The sentence is grammatically correct in the context of the first paragraph.

[88] Excerpt taken from https://www.timeforkids.com/k1/what-do-you-say/

It is not suitable though as a main message which needs to stand alone. If the reading was about how humans communicate and how animals communicate, the main message would be 'Both humans and animals communicate.' 'Animals communicate too' does not explain what else (in this case humans) communicates.

Main messages are complete sentences

The main idea, or main message, of a reading must always be expressed as a complete sentence.

Consider the message 'animals communicate'. This statement is a complete sentence.

Some people might notice that the reading is about animals. They might think the main idea is 'animals'. However 'animals' is not a complete sentence, so it is not a message.

Others might notice that the reading is about animals that live in the sea. They might think that the main idea is 'animals that live in the sea.' However, 'animals that live in the sea' is not a complete sentence, so it is not a message. When you are trying to identify the main message of a reading, remember that a message is a complete sentence, not just a word or a clause.

Once we have located the main idea or message, we can begin our diagram, by drawing an arc to represent the main idea.

Figure 4.1. Diagram of the main idea

Re-read 'What Do You Say.'

There are also related ideas in this text. When related ideas prove that the main message is true, they are called supporting ideas. The supporting ideas (messages) provide examples or details related to the main idea.

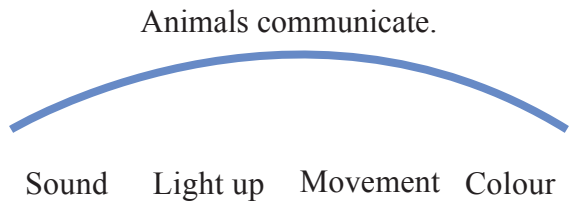
In ‘What Do You Say?’, there are several messages which support the main message that animals communicate. Each supporting message has its own paragraph. The paragraph contains the supporting idea and some related details or examples.

The related ideas that the author provides to demonstrate that animals communicate are:

- Some animals use sound.
- Some animals light up.
- Some animals use movement.
- Some animals use color.

After we identify the supporting ideas, we can add them to our diagram:

Figure 4.2. Diagram of the main and supporting ideas



Read ‘What Do You Say’ again. Do you understand it completely? If you have questions about it, such as ‘what is a fiddler crab?’ or ‘how do jellyfish make their bodies glow?’ then your students will likely have those questions too. Students may also have other questions that do not occur to you when you read the text; for example,’Where do penguins live?’ or ‘What does an octopus eat?’ Or ‘Do jellyfish light up when they are sleeping too or only when they are awake?’ Children are curious about all sorts of things, not just the information presented in the reading.

You cannot possibly learn everything there is to know about jellyfish, fiddler crabs, penguins, and octopus before you teach the lesson. Do not worry. You do not have to know everything about those animals to teach your lesson. You do need to know what they are, and you do need to know what all of the sentences mean.

Part of preparing for a lesson is to know that children will ask questions that are not related to the main message, and to plan how you will respond to those questions when you do not have the answer. There are many ways you can respond to these questions without discouraging natural curiosity. It is important for children to continue to be curious because natural curiosity is necessary for learning and for developing their critical thinking and higher order thinking skills.

Try to think about children's questions that are not related to the main idea of a reading as opportunities for you to help them understand how to identify the main idea. You could say something like, 'The reading doesn't tell us what an octopus eats, does it? Why doesn't it tell us that? Is this a reading about what animals eat? No, it is not. You are right. What is this reading about?' Guiding them to understanding that the reading is about how animals communicate helps them to begin to be able to understand what a main idea or main message, is. Then, to encourage curiosity, you can ask children where they think we could find answers to our questions. After the lesson is complete, you might demonstrate using a dictionary, encyclopedia or the internet to find the answers to some of the off-topic questions. By doing this, you are helping children to begin developing an understanding of research skills.

If a child asks a question about how other animals, not mentioned in the reading, communicate, then the question is not off-topic. You will want to be prepared for questions such as: 'Teacher, how do snakes (or mice or elephants or many other types of animals) communicate?' These are excellent questions because they demonstrate that the child clearly sees the pattern in the reading and understands that the main idea is that different animals communicate in different ways. You would respond differently to these types of questions than to questions that are not related to the pattern – such as what an animal eats or where it lives.

'What Do You Say?' is quite a short reading. In higher primary grades, your students will be reading longer texts. When you are trying to teach yourself the content of longer readings, notice the title of the unit, and the heading of the section that you are reading. Titles, headings, and subheadings are very useful for helping us understand the main idea discussed in a reading, and the relationships between other main ideas discussed elsewhere in the reading.

You can also refer to other resources to increase your understanding. If there is vocabulary in the heading, sub-heading or topic sentence that is new to you, then likely it will be new to your students as well. Use a paper or electronic dictionary to help determine the meaning of any words you do not know. When consulting a dictionary, read not only the dictionary definition of the word, but also the synonyms and antonyms that are provided.

Some words will have more than one definition in the dictionary. When this happens, it can be difficult to know which is the correct definition in this context. Do not give up! Try replacing the new vocabulary from the reading with the synonyms that you know the meaning of. When you read the heading or topic sentence using a synonym instead of the unfamiliar vocabulary, is the meaning clear to you? If not, try the same approach with one of the other synonyms that you know the meaning of.

Some readings will also include a conclusion. ‘What Do You Say?’ does not include a conclusion, but other readings will. The conclusion can also be very useful to you in determining the main message of the reading.

Learning activity 1

Re-read the contents of this unit. Draw a simple diagram to represent the main idea and supporting ideas that are presented about how to teach yourself the content.

4.1.2.
Seven steps to teaching yourself content

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify the main concept and related ideas of a reading.

Teach yourself the content: Seven steps

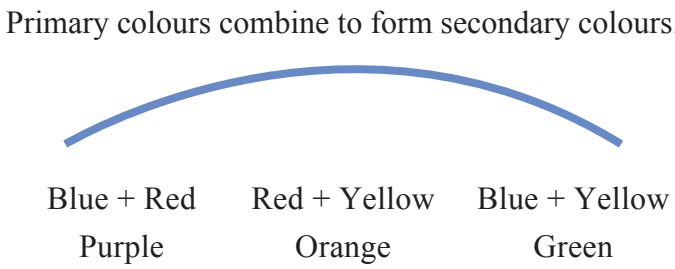
1. Read the reading.
2. Identify the main idea.
3. Identify the supporting ideas.
4. Draw a diagram to represent the main and supporting ideas.
5. Understand the meaning of every sentence.
6. Anticipate meaning, off-topic, and relevant questions primary students will have. Generate a minimum of two questions in each category.
7. Plan how you will answer the questions.

Readings about process

Some readings are about processes or about cycles. The process or the cycle, that they explain is the main idea.

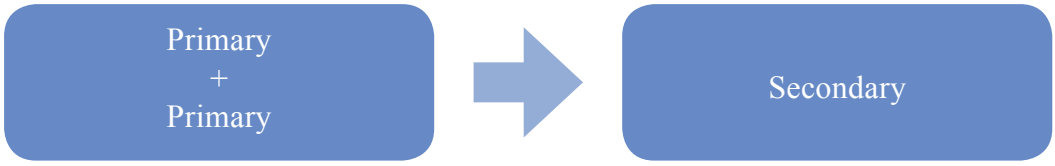
A process is an explanation of how to do something step-by-step. For example, if you are reading about how primary colours can be combined to create secondary colours, you might want to draw a diagram like the one below.

Figure 4.3. Diagram of the main and supporting ideas



Or this one:

Figure 4.4. Diagram of the process of creating secondary colors



If the reading explains a process, we can draw a process diagram to help understand the main ideas. Read 'How Bees Make Honey', below, and see if you can identify the main idea.[89]

How Bees Make Honey

Bees start making honey, which is their food, by visiting flowers. They collect a sugary juice called nectar from the blossom by sucking it out with their tongues. They store it in what is called their honey stomach, which is different from their food stomach.

When they have a full load, they fly back to the hive. There, they pass it on through their mouths to other worker bees who chew it for about half an hour. It is passed from bee to bee, until it gradually turns into honey. Then the bees store it in honeycomb cells, which are like tiny jars made of wax. The honey is still a bit wet, so they fan it with their wings to make it dry out and become more sticky. When it is ready, they seal the cell with a wax lid to keep it clean.

So that is how bees make honey. They don't make very much of it, though. It takes at least eight bees all their life to make one single teaspoonful. Fortunately for us, they usually make more than they need, so we can have some, too.

[89] From Bill Turnbull at https://www.theguardian.com/lifeandstyle/2013/aug/10/how-bees-make-honey-ask-a-grown-up

The main idea of the reading can be stated as: 'Bees make honey in a seven step process.' Process readings also have main messages which are expressed as complete sentences. There are a few ways you might draw a process diagram:

'How Bees Make Honey'

Figure 4.5. Diagram of the process of 'How Bees Make Honey (1)'

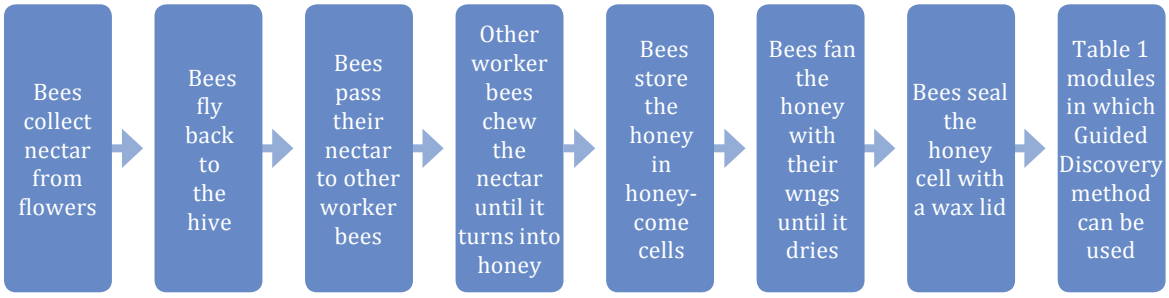
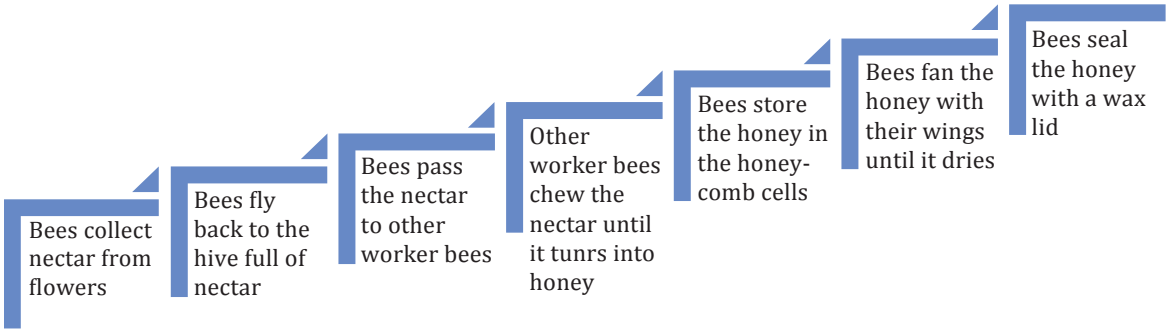


Figure 4.6. Diagram of the process of 'How Bees Make Honey (2)'



Learning activity 1

Think about a process that you know without having to read about it. It could be the process of cooking curry or the process of changing the oil in a motorbike. Practise diagramming a process that you know well.

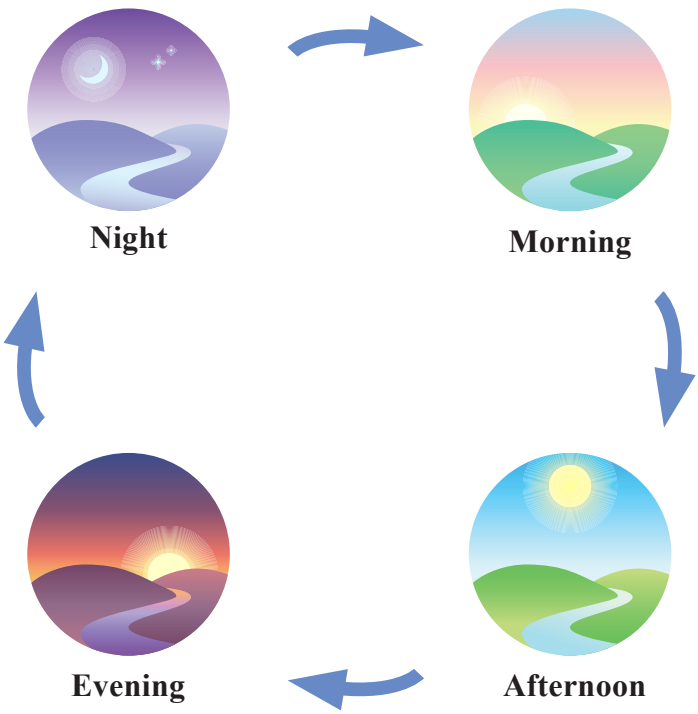
You can also think about a process that you learned about in a previous unit of this Education Studies Student Teacher Textbook. Can you draw a diagram of that process?

Readings about cycles

Sometimes you may be teaching about a continuous cycle. A cycle is different than a process. A process has a starting point and an end point and steps in between. A cycle, on the other hand, does not have a starting point or an end point. It keeps going and going. This is always the main idea of a cycle text.

Consider the main idea: *Time is a continuous cycle*. The diagram below may be useful for teaching yourself (and your students) about the main idea:

Figure 4.7. The cycle of time



Learning activity 2

Read 'The Water Cycle' below about the water cycle and practise drawing a diagram for the cycle.[90]

The Water Cycle

Evaporation

Energy from the sun heats up the surface of the Earth, causing the temperature of the water in our rivers, lakes and oceans to rise. When this happens, some of the water 'evaporates' into the air, turning into a gas called 'vapour.' Plants and trees also lose water to the atmosphere through their leaves. This process is known as 'transpiration.'

Condensation

As water vapour rises up high into the sky, it cools and turns back into a liquid, forming clouds. This process is called 'condensation.' Currents high up in the air move these clouds around the globe.

Precipitation

When too much water has condensed, the water droplets in the clouds become too big and heavy for the air to hold them. And so they fall back down to Earth as rain, snow, hail or sleet, a process known as 'precipitation.'

Collection

The fallen precipitation is then 'collected' in bodies of water – such as rivers, lakes and oceans – from where it will eventually evaporate back into the air, beginning the cycle all over again.

The main idea of the text is not seen in either the first or last paragraph. The main idea of cycle text is a sentence that summarises the cycle. In this case the main idea is 'All the water that falls as rain comes from bodies of water and plants and trees.'

[90] Adapted from https://www.natgeokids.com/uk/discover/science/nature/water-cycle/

Learning activity 3

Can you think of any other cycles? Diagram a cycle that you know well.

Other types of readings

Some readings are lists of facts. They present many unrelated details about a person, place or thing. The person, place or thing which they discuss in the main idea of the reading.

Many readings for children are stories. They present an account of events that happen over time. Some stories teach a lesson, such as be kind to others or respect your parents or do not be greedy. These morals are the main idea of those stories. Other stories tell about the life of a person, for example a king. The main idea of these stories is 'the life of _____.' Other stories tell about an event. The main idea of those stories is expressed as a sentence about the character and the event. Examples of this, could be 'A boy got lost' or 'A man went on a long journey.'

Whichever type of reading you encounter in student textbooks, it is important that you understand the meaning, and that you can distinguish the main idea, related ideas and supporting details before you introduce this reading to the students. Anticipating the questions students may have related to the meaning of the reading is a useful strategy for teaching yourself the content.

Review questions

1. What are some strategies that you can use to identify the main idea in a text?

4.2. Setting Learning Objectives, Outcomes and Success Criteria

Once you understand the reading, can distinguish main idea, related ideas and supporting details, and have anticipated the questions that the students may have, you can proceed to setting learning outcomes, objectives and success criteria. From the 10 Steps process for lesson planning and preparation, these are Steps 3 and 4. These are the steps in which the teacher asks herself, 'What specifically do I want my students to be able to do at the end of the lesson?' and 'How will I decide if they can do it to a satisfactory level?' This unit equips you with the skills you need to ask and answer these questions for yourself as you plan your lessons.

4.2.1. Objectives, outcomes and success criteria

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain the importance of learning objectives, outcomes and success criteria.

There are many different explanations about learning outcomes and learning objectives. Some of those explanations contradict each other. What you will see described here as a learning outcome may be described in other resources for teachers as a learning objective. Once you understand the concepts that are presented here as learning outcomes and learning objectives, then when you are doing your own research or continuing in professional development courses in future, the specific language used will not be a problem.

Learning outcomes

After we are confident in our own understanding of the lesson material, we can proceed with our lesson planning and preparation. Our next step is to ask ourselves 'what specifically will my students learn in this lesson?' When we answer this question, we have identified the lesson's learning outcomes. Earlier in this teacher education program you learned about Bloom's taxonomy, so you know that learning is more than just memorisation. The question is not 'what will my students memorise?'. It is 'what will my students learn?' This learning could involve knowledge, skills and/or attitudes.

~~What will my students memorise?~~
What will my students be able to do?

Writing a learning outcomes statement

In reading this Student Teacher Textbook, you have probably noticed that every lesson and every unit has one or more learning outcomes listed at the beginning of each unit and the beginning of each lesson.

Without looking back in your textbook, try to write what you think the learning outcomes are for these lessons:

- Lesson 2.4.1. Children as natural learners
- Lesson 2.9.1. What is IPO?
- Lesson 3.6.1. Offering positive feedback to promote learning

Now, turn to the lessons mentioned above. Check your answers.

When you checked the learning outcomes, you might have noticed that the first part of the learning outcome statement is always the same. The lesson learning outcome statements start with: *'At the end of this lesson, you will be able to…'*

The second parts of all learning outcome statements are different in content from each other, but similar in structure.

What do you notice about the first word which follows 'you will be able to'? That word is a verb. Explain, describe, provide are some examples.

At the end of this lesson, you will be able to explain — Explain what?
At the end of this lesson you will be able to draw — Draw what?
At the end of this lesson, you will be able to provide — Provide what?

At the primary school level, students will need numerous lessons to be able to develop skills. For this reason, many of your lessons may have similar learning outcomes or your lessons may take a few class periods (over the course of a few days) to teach.

Re-read 'What Do You Say?' in Unit 4.1.

Imagine you are teaching from a textbook which contains the text 'What do You Say?' Write the first part of the learning outcome:

- By the end of the lesson, students will be able to…

Now think about what you want students to be able to do at the end of a lesson about 'What Do You Say?' Do you want them to be able to draw something? Do you want them to be able to compare two things? Do you want them to be able to explain something?

Likely you will want the students to be able to explain the main idea and some related details about the ways that animals communicate. Using the learning outcome structure that you have just read about, write one or two expected learning outcomes for what you want your students to know or be able to do following a lesson on 'What Do You Say?'

Learning activity 1

Look at all of the learning outcomes listed for each unit in this Student Teacher Textbook. You will find these listed at the first page of every unit. Make a list of all of the different verbs that you see. Label this list Learning Outcome Verbs and keep it for future reference.

4.2.2. Comparing learning outcomes, objectives and success criteria

Expected learning outcomes

By the end of the lesson, you will be able to:

- Compare the differences between learning objectives, outcomes and success criteria.

Learning objectives

After a teacher determines the learning outcomes, based on the Basic Education Curriculum, then he or she begins to think about the best way to move students towards these desired learning outcomes.

As discussed, earlier in this unit, outcomes are about what learners will be able to do at the end of the lesson, sub-unit or unit. Objectives are general statements about what teachers intend to do during the lesson. They do not include specific details of which specific learning activities the teacher will use but they may mention method(s).

An objective for a lesson about vowels and consonants might, for example, be: Teach the six vowels in the English alphabet a, e, i, o u and (sometimes) y.

The teacher knows that students do not have to memorise whether each of the 26 letters is a consonant or a vowel. Out of the 26 letters in the alphabet, only six are vowels, so if she teaches the students which ones the vowels are, then they will automatically know which ones are the consonants. If a letter is not a vowel, it is a consonant.

Similarly, for a lesson in which the outcome is: 'Students will be able to write WH questions (in Myanmar language),' then the lesson objective might be: 'Teach the rule that WH questions end in လဲ (le) instead of လား (la).' The teacher may decide to teach exceptions to this rule in this lesson or in another lesson.

Success criteria

Part of the planning process is asking yourself the question, 'How will I know if my students have achieved the learning outcomes of this lesson?'

If the learning outcome of your lesson is that your students can distinguish English alphabet vowels from consonants then your success criteria might be that when presented with a letter from the alphabet, every student can correctly identify whether the letter is a vowel or a consonant approximately 95% of the time.

Depending on your students and your lesson outcomes, it may not be realistic for all students to achieve 100% mastery of the concept or skill in the very first lesson about that concept or skill. Perhaps the first time you teach vowels and consonants, the success criteria is lower. For example, every student can correctly identify whether the letter is a vowel or a consonant approximately half of the time.

For the WH question lesson example, the success measure might focus on the use of the correct question word at the end of the question. If students make mistakes on the words in between the WH word and the question word but the WH word and the question word are a match, then the students have achieved success in the lesson.

Learning activity 1

Sometimes different education experts have different definitions of terminology. Look on the internet for webpages which mention learning outcomes, learning objectives and success criteria. Do you notice any places where examples given for learning objectives have the same structure as presented in this textbook as the structure for learning outcomes? That is students will be able to…

Even though the terms used may be different, the common message is that in planning and preparing for a lesson, it is important for teachers to decide specifically what students will be able to do at the end of a lesson.

What additional information do you see about success criteria?

Learning activity 2

Complete the following table in pairs.

Table 4.1

	Outcome	Objective	Success criterion
What is it? (definition)			
Example			
Is it general or specific?			
When does the teacher write it? Before deciding which activities she will use in the lesson? During the lesson? At the end of the lesson?			

1. Join another pair and compare your answers for the table.
2. Discuss with your class the contents of the table and make corrections as necessary.

4.2.3. SMART learning outcomes

Expected learning outcomes

By the end of the lesson, you will be able to:

- Construct Specific, Measurable, Achievable, Relevant and Time bound (SMART) learning outcomes; and
- Compare the differences between learning objectives, outcomes and success criteria.

SMART learning outcomes

We have already learned what a learning outcome is. What is a SMART learning outcome? It is a learning outcome which is:

S – Specific
M – Measurable
A – Achievable
R – Relevant
T – Time-bound

Let us consider a learning outcome from this textbook to help us understand SMART learning outcomes.

> *By the end of this lesson, you will be able to compare the differences between learning objectives, outcomes and success criteria.*

This learning outcome is a SMART learning outcome.

It is **Specific.** It tells us exactly what you, as a student teacher, will be able to do:

> *By the end of this lesson, you will be able to compare the differences between learning objectives, outcomes and success criteria.*

Compare the specific learning outcome above with these non-specific statements:

By the end of this lesson, you will have new knowledge; and
By the end of this lesson, you will know about lesson preparation.

Do you see the difference? *'Have new knowledge'* is non-specific. *'Comparing the differences'* between two or more concepts (or objects, people or animals) is specific. Earlier we discussed the structure of the learning outcome statement. It is the verbs and objects in the statement that make learning outcomes specific.

Our example learning outcome is also **Measurable**. By the end of this lesson, your teacher educator will easily be able to assess whether you can make the comparisons well or whether you are unclear about the differences between objectives, outcomes and success criteria.

Our example learning outcome is also **Achievable.** It is not too difficult. It is suitable for your level of understanding of Educational Studies and your knowledge of lesson preparation at the time the teacher educator expects you to learn it. And it is not too much to expect in the time available (one lesson) for you to learn it.

Our example learning outcome is also **Relevant**. Being able to compare the differences between learning objectives, outcomes and success criteria demonstrates that you understand the differences between these concepts. Understanding the difference is necessary to be able to plan and prepare quality lessons. And planning and preparing quality lessons is something that a teacher needs to be able to do. If a teacher cannot plan and prepare quality lessons, then his or her students will likely not develop the required competencies according to the Basic Education Curriculum.

And finally our example learning outcome is also **Time-bound.** That is, it tells us when students are expected to achieve the outcome.

By the end of this lesson, you will be able to compare the differences between learning objectives, outcomes and success criteria.

Review the learning outcome you wrote earlier for a lesson about ‘What Do You Say?’ Is your learning outcome SMART?

Learning activity 1

SMART is also useful for setting personal and professional goals. For example, next month I will read three English books. What are the SMART goals that you want to accomplish in the next two years?

Review questions

1. Explain what a SMART learning outcome is.
2. Write a SMART learning outcome for a lesson about teaching the days of the week in English class.
3. Explain what success criteria are and why it is important.

4.3. Selecting Teaching Methods for Each Subject

After you have taught yourself the content; anticipated students' questions; developed SMART learning outcomes, objectives and success criteria for your lesson; next you will consider and decide on teaching methods for your lesson. Particular teaching methods may be a better fit with some subject areas than with others. This unit helps you to develop some knowledge and skills related to selecting teaching methods that you will need to complete Step 5 of the preparation and planning process outlined at the beginning of this unit. Step 5 is: Using your knowledge of activities and methods, and the importance of sequencing and variety, visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes.

4.3.1. Teaching methods for subjects

Expected learning outcomes

By the end of the lesson, you will be able to:

- Select teaching methods based on the nature of the subject.

In primary school, you will be teaching a number of subjects, including Art, Life Skills, English, Morality and Civics, Myanmar, Science, Social Studies, Maths and Physical Education. There are not strict rules about which teaching methods to use to teach particular subjects.

The important thing is to try different teaching methods with different subjects and to notice what works well and what does not for your specific group of students. Most professionally trained and experienced teachers will tell you that what works well for teaching a subject to one class does not always work well with a different class. This is because each class of students you teach will have its own dynamic based on the individual personalities, backgrounds, and ability levels and how they interact as a whole.

It is important to consider the students you have in your class and how you can best help them to achieve the learning outcomes for the lesson. There are a variety of teaching methods and activities that you might use to do this. Given both the learning needs of your students and their attention span, it is a good idea to vary the teaching methods you use during a lesson.

4.3.2. Guided discovery

Expected learning outcomes

By the end of the lesson, you will be able to:

- Select teaching methods based on the nature of the subject.

One teaching method that can be effective for teaching primary school students across a number of different subjects is 'guided discovery.'

Discovery learning is an inquiry-based instructional technique where students 'learn by doing'. Jerome Bruner, a renowned cognitive psychologist at Harvard University, promoted the approach on the basis that students are more likely to remember concepts and principles when they discover them on their own.'[91]

[91] https://teachingcommons.stanford.edu/resources/learning/learning-activities/guided-discovery-problems)

Guided discovery involves the teacher asking open-ended questions to the students which encourage them to make their own discoveries about something. It can be difficult to imagine this method if you have not seen it in a classroom setting before. The following excerpt from an article written by Paula Denton, Roxann Kriete and Lyn Betchel provides several examples from different teachers and their classes of guided discovery with primary school students.[92]

Guided discovery in action

A guided discovery can take as little as 15 or 20 minutes. But the interest and excitement that are generated and the skills that children practice support academic learning throughout the day. Here are five examples of guided discovery in the classroom.

Introduction

The fifth graders and their teacher, Mr. Lomax, sit in a circle. In front of Mr. Lomax is an array of five dictionaries. The largest dictionary has a worn leather cover and looks well-used. The rest of the dictionaries come in all sizes and shapes—two paperbacks, a bright red hardcover, and another hardcover that's a sedate gray.

'Today we're going to explore dictionaries,' Mr. Lomax says. 'I love dictionaries. I always learn something new when I flip one open.' He picks up the old dictionary and gently touches its cover. 'Now I know you're all familiar with dictionaries. What have you used them for so far?'

A few hands shoot up.

'I look up words to see if I've spelled them right.'

'Whenever I ask my mom what a word means, she tells me to look it up.'

'We used a Spanish dictionary a lot last summer when we went to Puerto Rico.'

[92] https://www.responsiveclassroom.org/guided-discovery-in-action/

So begins a guided discovery of dictionaries. Guided discovery is a teaching strategy used to introduce materials in the classroom. The primary goal of guided discovery is to generate interest and excitement about classroom resources and help children explore their possible uses. Guided discovery also provides opportunities to introduce vocabulary, assess children's prior knowledge, and teach responsible use and care of materials.

Example 1: Naming

Second grade teacher Ms. Martell holds a covered plastic box. 'I have some wonderful tools in this box,' she says as she shakes the box. 'They come in many colour and you use them to draw. What could they be?'

One of the goals of step one is to get children interested in the material. One way teachers do this—particularly with younger children—is to create a mystery. This engages children's thinking and helps them see familiar materials with fresh eyes.

But materials do not always need to be hidden inside packages, and introductions do not always need to take the form of mysteries. The teacher's tone of voice and the way s/he holds the material can catch children's attention. In the opening vignette, the teacher's excitement about the dictionaries and the reverence with which he handled the old dictionary helped get the children interested in learning more about the potential of a familiar tool.

Another goal of step one is to build a common knowledge base. To do this, teachers use open-ended questions that encourage children to think about their past experiences with the material and to share current observations. Questions such as 'How have you used dictionaries so far?', 'What might be in this box? What are your clues?', 'What do you know about markers?' and 'Look closely at your ruler. What's one thing you notice?' are all examples of open-ended questions.

Open-ended questions are at the heart of guided discovery, occurring in every step. When teachers ask an open-ended question, they are looking for a reasoned, relevant response

rather than one ‘correct’ answer. By listening without judgment to a range of answers, the teacher says, ‘You have valuable experience and ideas that we want to hear about.’

Example 2: Generating and modelling students’ ideas

‘We’re all going to get a chance to work with the modeling clay today,’ Ms. Wilson says to the circle of K–1 students. ‘First, we want to think about some ways to shape it. Who has an idea to share?’ Students call out their ideas:

‘Make a ball.’

‘Flatten it into a pancake.’

‘Make a long, skinny snake.’

‘What a great start!’ Ms. Wilson says when there is a pause. ‘I wonder if we can come up with two more ideas.’

‘Make a letter.’

‘Make a number.’

In step two, the teacher invites children to think through how to use the material. Ms. Wilson begins with an open-ended question to get children thinking. When the brainstorming falters, she challenges the students to go beyond their first ideas. She uses the phrase ‘I wonder’ so that the challenge seems fun rather than stressful.

After the children name ideas for using the material, the teacher invites them to model some of the uses:

‘Alexis, you suggested making a ball,’ Ms. Wilson says. ‘Will you show us how you do that?’

Alexis sits down next to Ms. Wilson, takes the small piece of clay that Ms. Wilson hands her, and carefully rolls and pats it into a ball.

While she works, Ms. Wilson asks the rest of the class, 'What do you notice about how Alexis is making a ball?'

There are many situations during a typical day when a teacher needs to show students the correct way to do something (for example, the safe way to carry scissors). However, during guided discovery, teachers turn to the students to model their own ideas. This sends the message that the teacher values the children's ideas for using the material creatively and appropriately and trusts their ability to do so. As several children step forward to shape clay or draw a design with markers or look up a word in the dictionary, everyone in the class observes and learns.

Example 3: Exploration and experimentation

'Now you will all be able to try some of the ideas we listed for using markers,' second grade teacher Ms. Martell says. She distributes sheets of cardboard and drawing paper. She then passes around the box of markers, asking each child to take two. At first, all the children work on the same tasks—drawing a figure, making a design, writing big letters—tasks that they just saw modeled. After a while, Ms. Martell says, 'Now you can try out an idea of your own.' As the children explore, she walks around to observe their work, pausing occasionally to make a suggestion or redirect a student who has got off track.

After students have generated a list of ideas and a few children have modeled ideas, it is time for children to independently explore the material. They tend to begin trying what was modeled. But with encouragement, they will soon start experimenting with new ideas. Although the teacher sets some limits on the task, the children still can make choices about how to do the task. They learn to turn to their own and their classmates' resources rather than always looking to the teacher.

Example 4: Sharing exploratory work

After a brief exploratory time, Ms. Martell, the second grade teacher, rings the chime to get the children's attention. 'It is time to share our work,' she says, 'If you would like us to see your work, put it on the floor in front of you.' All but two children display their drawings. 'Without talking, everyone look around and see all the good ideas!' There is a moment of silence as the children look. 'Who would like to share one detail that you noticed?'

'Ramona used lots of different colors.'

'Ray's design looks like lots of lightning bolts.'

The children continue sharing things they notice.

'Now who would like to tell us one thing they like about their own drawings?' Many hands go up.

There are many opportunities during guided discovery for children to learn from each other: they share and model their ideas, sometimes help each other during exploration, and at the end of the guided discovery they have an opportunity to share the work they have done.

Work-sharing is always voluntary; in order for children to feel free to experiment, they need to know they will not have to make their results public. Ms. Martell lowered the risk of work-sharing by having the entire group display their designs at once. She knows that the more examples of each other's work children see, the more opportunity they have to learn from each other.

Example 5: Cleanup and care of materials

The fourth graders in Mr. Alonzo's classroom are finishing a guided discovery of rulers. 'We'll be keeping our rulers on the supply shelf with our other tools such as pencils, scissors, and staplers,' Mr. Alonzo says. 'Who can show us a safe and careful way to put your ruler away when you're done with it?'

Jocelyn volunteers. Holding her ruler by her side, she calmly walks to the supply shelf and neatly places the ruler in the box marked 'rulers.'

'What do you notice about how Jocelyn put her ruler away?' Mr. Alonzo asks.

In the final step, the teacher engages the children in thinking through, modeling, and practicing how they will clean up materials, put them away, and access them independently at a later time. As in previous steps, it is the children who generate and model ideas.

Earlier in the year, Mr. Alonzo had already discussed with the children where and how the rulers are stored. He now trusts that Jocelyn can take the lead in reminding the class how to put the rulers away in their designated spot.

Guided discovery benefits learning

Guided discovery has a deep impact on children's learning. Children get interested in classroom materials and learn how to use them creatively in their academic work. They have opportunities to stretch their thinking and work independently. Perhaps most importantly, children are at the centre of the process. Every aspect of guided discovery encourages children to offer ideas, act on them, and share the results of their work with others which stimulates everyone's thinking about future uses of the material.

The scenarios in the article above contain some clues about what subjects the teacher was teaching. For example, how to use a dictionary (the first scenario with Mr. Lomax) is often taught in what is called ‘Language Arts’ in North America.

Learning activity 1

Language Arts is not a subject in Myanmar primary school. In which subject do Myanmar students learn to use dictionaries?

Table 4.2. Modules in which guided discovery method can be used

	Visual Arts	Life Skills	English Text	Morality and Civics	Myanmar	Science	Social Studies	Maths	Physical Education
Guided discovery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Next, let us consider some of the teaching methods you learned about in Unit 2.

4.3.3. Dramatisation and other methods

Expected learning outcomes

By the end of the lesson, you will be able to:

- Select teaching methods based on the nature of the subject.

Dramatisation

Role plays and puppet shows are good teaching methods for lessons on topics related to interpersonal communication, relationships, empathy, values, and decision making. Such lessons will be common in the subjects of Life Skills and Morality and Civics. Role plays and puppet shows can also be useful for helping students to comprehend the stories they will read in subjects like Social Studies, Myanmar, and English.

Table 4.3. Modules in which dramatisation can be used

	Visual Arts	Life Skills	English	Morality and Civics	Myanmar	Science	Social Studies	Maths	Physical Education
Dramatisation	--	Yes	Yes	Yes	Yes	--	Yes	--	--

Pair and group discussion

Pair and small group discussion are very popular teaching methods. Carefully chosen discussion questions can support many different learning outcomes. While generally teachers do not use group discussion methods very much in Physical Education, perhaps you can think of a way that it would be useful.

Table 4.4. Subjects in which discussion can be used

	Visual Arts	Life Skills	English	Morality and Civics	Myanmar	Science	Social Studies	Maths	Physical Education
Discussion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	--

Group projects and presentations

Like discussion, group projects and presentations can be effective teaching methods to help students achieving the desired learning outcomes across all subjects. Group projects also provide an opportunity for students to learn value skills of collaboration and teamwork as they learn to work together with their classmates to accomplish a shared goal.

Table 4.5. Subjects in which group projects and presentations can be used

	Visual Arts	Life Skills	English	Morality and Civics	Myanmar	Science	Social Studies	Maths	Physical Education
Group projects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Presentations	Yes	Yes	?	Yes	Yes	Yes	Yes	?	?

Some examples of group projects in different subjects include:

Visual Arts: Groups create posters, murals, collages or sculptures.

Life Skills: Groups plan a healthy lunch menu that includes all food groups.

English: Small groups work together to write a simple story in English, each member taking a turn to write the sentences.

Morality and Civics: Groups plan (and implement) an activity which would benefit their neighbourhood, such as cleaning up a park.

Science: Groups conduct simple science experiments such as making a lever using a binder clip and a ruler.[93]

Physical Education: Groups make up a new game or an original dance.

Learning activity 1

Can you think of group projects for the subjects of Myanmar, Social Studies and Maths? All subjects can be taught using more than just one teaching method. Many teaching methods can be used successfully in more than one subject. Do not restrict yourself to just one or two teaching methods per subject. With respect to teaching methods in all subjects, the most important thing to remember is to minimise use of lecture method and choral repetition.

Review questions

1. True or False: There is only one suitable teaching method for each primary level subject.

[93] https://learning-centre.homesciencetools.com/article/how-to-make-a-lever-simple-machines-science-project/

4.4. Teaching and Learning Materials

In the 10 Steps to Planning and Preparing for Successful Lessons, Step 7 is determining teaching and learning materials (TLM) needed for each activity. In this textbook, the terms TLM and teaching aids are used interchangeably. The TLM you need will depend on the learning methods and activities that you choose, and on the students in your class. This unit presents six types of TLM - TLM on classroom walls, worksheets, real-world objects, videos, picture card system and assistive and augmentative communication. There are other types of teaching and learning materials too. There are too many to discuss in one unit. As you proceed through this program, you will experience other types of TLM first-hand. That is, other types will be used by your teacher educators as they teach you. You will also learn more about other types of TLM – including technology-based TLM in future courses.

4.4.1. Common teaching and learning materials

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe the importance of teaching aids and how to use them effectively in different circumstances.

What are teaching aids?

In addition to the class textbook, effective teachers use many other teaching aids, which are also called teaching and learning materials. These may include: worksheets, puzzles, posters, videos, audio recordings or podcasts, flashcards, overheads, 3D items such as models or building blocks, and more. Teachers often develop many of their own teaching aids and add a few more to their collection each year. Once you have developed a teaching aid and determined that it works well for your students, do not throw it away –you will want to keep it in a box file for future use.

Why are teaching aids important?

Teaching aids are important for at least three reasons. First, as you have already learned, not all students learn the same way. Presenting concepts to your students in different ways increases the likelihood of you teaching in ways compatible with different learning styles. The second reason is that young students often do not learn something the first time it is introduced. Learning requires repetition. However, repetition of the same concepts in the same format becomes boring for children, and they are likely to lose interest. When they are not interested and engaged, they are not learning. Another problem with repetition of the same material in the same format is that it promotes memorization rather than the more useful thinking skills of understanding and application. Finally, teaching aids help the teacher, not just the students. They are the 'tools' in your teacher's 'toolbox.' Just as a carpenter cannot build a cabinet without tools and a mechanic cannot fix a motorcycle without tools, a teacher cannot teach effectively without tools. Teaching aids are your tools. There are many different types of teaching aids. In this unit we will look at six types of teaching aids, including:

- Teaching aids on classroom walls;
- Worksheets;
- Videos and films;
- Real-world objects;
- Picture card systems; and
- Assistive and augmentative technology.

Teaching aids on classroom walls

Some teaching aids are posted in the classroom on the walls. Teaching aids we might find here include poster-sized maps, letters of the alphabet, numbers, posters with classroom rules, WASH posters and more. In some cases you may be able to get posters free of charge from NGOs or INGOs. If you can draw, you may decide to draw some of your own posters. If some of your students can draw especially well, you may ask their permission to use one or more of their drawings as posters in your classroom.

What are some teaching aids that you can see posted on the walls of the primary school classrooms in the photo below?

Figure 4.8. TLM on classroom walls

In your classroom, you may decide to keep the same posters up for the entire year or you may decide to take some posters down and put new posters up during the year, as the topics of your lessons change. For example at the start of the year, you may have a poster with the numbers 1-20. Once students have mastered the numbers, you may take that poster down and create a different one, such as a poster which shows different methods of counting such as counting by twos (2,4,6,8…), counting by fives (5, 10 15, 20, 25…), and counting by tens (10, 20, 30…).

What kinds of teaching aids are posted on the walls in the classroom you are in right now? Is there a poster of the Bloom's Taxonomy diagram? Or a poster of the different learning styles? Thinking skills and learning styles are concepts which recur throughout the units in your textbook. Would not it be convenient to be able to just glance up to a poster on the wall to refresh your memory about the thinking skills or the learning styles every time they were mentioned in the textbook, by your teacher educator or by your classmates? What are some other recurring models or key concepts you can think of?

The posters that would be useful for you as learners in this program will be different than the posters that will be useful to your primary school students because what they will be learning is different than what you are learning as a student teacher.

Learning activity 1

Think about what you have been learning in your classes. Is there a concept, process or cycle that is taught in more than one of the subjects? In your notebook, draw a design for a classroom wall poster for one such recurring theme.

4.4.2. Worksheets

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe the importance of teaching aids and how to use them effectively in different circumstances.

In schools where teachers have access to a printer or a photocopier, but not to wi-fi, laptops or projectors, worksheets are amongst the most common teaching and learning materials. Worksheets provide opportunities for children to discover, practice or review the concepts and skills related to the lesson's learning outcomes.

Not all one page documents are worksheets. Some are diagrams, articles or supplementary (extra) reading. Students need to look at these, read them and study them, but they do not need to interact with them in any way. Worksheets, by contrast, always require a student to do something more than 'read' or 'look at.' Most often, students are required to draw, write, complete, circle, underline, match or answer something on a worksheet.

Worksheets can be used to help teach any subject. There are many worksheets available on the Internet. They often include graphics and so can be more interesting for children than the blank pages of their notebooks. If you would like to use a worksheet as a teaching aid, but you do not have access to a printer and a photocopier, there are a few options. If you have access to an overhead projector and overheads, you could create a worksheet on an overhead which children then copy into their notebooks and then complete. Alternately you may want to draw a worksheet on a flip chart paper or on the board for the whole class to see and copy and then to complete.

Browsing worksheets on the Internet will give you some ideas for creating your own worksheets in Myanmar language. As with teaching methods, learning activities, and other teaching aids, the important thing is to choose a worksheet which provides practice or reinforcement necessary for your students to achieve the desired learning outcomes of your lesson. A worksheet that is not related to the outcomes of your lesson is not a useful teaching aid. It may create confusion and actually interfere with students achieving the learning outcomes.

Many of the websites with worksheets that you can download will require you to create an account or profile before you can access the worksheets and other resources. While some of the sites charge a fee, there are many very good sites that do not charge any fees. One way to find worksheets is to search for worksheets on a specific topic at a specific grade level. For example, when you search (English) spelling worksheets for Grade 1, we might find worksheets that look like:

Figure 4.9. Grade 1 spelling worksheet

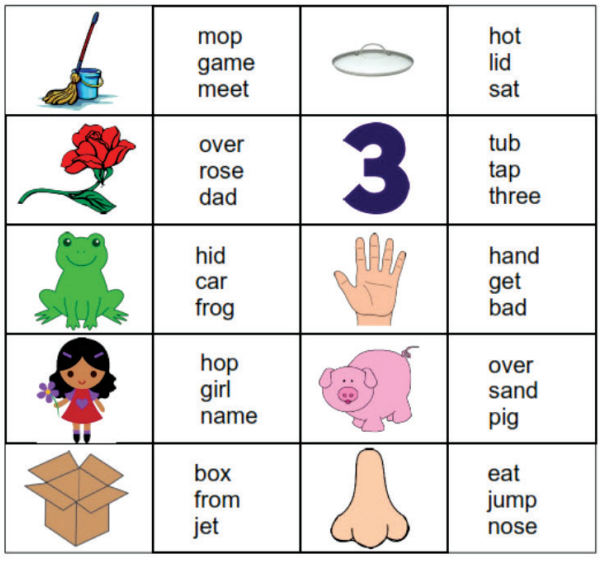


Figure 4.10. Beginning blends worksheet

Learning activity 1

Try searching the internet now, using your phone. On the Google homepage enter Science Worksheet for Grade 2. You will see many results for your search. Many of them are made by teachers in English speaking countries. This means they are in English, and they contain content related to Grade 2 curriculum from other countries, which may be quite different than the Grade 2 Science curriculum here. Therefore, you may not be able to do a direct translation of most of these worksheets and give them to your students, because they will not be relevant in the Myanmar context. You can, however, use ideas from the worksheet to create your own that fit with Myanmar's Basic Education Curriculum

Using 'Science worksheets, Grade 2' as a search term returns lots of results because it is quite broad. What other search terms could you enter?

Learning activity 2

Look back at Sub-unit 1 of this unit to the text entitled 'What Do You Say?' If you were preparing to teach a lesson about the main message of that text, what search term could you use to check if there are worksheets you can use to get ideas?

Try searching 'animal communication.'

Now try searching animal communication for primary school. Or animal communication worksheets Grade 2. Or animal communication for Grade 2. Take a few moments to look at your results. Do you see any that would fit with the learning outcome: *students are able to explain and give examples of ways that animals communicate?*

Videos and films

Videos can be a useful teaching aid to use in your classroom if you have access to a computer and projector or to a TV, DVD player and DVDs. Most teachers use videos occasionally rather than frequently. There are many videos suitable for supporting learning outcomes for primary level lessons on Youtube.com. Finding a good quality video that is a good fit with the learning outcomes you have identified can be quite time consuming, so if you find one make sure to bookmark it so you can use it again in future.

Real-world objects

If you can, bring a real-world object related to the learning outcomes of your lessons into the classroom. Not every lesson will be well-suited to bringing real-world objects, but some will. If you are teaching a lesson related to animal communication, it may not be realistic to bring an animal in, especially not a live fiddler crab or penguin or octopus! However, if you are teaching about the water cycle, you can bring in some rain water (not bottled water!) that you have collected. Or if you are teaching about how water moves through trees from the roots to the leaves, you can bring in some leaves and have students look closely at the veins.

TLM can be time-consuming to find and to create but they are so important to achieving student learning outcomes that they are a valuable investment of your time and energy.

As you have seen in this unit, TLM do not need to be expensive. Real world objects, such as rainwater for the water cycle lesson, and such as the pole, plants and other items used in the lesson about shadows (shown on video), are no cost TLM. Worksheets do not have to be printed on colour printers and distributed. Teachers can draw the worksheets on the whiteboard or overhead projector and have students copy them into their notebooks. There are many free videos and other TLM that you can download from the internet at home or at a wi-fi cafe in your weekend planning time and use in your lessons even if wi-fi is not available in your classroom. Use the resources available to you and your own creativity to choose TLM that are relevant to your lesson learning outcomes and keep students engaged in learning.

Picture cards

Picture cards are also useful TLM. Cards with pictures on them can be used for teaching vocabulary, art, emotions, social and behavioural skills, safety, seasons, and more.[95] Picture cards are useful when teaching students who have reading difficulties or disabilities and they are 'particularly effective for those individuals who have trouble processing verbally delivered information and conceptualising abstract concepts'.[96]

Augmentative and alternative communication

Picture cards can also be used as communication tools by students with limited speaking ability.[97]

> 'The Picture Exchange Communication System or PECS, allows people with little or no communication abilities to communicate using pictures. People using PECS are taught to approach another person and give them a picture of a desired item in exchange for that item. By doing so, the person is able to initiate communication. A child or adult with autism can use PECS to communicate a request, a thought or anything that can reasonably be displayed or symbolised on a picture card. PECS works well in the home or in the classroom…PECS begins with the exchange of simple icons but rapidly builds 'sentence' structure.'[98]

[94] http://www.mun.ca/educ/faculty/mwatch/vol2/ryan2.html
[95] http://do2learn.com/
[96] http://do2learn.com/
[97] https://www.autism.org.uk/
[98] https://www.nationalautismresources.com/the-picture-exchange-communication-system-pecs/

Figure 4.11. Picture Exchange Communication system [99]

Review questions

1. Write a short paragraph to describe a type of teaching aid and how it could be used in a lesson.

[99] https://www.nationalautismresources.com/the-picture-exchange-communication-system-pecs/

4.5. Characteristics of Good Learning Activities

Some learning activities require TLM, and others do not. Knowing how to recognise good learning activities and how to create them is necessary for you to complete Step 5 of the 10 Step planning and preparation process. Step 5 is: Using your knowledge of activities and methods, and the importance of sequencing and variety, visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes.

4.5.1. What makes a good learning activity?

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe what a learning activity is and explain the characteristics of a good learning activity.

What is a learning activity?

A learning activity is an activity that the students participate in for the purpose of achieving the learning outcomes of the lesson.

Examples of types of learning activities include:

playing games	active reading	making presentations
singing songs	writing	conducting simple experiments
completingn worksheets	drawing	researching
watching videos	painting/coloring	debating/discussing
role playing	solving puzzles	individual or team problem-solving

Learning activity 1

What other learning activities can you think of?

Just like you prefer some learning activities over others, your students will have their own preferences too. They will have different personalities and different learning styles, and some may have physical, cognitive or other limitations which prevent them from participating in some of the activities. Develop alternate learning activities for those students or choose activities which everyone can participate in and benefit from.

Some learning activities will be very effective for some students but not as effective for other students. For this reason it is important to use different learning activities in your classroom, even the ones you do not personally prefer, when you are learning something new!

Characteristics of a good learning activity

While different learning activities may work well for different students and for different topics, there are some common characteristics of good learning activities:

- A good learning activity effectively moves children toward the learning outcomes of the lesson. Many children have favorite games and songs, but if the learning outcome of your lesson is for children to learn to be able to count to twenty, then songs and games about other topics will not help them achieve the learning outcome.

- A good learning activity is one which gives all students a chance to participate. If only a few students can participate in the activity, others will soon get tired of watching the lucky few who are participating. They will daydream or draw pictures in their notebooks instead of learning what you had intended.

- A good learning activity is easily explained to children. Some learning activities give all students a chance to participate but the instructions for the activity are very complicated. When students are confused about what they are supposed to do, the learning value of the activity is lost.

- A good learning activity is not too long. Even very keen students can lose interest in an activity if it drags on and on.

- A good learning activity is one which after receiving initial instructions, children can perform relatively independently. That is to say, it does not require the teacher to be directing the activity throughout. The teacher's role during the learning activity is to observe and monitor student performance of the activity so that they can determine which students are grasping the concepts or developing the skills and which are struggling to do so.

- A good learning activity is interesting for your students. Historically, lessons in Myanmar have involved students repeating questions and answers spoken by the teacher. When you are teaching pronunciation, tones or intonation, repeating after the teacher may be a suitable activity for a very brief time, however it should not be the only learning activity used.

- The most interesting (and memorable) activities for children tend to be those that are not too easy or too difficult, and that incorporate some fun, such as music, movement, a friendly race or competition among fairly evenly matched teams.

- A good learning activity develops more thinking skills than just remembering. Bloom's Taxonomy identifies seven thinking skills. When you are choosing a learning activity, think about what kind of thinking skills it helps to develop.

Learning activity 1

There is a difference between an activity and a good learning activity. Lots of activities are fun and entertaining and keep students busy and entertained. Many teachers would say that they enjoy seeing students happy and enjoying themselves. The role of a teacher though, is not to keep students busy and entertained. It is to move them toward learning outcomes. A good learning activity can be, but does not have to be, fun and entertaining. It is the learning value of the activity relative to the learning outcomes that matters.

Review questions

1. Describe the characteristics of a good learning activity.

4.6. Designing Teaching Activities

Teaching activities and learning activities go hand in hand. The teaching activities are what the teacher will do and the learning activities are what the students will do. Like Unit 4.3 and Unit 4.5, this sub-unit helps you to develop the knowledge and skills that you need to be able to visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes.

4.6.1. Teaching activities for introducing a lesson and teaching main idea and related ideas of a reading

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain various types of teaching and learning activities.

Teaching activities

Teaching activities are activities that you, as the teacher, do in the classroom. When we plan a lesson to achieve particular learning outcomes, it is helpful to visualise what the teacher will be doing and what the learners will be doing during the lesson.

At the beginning of the lesson, the teacher may choose an activity to review material from a previous lesson, introduce a new concept or skill, connect with students' prior learning or generate interest in materials that students will be using in the upcoming lesson.

Beginning the lesson

Let us consider two possible activities for beginning a lesson. Let us say that the desired learning outcome of the lesson is that students will be able to use a dictionary to identify related forms of a word; for example, the noun, adjective or adverb form of a word.

A. You can begin a lesson with an announcement and instruction for the students. For example, the teacher might say, 'Good morning, class. Today we are going to learn more about how to use a dictionary. Please take out your dictionaries.'

B. You can also begin by asking questions to see what your students already know or to connect with a prior experience. Remember the article on guided discovery in Unit 4.3? Let us look at the introduction for another way to start the lesson:

> The fifth graders and their teacher, Mr. Lomax, sit in a circle. In front of Mr. Lomax is an array of five dictionaries. The largest dictionary has a worn leather cover and looks well-used. The rest of the dictionaries come in all sizes and shapes—two paperbacks, a bright red hardcover, and another hardcover that's a sedate gray.
>
> 'Today we're going to explore dictionaries,' Mr. Lomax says. 'I love dictionaries. I always learn something new when I flip one open.' He picks up the old dictionary and gently touches its cover. 'Now I know you're all familiar with dictionaries. What have you used them for so far?'

A few hands shoot up.

'I look up words to see if I've spelled them right.'

'Whenever I ask my mom what a word means, she tells me to look it up.'

'We used a Spanish dictionary a lot last summer when we went to Puerto Rico.'

Learning activity 1

What other activities can you think of for introducing the lesson?

Presenting a concept: Seasons

For students to achieve the learning outcome(s) of a lesson, the teacher will likely need to introduce a new concept or new information about a concept that students already know about from their life experiences or from previous lessons.

Now, let us consider two possible activities for presenting the concept of the three seasons in Myanmar to primary students who are not yet reading proficiently. The learning outcome is that children will be able to name the three seasons and explain weather and items associated with each season.

A. One way the teacher could teach this concept is by reading three short children's books to the class, each of which tells a story about a different season. While she is reading, the teacher pauses to show the children the pictures of each season.[100]

[100] https://www.wikihow.com/Sample/Lesson-Plan-for-Younger-Children

B. The teacher draws four pictures of the different seasons on the board. The teacher points to the cool season drawing and ask the children: 'Is this the hot season? No? How do you know? Which one is the hot season? Why do you think so? Who agrees that this is the hot season?' The teacher writes 'hot season' beside the picture after the students identify it. The teacher then continues to ask questions to extend the children's knowledge; for example, 'What other pictures could we draw for hot season? Who likes the hot season? Why do you like it?' The teacher then follows a similar process for the other seasons. What other activities can you think of for presenting the concept of seasons and their associated characteristics?

Presenting a concept: Subtraction

Now, let us consider an activity for teaching subtraction.

The teacher places five pencils on a table. She writes the number 5 on the board. She then calls on a student to come and take away two of the items. She writes –2 behind or under the 5 on the board. The teacher explains that '–' means 'take away.' She asks another student to count how many items are remaining on the table. The student counts 1-2-3. The teacher writes = 3 on the whiteboard. She says that '=' means remaining. The teacher repeats the same demonstration with different items – for example, buttons or books – so that students understand that the result is always the same. 5–3 = 2. She repeats the demonstration with different starting numbers 6, 7, 8, 9 10 and different equations before assigning a learning activity.

4.6.2. Activities for teaching vocabulary

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain various types of teaching and learning activities

Presenting a concept: New vocabulary

Now, let us consider two possible activities for teaching new vocabulary in a text.

A. After the students have read the text once and understand what it is about, the teacher displays the text on overhead projector and asks students individually, in their textbooks, to circle the words that are new to them. The teacher asks children if any words in the first sentence are new to them. The teacher demonstrates strategies for determining meaning from context. For example, in *'How Bees Make Honey'* if 'gradually' is a new word for children; the teacher might ask questions to elicit what we can learn from the context or the text surrounding the word. For example, the teacher might ask, *'How long do the bees chew the nectar for? Thirty minutes? Thirty minutes is the same as recess. If you start chewing some food at the start of recess, will you still be chewing the same bite at the end of recess? No. So is 30 minutes a long time to chew for? Or a short time? A long time. So if it takes a long time to chew the nectar to make the honey, is the honey made slowly over a long time or quickly over a short time? Slowly over a long time. And that is what gradually means slowly over a long time.'* Then teacher reinforces the new vocabulary with other examples. *'What are some other things that happen gradually? Our hair grows gradually. It takes a long time to grow long hair. Our parents gradually become elderly''.* Students write the new word, the simple definition, and the examples in their notebooks.

B. The teacher distributes a handout with definitions for the words that the children are unlikely to know so they can refer to when they read the text.

Learning activity 1

What other activities can you think of for teaching new vocabulary? What other activities can you find on the Internet? Teaching vocabulary is different than testing vocabulary or giving learners chances to practice the new vocabulary they have learned. Make sure when you look at the Internet, you are looking for activities which are used to introduce new vocabulary to students.

4.6.3. Putting it all together

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain various types of teaching and learning activities

In the first lesson of this unit, you practised strategies for identifying the main idea and related ideas of a text. Do you remember them? Could we teach these strategies to our students? What could be an activity for teaching how to find the main idea and related ideas?

When you are planning a lesson, the important thing to remember is that you need to visualise what the teacher will be doing as well as what the learners will be doing during the lesson. DO NOT write out or memorise a script of everything you will say. Teaching is not about delivering memorised speeches or reading words from a page. But having a general idea of main points that you want to communicate, and the order that your lesson will follow, is essential for a successful lesson.

In Unit 2 and in sub-unit 4.2 of this unit, you learned about teaching methods. Broadly speaking, a teaching method is a general approach to teaching which reflects a teacher's set of beliefs about the teacher's role and the students' role in the teaching and learning process. Directive, teacher-focused methods reflect the belief that the teacher is the source of knowledge and his or her job is to fill students up with knowledge. Learner-focused approaches reflect a set of beliefs that students are not just passive recipients of knowledge imparted by the teacher; they are actively involved in learning, not just from the teacher and the teaching and learning materials that the teacher provides, but also from their peers, and by exploring and experimenting with new concepts and how they relate to the knowledge of the world that the child already possesses.

Teaching activities by contrast, are the specific actions that the teacher takes to present new concepts to students. Generally, teachers use teaching activities that are consistent with their beliefs about the role of teachers and students in the learning process.

Do not be too concerned about terms and differences between teaching methods and teaching activities. What are described as teaching methods by one education expert are described as teaching activities by another?

When you are designing teaching activities, there are five important principles to remember:

1. Children already have some knowledge about the world. They have experiences and memories and likes and dislikes. Before teaching something new, elicit the related knowledge that your students already have. In your teaching activity, connect the new information to their existing knowledge. For example, children are not likely to know the seven steps to making honey but they do know what honey is, what bees are, and possibly also that bees make honey. They know if they like honey or not. They know that bees live in hives. They may also know about different types of bees– the queen bee and the worker bees. To activate the knowledge that children already have you can ask questions you expect they know the answer to from their life experiences. You can then build on this base to introduce new more complex concepts. By activating the knowledge that they have first, you also reinforce that your students are knowledgeable and smart. When children feel knowledgeable and smart, they have more self-confidence in their ability to learn new things, and consequently they learn better.

2. Do not present too many new concepts or details at one time.

3. When presenting new concepts, stop often to ask questions to check that the children are understanding what you are saying. Do not simply ask 'do you understand?' because children may be shy about admitting that they actually do not understand. Instead, ask a question which checks their understanding. There are many ways to ask these questions. One way is to give children two choices; for example, if presenting new information on seasons, you might ask, 'In the cool season, do we need our mittens or our umbrellas?'

4. Teach strategies that will help children to remember new information. An example of a strategy in this unit is the anagram 'SMART.' Other strategies include rhymes and short easy to remember 'rules'. For example, there are well-known rules about English spelling such as 'i before e except after c,' or, rules in Maths such as 'a number multiplied by 0 always = 0'.

5. Teaching thinking skills is interwoven with teaching concepts. Whenever you teach a concept, you are also teaching or drawing on students' existing skills related to understanding and critical thinking.

Learning activity 1

Create a strategy to help yourself remember the five points above. It might be an acronym (like SMART is an acronym of Specific, Measurable, Achievable, Relevant and Time-bound) or a rhyme, a chant or some other way to help you remember these five points.

Review questions

1. What are the five principles of designing teaching activities?

4.7. Lesson Planning

Lesson planning is not just one step in the 10-Step process. Lesson planning is Steps 3-10. This sub-unit will better equip you for Steps 5, 6, and 10 which are:

5. Using your knowledge of activities and methods, and the importance of sequencing and variety, visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes.

6. Decide how much time to allow for each activity.

10. Document your plan on a lesson plan template.

4.7.1. Sequencing, chunking, estimating time, documenting the plan

Expected learning outcomes

By the end of this lesson, you will be able to:

- Explain what needs to be considered in order to prepare a good lesson plan.

What is a lesson plan?

You will remember from Unit 4 that a lesson is a purposeful, planned organised approach to teaching a main concept and developing your students' behaviours, attitudes and skills (including their thinking skills) that occur within a specified time. Before you enter your classroom to teach a lesson, you need a clear and organised plan as to how you will support your students to achieve the learning outcomes you have identified. To help you develop the skill of visualising what you will be doing and what students will be doing ask yourself the following questions:

1. How closely is this new lesson connected to your previous lesson? Is it part of the same unit as the previous lesson? Or are you beginning a brand new unit?

2. Do you have any unfinished business from the previous lesson?

3. What will you and your students do first?

    a. Will you group the students into pairs? Small groups? Or is this a large group (whole class) activity?
    b. Will you require any classroom supplies? Any teaching learning materials or technology?
    c. How long will you do this for?
    d. What obstacles might prevent you from doing this? What is your back up plan?

4. What will you and your students do next?

    a. Ask yourself all of the same questions as you asked yourself after question 3.

5. What comes next?

    a. Again, ask yourself all of the same questions that you asked yourself after question 3.

6. At the end of the lesson, how will you determine if the students have achieved the learning outcomes?

7. How will you end the lesson?

8. Will you assign homework? If yes, what homework will you assign?

When you think about teaching five or more lessons per day, this may seem like a long list of questions to ask and answer for every one of those lessons. Yes, lesson planning takes some time to do well, especially when you first begin teaching. Many professional teachers, especially in their first year, find that they need to plan lessons in the evening or on weekends. The good news is that with some teaching experience, and reflection on what went well during a lesson and what did not go as well as you thought, the questions soon become automatic for you to think about when you are planning a lesson. From year to year, you will find you are teaching the same courses, so you will be able to re-use lesson plans for lessons that were successful, and make changes to ones that did not go quite as you had planned. This will save you a great deal of time, so make sure to keep your lesson plans after you create them.

Variation

When you plan a lesson, you want to have some variety. If the first learning activity involves students working in pars to complete a worksheet, for example, then plan for a different grouping and a different type of activity, such as individual reading or small group discussion for the next activity. A variety of activities and groupings will keep learners more engaged than very similar activities and groupings throughout the entire lesson.

Sequencing and chunking

Sequencing means deciding which activities should happen in which order. Should the students read about animal communication first? Or talk to each other about it first and then read the text? Or should you begin the lesson by asking some questions about animal communication to the whole class? Often there is more than one right way to sequence the activities in your lesson.

The key to sequencing is to order the activities from easiest to most difficult. During the lesson, students add a bit of new knowledge to the knowledge they already have. Then they add a bit more and a bit more until they have reached the learning outcome.

Think about teaching a process such as bees making honey. There are several steps to the process. Before students can understand and explain all seven steps, they need to be able to understand and explain some of those seven. Will you teach each step in order? Or will you teach the first the middle and the last step, and later add in the remaining steps? Will you begin by teaching that there are two types of bees involved and the step where the nectar passes from the first type to the second type of bees before you teach about the other steps?

There are many ways that you can teach pieces of the process separately. This is called ‘chunking’. Chunking refers to breaking information down into manageable pieces for students. Human brains are much better suited to receiving smaller chunks of information rather than a large amount of information at once.

Not all lessons will be about processes but you can use the same type of thinking in planning any lesson. Work backwards from the learning outcome.

Similarly, before students can write a letter to a pen pal in Britain, they need to understand the concept of Britain as a different country than Myanmar, the concept of a pen pal, the idea that life in Britain is similar to our life in some ways and different from our life in some ways, the sections of a letter (salutation, body, closing), and that good letters include some information about ourselves and some questions about the people we are writing to. Clearly this is too much for students to learn in just one lesson. So, you may teach it over several lessons. One or more lessons about life in Britain, one lesson about pen pals and one or more lessons about letters, the last of which has a learning outcome of writing a letter to a pen pal in Britain.

Sequencing lessons and sequencing activities within lessons requires you to use the higher order thinking skill of analysis, presented in Bloom’s Taxonomy as ‘analyse.’

It might be helpful to think about a lesson planning as solving a challenging problem. The best approach to solving a challenging problem is to separate it into two or more simple problems.

We encounter challenging problems in our day to day lives, and we are able to solve them. When a school aged child of a single working mother wakes up on a weekday with a fever and there is not any medicine in the house, she has a challenging problem to solve. She breaks it into two simple problems and solves those.

Simple problem 1: The child is sick with fever and there is not any medicine in the house.

Solution: The mother calls her sister who lives nearby and explains the situation. The sister has to go to work, but can bring some medicine by on her way. Or: the mother makes her child a different remedy from items she does have in the house. Or the mother borrows some medicine from her next door neighbour.

Simple problem 2: The mother is supposed to go to work, but her child cannot go to school.

Solution: She calls her employer and explains that she will not be in today. Or she calls someone she trusts to come and stay with her child.

Your analysis and problem-solving skills are like muscles. The more you use them, the stronger they get. Practice working backwards from a lesson learning outcome to decide which activities you want to include in which order. Remember to use a variety of activities and teaching methods. And include some fun.

Estimating time

Some activities will take longer than you expect they will and some activities will take less time than you expect. The size of your class, your teaching methods and teaching/learning activities and your students' interest in the topic and energy levels are all factors which influence how long activities will take. Role plays take longer than completing worksheets. Small group discussions of a topic take longer than pairs discussions.

Giving clear instructions will help to contain the time needed for an activity. If your instructions are unclear, and students do not understand what they are supposed to do, the activity can take much longer than planned.

Be flexible. Just because you have made a plan does not mean thaat you cannot modify it in response to what is happening in your classroom.

Who will see the completed lesson plans?

You will see the completed lesson plans. Other teachers who come from time to time to observe your lessons will see the completed lesson plan for the lesson they are observing. You may be asked to submit completed lesson plans to your school's administration. The reason for this is that teachers preparing plans for effective teaching is an indicator of school quality. Lesson plans are the 'evidence' schools need to know if teachers are planning their lessons. If you are asked to submit one or more of your completed lesson plans to the school's administration, make sure to keep a copy in your box file! You will want to be able to refer back to a lesson plan when you teach the same lesson in future to different students. After reviewing the original lesson plan, you may decide to repeat exactly the same lesson or you may decide to change it. Either way, having the old lesson plan to refer to saves you time, compared to completing another blank lesson template for a lesson you have already taught.

What is a lesson plan template?

A template is a standard form which always contains the same headings. We create our Facebook profile using profile templates. Everyone who creates a Facebook profile enters the same type of information (name, gender, birthdate, company they work for). The template is the same but the profile is unique to each person. Lesson plan templates always require us to enter the same type of information but the completed lesson plan is unique for each lesson. There are many possible templates for lesson plans. Every template includes some headings and some space for the teacher to write. You can complete a lesson plan template on paper or on a computer. The headings in a lesson plan template help teachers remember all of the things they need to think about when planning the lesson.

Different lesson planning templates specify differing amounts of detail. There is not one right way to make a lesson plan. You will need to choose the one that works best for you or your teacher educators or school administrators may have one they want you to use.

Learning activity 1

Before proceeding to the next section, predict what information you think a lesson plan template will include. What headings will it include? Draw what you imagine a template will look like in your notebook.

It will be helpful for you to review some different lesson plans. The following plans are prepared on different templates. Different schools may use different template or may allow teachers to use the lesson plan format that suits them best.

4.7.2. Teaching the seasons

Figure 4.12 'Teaching the seasons' lesson plan

Lesson: Teaching the seasons

Objective: Teach students about the different seasons of the year: spring, summer, autumn, winter.

Materials: Construction paper, arts and craft supplies, calendar, photos of each season, four children's books

Procedure:

12:00–12:15 → Show different pictures of each season. Start with spring and progress all the way to winter, explaining the weather in each season and using the pictures as a visual aid.

12:15–12:30 → Read four short children's books, each telling a story about a different season. This will give the students something familiar to associate with each season.

12:30–12:45 → Put the children at different tables, and hand out art supplies. Demonstrate to them what the project is: a large piece of construction paper split into fourths. In each corner, the students will be doing art that reflects each season. For spring, they can make flowers; for summer, they can make a sun; for autumn, they can make leaves; for winter, a snowman.

12:45–1:45 → Give the students ample time to complete this project. Go around and help them construct this piece of art and label each of the seasons. Frequently ask questions when going around about other things each season includes. For example, summer is a time to go to the beach while winter is a time to wear coats, mittens, and scarves.

1:45–2:00 → Clean up art projects, and hang them around classroom.

2:00–2:15 Have a final wrap-up with the children with a question and answer period about each season. Ask them what kinds of things they associate with each season, including things like weather and also personal memories. This will solidify that they understand the lesson completely.

Homework: Have them draw a picture at home including something from one specific season of their choice. They will have to come in the next day and show the class their drawing and explain why it fits into one particular season.

4.7.3. Comparing and creating lesson plans

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain what needs to be considered in order to prepare a good lesson plan; and
- Prepare a draft lesson plan and assess it using criteria for good lesson planning.

Figure 4.13. First grade Maths lesson plan[101]

First grade Maths 50 minutes

Learning objectives: Students will learn to work as a team to count and write the numbers up to 120.

Introduction (10 minutes)

Ask students to join you in a circle and tell them that today you would like to try counting with them a little differently than usual.
Write the words 'Pass The Marker!' on the board and keep the marker in your hand.

Explain to the students that you want to practice counting up to 120 as a team by playing Pass The Marker. Go over the following rules with them:

1. The person that starts the game has to grab the marker and say 'One!' and immediately pass the marker clockwise.
2. The next person to hold the marker has to say 'two' out loud and pass the marker clockwise.
3. The pattern continues until they have reached 120.
4. They only have 60 seconds to reach 120.

Do a brief demonstration by counting from 1-10 with some volunteers and then continue to the actual game.

If the students cannot count up to 120 within 60 seconds, ask them what the class can do to get there faster.

Repeat the game by counting by 2's, 5's, and 10's.

Explicit instruction/Teacher modelling (5 minutes)

Tell the students that you would like to repeat the game but this time you would like to play Pass the Paper.

Tell students that the same rules apply as Pass the Marker but instead of saying the number the students must now write the number and then pass the paper.

Remind the students that they can look for patterns in the numbers to help them write the number that comes next. Give the clipboard, marker and graph paper to the first student and set 60 seconds on the timer.

Guided practice/Interactive modelling (15 minutes)

Divide the students into groups of 5.

Issue a copy of the Sally the Silly Snake worksheet to each group and tell them that their job is to work as a team to fill in the numbers 1-120 inside of the snake by playing 'Pass The Snake!'

Review the following rules with students:

1. They cannot fill the paper in for anyone else except themselves.
2. They can help each other by encouraging their team members to look for patterns.

[101] https://www.education.com/lesson-plan/pass-the-snake/

3. Every square must be filled in, if it is not, it means that they miscounted somewhere along the way.
4. The first team to fill in all the squares correctly wins.

Allow students to start the game and let them colour, cut, and glue the snake once they have finished the game.

Walk around and monitor the students' progress as the game goes on, stopping every now and then to help them.

Independent working time (10 minutes)

Issue a copy of the Countdown worksheet to each student once the activity is done.

4.7.4. Creating lesson plans

Expected learning outcomes

By the end of the lesson, you will be able to:

- Prepare a draft lesson plan and assess it using criteria for good lesson planning.

Period 1

In Period 1 of this lesson, you will continue your work on planning a lesson related to the water cycle. You will present your ideas to some of your classmates.

Remember the 10 steps to planning and preparation!

Period 2

In Period 2, you will consolidate all your learning about lesson planning.

You will work with a partner to create a 20-minute lesson plan. Your teacher educator will form pairs. You will be called Pair A or Pair B.

Pair A: Create a 20-minute lesson plan for the reading *'What Do You Say?'* in Lesson 4.1.1.
Pair B: Create a 20-minute lesson plan for the reading *'How Bees Make Honey'* in Lesson 4.1.2.

You will present your work in the next lesson. You will also self-assess your work, and assess your peers' lesson plans.

Remember: Planning can take a long time – planning the lesson often takes longer than the lesson itself! Planning and preparation are the 'foundation stones' of successful teaching and learning. Failing to prepare is preparing to fail.

4.7.5. Presenting lesson plans

Expected learning outcomes

By the end of the lesson, you will be able to:

- Assess a lesson plan using criteria for good lesson planning.

Criteria for a good lesson plan

Thus far, we have been thinking about lesson planning as a process, involving 10 steps and a number of questions that we ask and answer for ourselves related to the step of visualising what teachers and students will be doing during the lesson. A lesson plan is also a product. Some lesson plans are good lesson plans, and some are weak lesson plans.

Criteria for good lesson plans are as follows:

- The lesson plan identifies, the teacher, subject, grade, and date of the lesson.
- The lesson plan includes one or more SMART learning outcomes for the lesson.

- The lesson plan includes logically sequenced activities (from easiest for students to most difficult for students) which lead students to achieving the learning outcome (s).
- The lesson plan includes more than one type of learning activity.
- The lesson plan includes activities which are suitable for students who are differently abled, for example intellectually advanced students and students with cognitive, behavioural, emotional and /or physical limitations.
- The lesson plan clearly identifies how much time each learning activity is expected to take.
- The lesson plan clearly states the teaching and learning materials required for each activity and where another teacher can find those materials. If there is not a 'shared drive' on which the print/picture based materials are stored, they are attached to the lesson plan.
- The lesson plan can easily be understood and used by another teacher to teach the lesson. It includes enough information, but not too much detail. The information is presented clearly.
- The lesson plan includes a 'wrap up' activity at the end.
- The lesson plan includes any homework to be assigned.

In the next unit, you will learn about assessment. The lesson plan also includes assessment.

Table 4.6. A sample lesson plan template

Class:		**Date:**	**Time:**	**Teacher:**
Lesson:				
• Learning outcomes:				
• Criteria for success:				
• Materials:				
• Timing	**• Teacher activity**	**• Student activity**		
• Additional possibilities:				
• Homework/Further work:				

Review questions

1. Explain the 10 steps involved in the process of lesson planning.

Unit Summary

Key messages

- The skill of planning and preparation is a skill you can learn and practise.
- There are 10 steps to planning and preparing for lessons.
- Teach yourself the main idea, related ideas and supporting details of the lesson content.
- Anticipate what content students might already know, based on life experiences and previous learning. Anticipate what (on topic and off-topic) questions students may have, and how they will respond to both types of questions.
- Determine one or more SMART learning outcomes for the lesson.
- Determine success criteria.
- Using their knowledge of activities and methods, and the importance of sequencing and variety, visualise what you will be doing and what students will be doing during the lesson which will lead them to the learning outcomes.
- Decide how much time to allow for each activity.
- Determine teaching and learning materials (TLM) required for each activity.
- Adapt existing TLM from the internet or create new ones.
- Anticipate obstacles which may interfere with your lessons going as planned (for example electricity outage may happen at time a teacher is planning to show a video) and what you will do to keep the students moving forward toward the learning outcomes.

- Document the plans on lesson plan templates and keep it for future use.
- Planning starts with teaching ourselves first.
- Good teachers make a plan.
- The plan includes a variety of activities and teaching aids which will help your students reach the learning outcomes.
- The plan includes activities which create opportunities for your students to discover things themselves and learn from each other, as well as ones which involve learning from the teacher.
- There is not one single ‘right’ way to plan a lesson. There are many right ways.
- Even the very best teachers had a tough time with planning and preparation at the start of their teaching careers. It is difficult, but, like most things it gets easier with practice.

Unit reflection

In your first year or so of teaching, be prepared for lesson planning to take up much of your free time. It is quite normal for the planning to take considerably longer than the lesson itself. Remember in this time of hardship that it will be worth it in the end because it will make you a better teacher – in the short-term because you will have well-planned lessons, and in the long-term because you will have had lots of practice of teaching well-planned lessons! As you become more experienced, you will find that your lesson planning becomes quicker, and that you are more confident when it comes to improvising in the classroom. Still, there is no substitute for good planning and preparation.

Included in your planning is the matter of resources. There is currently a trend for 'resource-light teaching' that is lessons that require few or zero resources, reducing energy from printing and waste from the amount of paper that is used. Again, this is probably an ambitious aim in your first years, as the experienced teacher can replicate the effects of a resource by seemingly conjuring up student-led tasks, rather than relying on paper-based materials. This does, however, lead us to the highly important matter of the student-centred classroom. Remember that although you are the teacher, you are a facilitator of learning, not simply a purveyor of knowledge. This means your job is to encourage active learning – curiosity, problem-solving skills, critical thinking – not just to transfer facts. So do not be afraid to give your students the job of finding solutions for themselves rather than giving them everything on a plate.

Finally, one of the most important aspects of lesson planning comes after the lesson. It is at this time that you must reflect on your teaching and plan to rectify or improve those elements of the lesson that you believe you could do better or would like to do differently next time. A lesson rarely goes perfectly to plan – you have a whole class of students who will be sure to mess up your plans! – but if you can plan for learning in the beginning and see learning at the end, you are on the right track.

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Unit 5

Assessment

Assessment of learning serves many different purposes, and can be carried out in a multitude of ways. Assessment can be used by both teachers and students to understand their level of knowledge and understanding, and can be used to improve and develop teaching methodologies to better meet the needs of students. Assessment can be made before, during and after teaching and learning, and the tools for each type of assessment can be applied in a number of different ways depending on the expected outcomes of the assessment and the numerous variables that influence learning. Data and information collected during assessment can be used formatively, as a tool to support learning or summatively, as a tool to define or sum up the learning of students.

Expected learning outcomes

By the end of this unit, you will be able to:

- Describe the meaning of assessment and the types of assessment;
- Identify the guiding principles about assessment for learning;
- Explain why feedback is important for learning;
- Be aware of and understand why we need to assess and when we have to do assessment;
- Explore when to use which types of assessment appropriately;
- Use feedback strategies effectively;
- Describe different types of assessment;

- Explain at least two types of assessment;
- Demonstrate the reason behind using different types of assessment;
- Apply appropriate techniques of assessment for learning in the teaching and learning situation;
- Describe sself-assessment and peer-assessment;
- Evaluate their teaching ability by using self-assessment and peer-assessment;
- Apply the understanding of differences between nature and definition of test and measurement;
- Organise effectively the understanding of major functions and purposes of educational tests;
- Classify the types of achievement tests according to nature of content and various function, types of methods applied;
- Understand and use planning the test;
- Explain various types of assessment tools;
- Discuss the importance of keeping accurate records for both formative and summative purposes;
- Discuss the importance of keeping accurate records for both formative and summative purposes;
- Discuss ways of collecting data;
- Understand and verify the quality of classroom test;
- Understand nature of statistical analysis in education; and
- Understand how to evaluate data using graphical analysis.

5.1. What Is Assessment for Learning?

Assessment for learning is one of three distinct viewpoints or outputs by which assessment is considered, and these are dependent on how the assessment will be used. Assessment for learning considers the formative element of assessment that is used throughout a period of learning to contribute towards the understanding of how successful teaching has been and to highlight what action needs to be taken to address the shortfall in learning. In order to understand assessment for learning, it is important to first unpack the different meanings and methods of assessment.

5.1.1. Introduction to assessment and feedback

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe the meaning of assessment and the types of assessment;
- Identify the guiding principles about assessment for learning; and
- Explain why feedback is important for learning.

What is assessment?

Assessment is used by both teachers and students before, during or after a period of learning to measure the extent to which the learning outcomes of a lesson or series of lessons have been achieved. Assessment can be carried out by a teacher in a variety of ways that support the documentation and measurement of the level of knowledge, understanding, skills and competencies of their students. Students themselves can also be involved in the assessment of themselves and their peers. IBE-UNESCO defines assessment as: 'the process of documenting students' acquisition and mastery of knowledge, skills and competencies in order to make informed decisions about the next steps in an educational process.'

Learning activity 1

Take a moment to think about examples of assessment you have experienced at school or on this programme, record them in column 1, below.

Table 5.1. Types of assessment

1. Assessment example	2. Type (AoL, AfL, AaL)	3. Form (Summative and so on.,)

[102] IBE-U NESCO. (2017). *Training Tools for Curriculum Development – Inclusive Student Assessment.* Geneva: International Bureau of Education

Assessment as a key function of effective teaching is explicitly referred to in the Teacher Competency Standards Framework (TCSF) and is included in Domain B: Professional skills and practices.

Table 5.2. Competency standard B2: Assess, monitor, and report on students' learning

Minimum requirements
B2.1 Demonstrate capacity to monitor and assess student learning
B2.2 Demonstrate capacity to keep detailed assessment records and use the assessment information to guide students' learning progress

Assessment is considered from many different and distinct viewpoints and this unit will introduce the various categories and explain their relevance in the classroom as tools to assess students in an inclusive and supportive way. The first distinction investigated is the different outcomes that can be achieved through assessment. These are known as assessment of learning (AoL), assessment for learning (AfL) and assessment as learning (AaL).

However, it is important to consider that the first opportunity a teacher has to assess students occurs before the class or any learning has started. This is known as initial assessment and is categorised by the term diagnostic assessment.

Diagnostic assessment of students' learning needs is essential, and is carried out by a teacher to measure students' prior knowledge before teaching begins. Diagnostic assessment is also essential in establishing any disabilities or other factors that could negatively influence a students' ability to have equal access to learning. Diagnostic assessment is essential to ensure inclusivity in the classroom.

All of the students in the classroom will have a unique and broad-ranging number of experiences, skills, attitudes, beliefs, misconceptions and varying levels of knowledge that they have all independently acquired before attending the class. These all influence how students interpret or understand their learning in the classroom, and new learning in the classroom is built upon this pre-existing knowledge. Although assessment in education is generally considered to be about 'gathering, interpreting and using information about the processes and outcomes of learning' (NCCA, 2018), initial assessment of knowledge is an essential and often overlooked element of the lesson planning process.

There are several ways that prior knowledge is collected and assessed. In this course, you will have taken part in this yourself in many different ways at the beginning of each lesson. For example, through questioning, pair and group work the development of mind maps, short informal tests and self-reflection of previous learning. The completion of Reflection 1 at the start of this unit could itself be used as a simple form of diagnostic assessment.

Diagnostic assessment is particularly important in assessing the strengths and weaknesses of students and can support the planning and design of inclusive teaching in the form of differentiated teaching strategies.

Learning activity 2

Take a moment now to reflect on your experience of diagnostic assessment. List the activities have you taken part in during your time on the course that have enabled you or your teacher to assess your prior knowledge of a subject.

Assessment of Learning (AoL)

Summative assessment

Summative Assessment generally refers to assessment that is carried out at the end of a period of learning. It is classified as an 'assessment of learning' and can be an informal or formal assessment. An example of a formal assessment is an end of year exam. In this instance, summative assessment is considered to be evaluative in that the exam is used to assign a grade, score or value to the student being assessed. An example of an informal summative assessment is a quick quiz at the end of a lesson to gauge understanding and learning, in this example, the assessment is not considered evaluative.

The information gathered through summative assessment can be used to inform students, teachers and even parents about the performance of a student at a specific point of their learning. Teachers can use this information to support their development of teaching in the future and to address gaps in teaching that have not been covered in the classroom. For example, if 100% of students got a particular question wrong in an exam or end of lesson quiz, this would highlight that the subject had not been sufficiently covered in the classroom and the teacher could re-evaluate their teaching methods to address this shortfall in the future.

Summative assessment alone is not sufficient to support learning, it must be used in conjunction with the other forms of assessment. For example, if the learning of students is only assessed at the end of the module in a formal exam, then the students do not have an opportunity to learn or improve from that process. In this instance, it is too late for any students that performed poorly in the module exam to recover their learning.

Evaluative assessment

Evaluative assessment is a form of accountability and supports the monitoring and evaluation of learning. Evaluative assessment outcomes, for example in the form of exam scores, are used as a tool to measure the effectiveness and quality of teaching. In many countries, league tables are published of the examination grades of schools in order to compare them. This type of assessment should not be used alone and should be a part of a teachers' assessment toolkit. One issue that is often considered by the use of evaluative assessment as a measure of quality is that the attainment of grades and scores becomes more important than the actual learning. This approach can lead to teaching being shaped by the exam and can lead to lower level remembering of keywords or facts, rather than higher-level cognitive understanding and evaluation of learning.

Low performing students and students that need additional support are especially negatively affected by the over-reliance on evaluative assessment. Assessment by its very definition should be used as a positive, supportive tool that empowers students to improve their learning. Evaluative assessment, used on its own can lead to decreased motivation of students and further poor performance.

Assessment for learning

Assessment for learning (AfL) is a measure of learning that is carried out during the learning process and is used to inform the teacher what the students have learned so far. Effective use of AfL enables teachers to be more reactive to the learning needs of their students and is an integral component of student-centred teaching. AfL can also be used to encourage students to talk openly about their learning and better gauge what additional learning they require.[103]

[103] https://www.theguardian.com/teacher-network/teacher-blog/2013/aug/29/assessment-for-learning-effective-classroom

> 'Assessment for learning is the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there.'[104]

Formative assessment

Formative assessments are used throughout, and in conjunction with the learning process, they are classified as AfL and can be both informal and formal. Formative assessment happens all the time, often unconsciously. An experienced teacher is continually informally and formatively assessing the students in their class. This could be through questioning or even something as simple as observing the interactions of the students. More formal formative assessment includes assessing the work developed in class, the completion of tests in class and project work.

Formative assessment not only identifies the progress and gaps in the knowledge of students, but it also gives the teacher an opportunity to provide feedback to the student to support their understanding of learning.

Formative assessment can also be carried out through student and peer self-assessment, and this continuous process of dialogue and interaction between teachers, students and peers is an essential part of AfL.[105] Formative assessment should be central to the practice of classroom-based teaching at all stages of the teaching cycle as a demonstration of effective planning. The benefits of this are that students are focused on learning through a better understanding of their learning outcomes and the criteria upon which their learning will be measured. This fosters motivation to learn and facilitates an environment of shared learning and enthusiasm to improve knowledge to achieve learning goals.[106]

[104]Assessment Reform Group. (2002). *Assessment for Learning: 10 Research-based Principles to Guide Classroom Practice*. London: Assessment Reform Group
[105] Assessment Reform Group, ibid.
[106] CCEA. (2009). *Assessment for Learning: A Practical Guide*

The use of feedback is the key to the successful use of formative assessment, as this allows teachers to identify and highlight any gaps in the students' knowledge, but also to highlight the student's achievements. The provision of feedback as a component of the assessment process allows students to reflect on their learning, and to consider what they need to accomplish or how they need to adapt to achieve the learning outcomes. This is often referred to as 'scaffolding reflection'. Feedback also facilitates teacher reflection, in that teachers can assess the effectiveness of their teaching and consider whether they need to adapt their teaching to better support the students in achieving their learning goals.

Clark suggests that the distinction between formative and summative assessment is not necessarily just related to the method of assessment itself but has more to do with the way in which the information collected during the assessment is used.[107]

Table 5.3. Comparison of AoL and AfL

Assessment of Learning (Summative assessment)	Assessment for Learning (Formative assessment)
Occurs after learning and looks at past learning	Is integral throughout the learning process and looks towards the next stage of learning
Information is collected by the teacher	Information is shared with the student
Information is often evaluative in the form of grades, score or marks	Information is more a qualitative reflection of learning, promoting thought and change
Is used as a benchmark or comparison against the performance of others	Is directly linked to the achievement of the learning outcomes
Examples of tools include: Tests, examinations, grading, marking, scoring, dissertation	Examples of tools include: Discussion, observation, self-assessment, peer-assessment, teacher debate, dialogue, questioning, feedback, no-grading, portfolio

[108] Clarke, M. (2011). *Framework for Building an Effective Student Assessment System*. Washington, DC: The World Bank Group

Authentic assessment

Authentic assessment is a type of formative assessment that requires students to demonstrate the skills and competencies that have been learned in class, in a real-life environment. The integration of knowledge and theory into practical application is a useful learning opportunity, but also an excellent way of assessing learning and the transfer of theory into practice. During your time on this programme, you will experience simulated authentic assessment within the classroom, but real authentic assessment will be carried out each year when you have the opportunity to spend time at the practice school.

Assessment as Learning (AaL)

Self-assessment

Self-assessment of learning by the students is often referred to as AaL. This formative assessment allows students to assess their work, establish areas where they can make improvements and carry out self-learning to address the gaps they have ascertained in their learning. This empowerment of students to take greater responsibility in their learning is integral to the concept of student-centred learning. James highlights the importance of self-assessment: 'Students need to learn for themselves how they move up to the next level, they need to internalise the process. Learning cannot be done for them by the teachers.'[108]

Peer assessment

Feedback and assessment can also be given between students and is also categorised as AaL. This peer feedback is useful as it supports students in developing independence and enables them to see the situation 'through the eyes of their teacher'. Peer assessment and feedback supports the development of critical and reflective thinking skills and can be used in conjunction with other methods of assessment and feedback.

The teacher must establish ground rules and give students the responsibility to provide feedback to each other. In order to provide effective and useful peer assessment and feedback, students must first understand the criteria upon which the assessment is being made and be able to provide positive and constructive comments on how improvements can be made.

[108] James, M. (1998). *Using Assessment for School Improvement*. Oxford: Heinemann

Learning activity 3

Take a moment now to reflect on your learning so far in this unit. Return to Learning activity 1. Against each assessment method you recorded in column 1, add the category of assessment (AoL, AaL, AfL) in column 2.

Learning activity 4

Reflect on the learning you have acquired in this unit. Return to Learning activity 1 and complete the third column. Against each assessment method you recorded in the first column, add the type of assessment (formative, summative, self, peer, authentic, evaluative, diagnostic). Take some time to consider where the gaps are. Are there any assessment methods missing from your list? Does one particular type of assessment appear more often than others? If so, why do you think this is?

Review questions

1. What is diagnostic assessment and why is it important?

5.2. Why and When to Assess

The different types of assessment introduced in Unit 5.1 are all used throughout the teaching cycle. It is important to use the right method of assessment at the right time and in the right way. Feedback is the driving force behind successful assessment, and when used correctly can support students' learning and motivation.

5.2.1. How to use assessment and feedback effectively

Expected learning outcomes

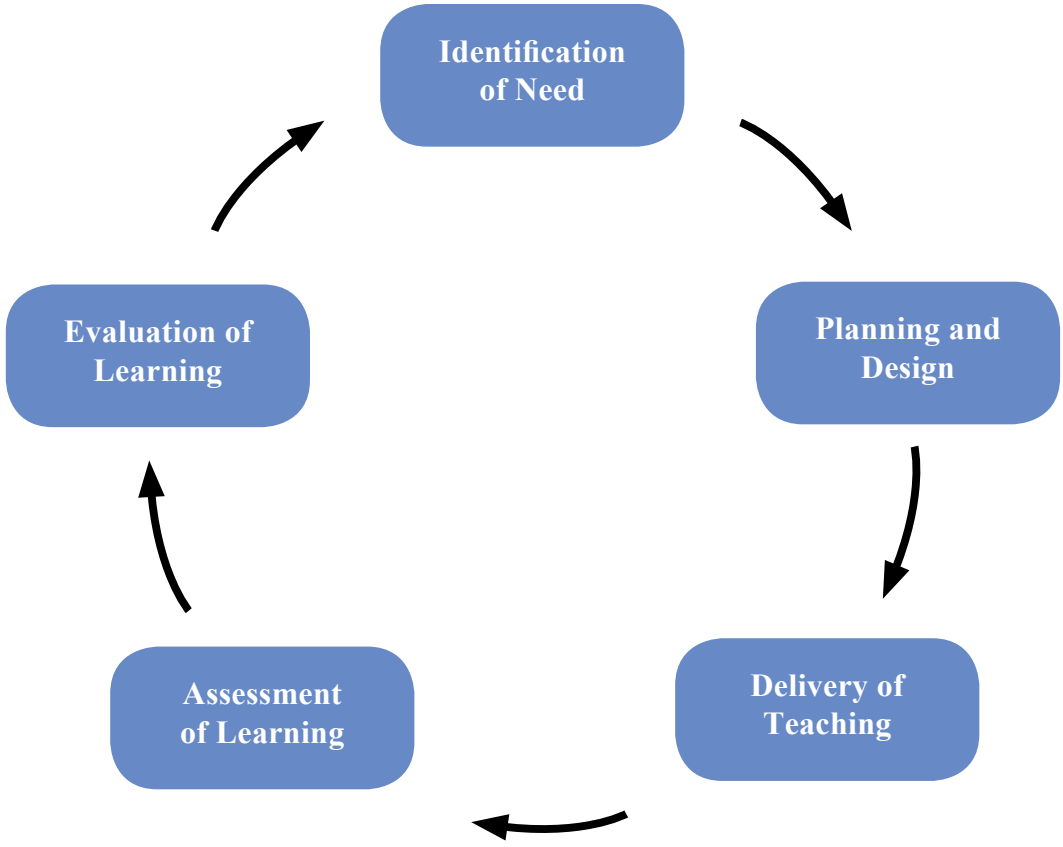
By the end of this lesson, you will be able to:

- Be aware of and understand why we need to assess and when we have to do assessment;
- Explore when to use which types of assessment appropriately; and
- Use feedback strategies effectively.

Why and when to use assessment

The different types of assessment introduced in Unit 5.1 are all relevant and useful in the assessment of students learning, and no one type is superior to the another as they are all correct when used at the right stages of the teaching cycle. Assessment supports both the teacher and student in measuring their learning and understanding of the subject either before, during or after the classroom-based teaching.

Figure 5.1. The teaching cycle



Learning activity 1

The five stages of the teaching cycle are expressed in Figure 19. Take a moment to consider which type of assessment (summative, formative, AoL, Afl, AaL) would be the most relevant to be used at each stage and record your answers in table below.

Table 5.4. Assessment in the teaching cycle

Stage of teaching cycle	Type of assessment that can be used
1. Identification of need	
2. Planning and design	
3. Delivery of teaching	
4. Assessment of learning	
5. Evaluation of learning	

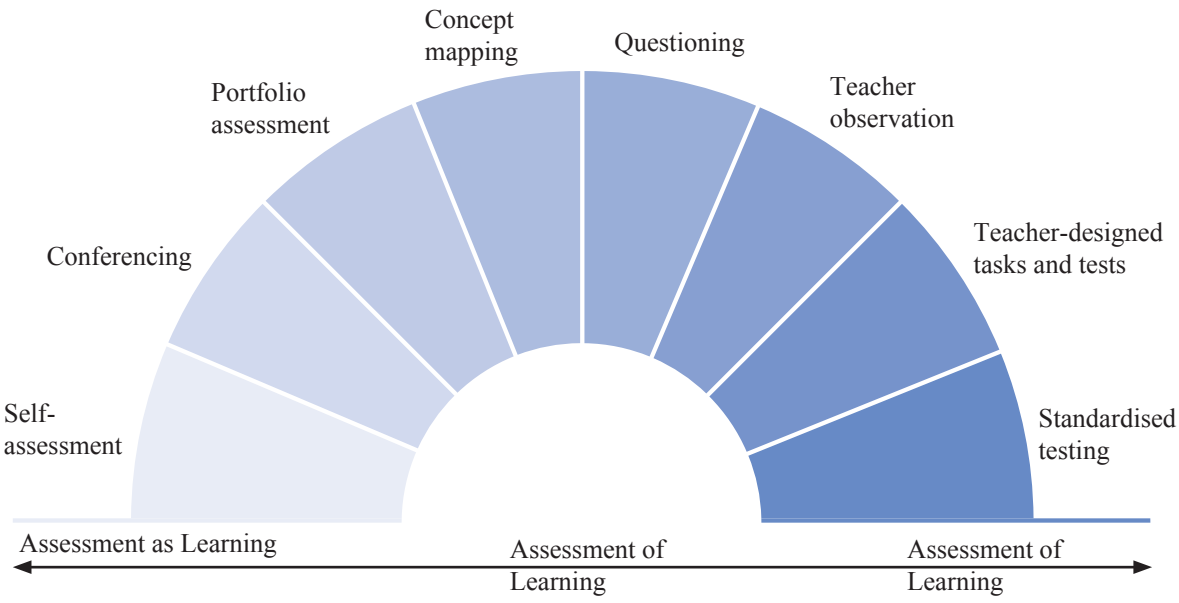
As you will see from your answers to Learning activity 1, there is a need to incorporate many different types of assessment activities into the different parts of teaching cycle, and multiple methods can be incorporated into each lesson or period of learning.

Balanced assessment

It is important to ensure that all the different assessment types and methods are balanced throughout the learning and teaching process to ensure that the learning needs of students are met. For example, as important as formative assessment is as a learning tool, without the support of summative assessment it is unquantifiable. Likewise, without formative assessment to support learning, summative assessment on its own does not contribute to the learning process. Self-assessment, peer assessment and diagnostic assessment are all excellent and inclusive assessment tools, but they are reliant on the formative and summative assessment to support and evaluate learning.

Different types of assessment have been categorised as AoL, AfL and AaL, these can be seen below expressed as the spectrum of learning and assessment. The correct method of assessment to use at a particular moment in the teaching cycle depends entirely on the reason why that assessment is being carried out to meet the learning needs of the students. For example, students learning on a degree programme, would not be expected to carry out self-assessment to determine whether they should graduate. Likewise, at the beginning of their studies in Year 1, students would not be expected to sit a formal exam to determine their initial knowledge of the subject.

Figure 5.2. Spectrum of Assessment based on NCCA (2007)



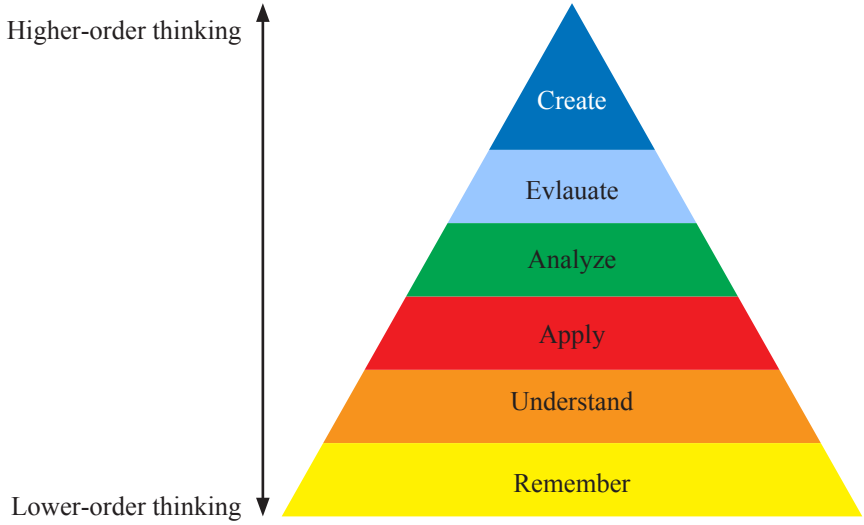
Objective and subjective assessment

Another way to classify assessment is to consider whether it is objective or subjective. An objective assessment seeks to establish the level of learning by requiring a student to provide a single correct answer. For example, 'What year did a human first step on the moon?' The answer to this question is a fact, and there is only one answer – the student can only get the assessment question right or wrong. Objective assessment is limited to a certain extent in that it is assessing knowledge at its lowest order, in other word, the remembering of facts. 'Why did America send a human into space to set foot on the moon?' is a much more subjective assessment question because there may not be one clearly defined answer. Depending on your perspective, opinion, political affiliation, gender or ethnicity you may have a multitude of 'correct' answers. Subjective assessment such as this allows students to demonstrate not only their knowledge and understanding of a subject at a higher order but also allows them to creatively and reflectively answer the question. Formative and summative assessment can involve both objective and subjective assessment methods.

Bloom's Taxonomy of Learning (revised)

Bloom's taxonomy is a hierarchical model that describes the different levels of learning in the cognitive domain (the part of the brain that deals with intelligence). The model was originally developed in 1956 by a committee of American educators and has been used as a guide to teaching and learning ever since. The taxonomy was revised by Anderson and Krathwohl (2001) to be more relevant for 21st century teaching and they took into account many of the criticisms of the original work including criticisms by Bloom himself.

Figure 5.3. Revised Taxonomy (Anderson & Krathwohl, 2001)[109]



When developing strategies for assessing learning, it is important to consider the different levels of cognitive knowledge and understanding that can be attained by students. The revised taxonomy presented in Figure 5.3 shows the differences between higher and lower-order thinking skills. The type and level of assessment must first and foremost meet the needs of the students, but it must also reflect the type of learning that has taken place.

The objective question, 'What year did a human first step on the moon? is represented in the lowest part of the taxonomy hierarchy – 'Remember'. Questions that start with the words 'when', 'where', 'who' and 'what' generally lead to answers within this lower-order level. Questions with the words 'why' and 'how' are usually located higher up the scale.

[109] Anderson, L. W., & Krathwohl, D. R. (2001). *A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* New York: Longman

When developing assessment methods, the type of words you use can determine the level of knowledge and understanding you are assessing. See Figure 5.4 for a list of verbs that can be used in the development of learning outcomes and assessments that demonstrate different levels of learning.[110]

Figure 5.4. Verbs that can be used at different levels of the taxonomy

Remember	Understand	Apply	Analyze	Evaluate	Create
Arrange	Classify	Calculate	Combine Figure	Appraise	Arrange
Define	Describe	Construct	Find	Argue	Assemble
Locate	Identify	Demonstrate	Sketch	Assess	Compose
Recall	Indicate	Estimate	Solve	Defend	Create
Recite	Organise	Illustrate	Predict	Estimate Judge	Design
Describe	Interpret	Interpret	Change	Predict	Devise
Repeat	Illustrate	Appraise	Survey	Qualify	Formulate
Identify	Reorganise	Contrast	Compare	Rate	Invent
Select	Translate	Criticise	Diagram	Support	Manage
Quote	Paraphrase	Diagnose	Examine	Critique	Modify
Label	Summarise	Identify	Test	Recommend	Organise
Copy	Transform	Classify	Modify		Plan
List	Discuss				Prepare
Name	Explain				Produce
State	Defend				Set Up
	Compare				Verify
	Report				Construct
	Restate				Develop
	Review				
	Rewrite				

The level of teaching and learning and the needs of the students determine the level that you should be assessing at. As with all the assessment methods introduced so far in the unit, no one is any better than another, they are all relevant. Assessment should be a balance of different methods and also a balance of different levels. New learning is built upon existing knowledge, so it is important to consider the different levels of cognitive learning when planning the assessment of a long period of learning such as a module or unit of a subject.

[110] Eberly Centre for Teaching Excellence, Carnegie Mellon University
http://www.cmu.edu/teaching/resources/Teaching/CourseDesign/Objectives/BloomsTaxonomyVerbs.pdf

For example, at the end of the first lesson in a subject, students should be able to be assessed at the lower ends of the cognitive domain. They will be able to perhaps define, describe, list or even demonstrate their learning. It is unlikely that after one lesson in a new subject they will be able to develop new concepts or effectively critique concepts. However, as the learning on the subject progresses and the students gain a better grounding in the knowledge, they will be able to carry out higher-order assessment activities. At the end of the period of learning, after several lessons, the students' ability to list, describe or remember key facts should already have been ascertained, and the assessment should be testing the higher-end cognitive domain, examining their ability evaluate and create new learning for themselves.

Learning activity 2

Using the verbs demonstrated in above, develop a series of assessment questions that address the different levels of the cognitive domain to complete the table below.

Table 5.5.

Cognitive domain	Assessment question
Remember	'**State** what year a human first step on the moon?'
Understand	
Apply	
Analyse	
Evaluate	
Create	'**Develop** a theory of why the Americans sent a human into space to set foot on the moon in 1969.'

Feedback

Feedback is the driving force of the assessment process, and is a tool that supports the learning and development of students. 'Feedback is among the most powerful moderators of learning'[111] as it gives students the opportunity to reflect on their learning and apply that knowledge to improve through a supportive, two-way, formative and continuous process. Providing feedback only *after* a summative assessment does not address any issues or gaps in learning – it is too late by then.

[111] Hattie, J. (2009). Visible Learning: A Synthesis of 800 Meta-Analyses Relating to Achievement. Routledge.

On-going feedback can take many forms, both informal and formal. Feedback can be as simple as a positive and constructive response to as an answer given in class or more detailed such as a written evaluation of a piece of submitted work. It is important to encourage students to give feedback to the teacher, too. This two-way dialogue allows the teacher to check the feedback has been understood and accepted. Well-delivered, accurate, honest and constructive feedback can be a great motivator for students, while poorly executed feedback can be a significant de-motivator.

We naturally give feedback almost all the time. When giving feedback for learning, it is important to do so in a positive, constructive, useful and forward-thinking way. Students must own the feedback that they have received, and therefore the feedback must have value to them. Feedback must also be timely, in that it is given as soon as possible. Feedback on something that happened a long time in the past has lost its value.

Ego-focused feedback is the most common feedback given by teachers as it is the easiest feedback to give. But it is also the least useful feedback for students to receive as it is not forward thinking or constructive.

For example:

'Good job!'	**'Not good enough!'**
'Great work!'	**'No! Try again!'**
'That's the correct answer!'	**'No, wrong answer!'**
'Well done, top of the class!'	**'Try harder next time!'**

As nice as it is for a student to occasionally be encouraged by positive ego-focused feedback, it does not give them an opportunity to improve. Strong students can become complacent and unwilling to try harder based on this type of feedback. Likewise, weaker students who are given negative unconstructive ego-focused feedback may become demoralised and unwilling to try harder. For feedback to be useful it must be constructive, positive, specific, forward-thinking and relevant. Feedback has the most value when students are given the opportunity to reflect on it and consider how they can use it to improve their performance and learn from it.

'Great answer! Now why do you think that is the case?'	'That's a good answer, but you need to be more specific. Have you thought about looking at it from this angle….?'
'Correct! What do you think would have happened if this had been…?'	'You have a good point, but I think you can go deeper with your answer. How about…?'

Learning activity 3

Take a few moments to read and answer the following questions about your own experiences being assessed in school.

- What kind of assessments did you undertake?
- Where they predominately low or high order?
- When you were assessed where you expected to remember facts or demonstrate your knowledge and understanding through creative and more evaluative methods?
- Why do you think the methods you experienced were used?
- Have you ever received bad feedback? How did it make you feel?

Review questions

1. What is the difference between formative and summative assessment?
2. What is the difference between objective and subjective assessment?

5.3. Different Types of Assessment

There are many ways to carry out the types of assessment introduced in this unit so far. Selecting the correct method of assessment depends on the stage of learning in which students are being assessed.

5.3.1. Describing different types of assessment

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe different types of assessment; and
- Explain at least two types of assessment.

Learning activity 1

Take a moment to re-read sub-unit 5.1 of this unit to reacquaint yourself with the different types and categories of assessment. While reading, consider how they relate to the different levels of cognitive domain introduced in Unit 5.2.

There are many different methods of assessment used in the learning process throughout the learning cycle. An important part of being a good teacher is being able to effectively assess your students' learning in a way that meets their individual needs.

Assessment Tasks

It is useful to consider how different assessment methods can be practically applied in the classroom.

Classroom assessments are a form of continuous assessment that can be both summative and formative. In Reflection 1 in Unit 5.1, you completed a table based on your own experience of assessment. Take a moment to review that table and see if you included any of the following:

a) Matching;
b) Open gap-fill questions;
c) Multiple choice questions;
d) Open-ended questions;
e) Closed answer questions;
f) Writing essays;
g) Closed gap-fill questions;
h) Putting into order; and
i) Classifying.

These examples can be classified based on how 'open' or 'closed' they are. An open assessment task has potentially many right answers, and is called 'low control' or 'free'. In this type of task it is possible that two students could get high marks for completely different answers. Closed assessment tasks, also known as 'controlled' generally have only one correct answer. (For example, 'What year did a human first step on the moon?')

'Why did America send a human into space to set foot on the moon?' is an example of an open assessment task as there are many different answers. Take a look at the nine examples of the different tasks in Handout 2, and then complete Learning activity 2.

Learning activity 2

Each of the examples (1-9) listed in Handout 2 relates to one of the assessment tasks listed at the start of this unit (a-i). Write the name of the assessment task next to the relevant example. For example:

Example 1: Matching

Open and closed assessment tasks

Some of the assessment tasks that you have been investigating are clearly open or closed, however some of the tasks are less well-defined and could be thought to be on a spectrum between open and closed.

Closed assessment tasks are usually associated with the testing of lower-order cognitive thinking as demonstrated in Bloom's revised taxonomy introduced in Unit 2.5. Closed question assessments test remembering and understanding. Open assessment tasks are more associated with higher-order thinking, as demonstrated in Blooms revised taxonomy, such as applying knowledge, analysis, and creative thinking. Both types of tasks are useful though and should be incorporated as part of a balanced assessment process. Closed questions can be used to test knowledge, and open questions used to assess values and skills.

Learning activity 3

In Learning activity 2, you matched examples to different assessment tasks. Now take a moment to consider how 'open' or 'closed' they are. Using the numbers 1 to 9 (as used for the examples) try to allocate where each example would fit on the spectrum below from completely open to completely closed. Some tasks will be at the extreme ends, and some will be somewhere in between. Example 1 (matching) would be placed at the far right of the line.

Figure 5.5. Open or closed assessment range

Open Assessment task Closed Assessment task

Deciding which assessment task to use depends very much on the assessment need. Before selecting an assessment type a teacher must first consider who they are assessing, at what stage in the learning are they being assessed, and is the assessment going to be formative or summative, evaluative or diagnostic. They must also consider if the assessment is AoL, Afl or AaL. The combinations are great but an effective teacher will understand where and when to use each type of assessment. Each type of assessment can also be tailored to better meet the needs of the student. Closed assessment tasks can be made more open, and open assessment tasks can be made more closed, as is necessary.

5.3.2. The reasons for using different assessment types

Expected learning outcomes

By the end of the lesson, you will be able to:

- Demonstrate the reasons behind using different types of assessment.

Deciding which assessment task to use depends very much on the assessment need. Before selecting an assessment type, a teacher must first consider who they are assessing, at what stage in the learning are they being assessed, and whether the assessment will be formative or summative, evaluative or diagnostic. They must also consider if the assessment is AoL, AfL or AaL. There are many combinations but an effective teacher will understand where and when to use each type of assessment. Each type of assessment can also be tailored to meet the needs of the student better. Closed assessment tasks can be made more open, and open assessment tasks can be made more closed, as necessary.

Inclusive assessment

Inclusivity is an increasingly important consideration in teaching although it is often misinterpreted. Inclusivity in education does not necessarily refer to students with disabilities but takes a broader approach to consider diversity. An inclusive learning environment aims to 'eliminate social exclusion that is a consequence of attitudes and responses to diversity in race, social class, ethnicity, religion, gender and ability. As such, it starts from the belief that education is a basic human right and the foundation for a more just society.' (IBE-UNESCO, 2016)

There has been a global education shift towards more inclusive methods of teaching – holistic approaches which have been developed with the intention of 'preparing children to become responsible citizens and better equipping them for their future lives.' (IBE-UNESCO, 2017) Assessment, however, has not undergone such a transformation, and assessment methodologies are often less than inclusive. Assessment must be used in a fair and transparent manner that gives all students an opportunity to demonstrate their learning.

Using a variety of methods when assessing the learning of your students has a number of benefits:

Better coverage of assessment of learning

By assessing students in different ways, you give the students a better opportunity to demonstrate their knowledge and understanding. Each student is an individual, and each student will react differently to different assessment types. For example, some students may enjoy the process of answering open-ended essay-type questions with a free reign to craft their answer onto paper. That same student may be horrified by the prospect of standing up in class and delivering a presentation on the same module. If only one assessment method were used, they potentially would score very highly in the first instance, and poorly in the second. By giving them multiple opportunities to demonstrate their learning, they will be better placed to do so, and would thus develop more confidence in their own abilities and knowledge.

Improved motivation of students

By using a mixture of assessment methods, you can motivate students. If only one method of assessment is used, for example a written test, students can become despondent by this repetitive process. Learning should be fun, and likewise there should be some enjoyment to be had in the process of demonstrating that learning. Authentic assessment, where relevant, is often a useful way of determining learning and understanding in a 'real-life' or simulated environment, and is more interactive and interesting than a sit-down test. That is not to say that the traditional test has no merit but it should be used in the mix with other methods. Remember that assessment means the assessment of the attainment of learning outcomes, so the assessment used should be relative to those learning outcomes.

If you are assessing the knowledge and learning of a student on the subject of flower arranging, you would get a more thorough and useful assessment of their learning if you gave them some flowers to arrange and observed and assessed their technique, than you would if you asked them to write an essay describing how to do it. However, you would get an even better and more relevant assessment and a more motivated student if you asked them to demonstrate their learning *and* write an essay or develop a training manual on the process they undertook.

Managing different class sizes

Some methods of assessment are not conducive to assessing large numbers of students, especially if the class contains a range of abilities. This could mean that the process of assessment is time-consuming for large numbers to take part in. For example, expecting a class of 80 students to each deliver a 10-minute presentation on learning is unrealistic, as it would take 16 lessons to carry out! Or it could mean that the process of grading that assessment is far too time consuming. For example, grading 80 written test papers of 1,000 words would take over a week!

In these examples, it would be more realistic to arrange for the students to present in groups and to write a more concise and concentrated paper of fewer words to achieve the same assessment outcomes.

Accurately assessing knowledge and understanding

Certain assessment methods have some limitations when it comes to accurately assessing individuals. For example, some students may not fully take part in a group presentation, while others take on a larger role. To give the whole group a grade may not accurately reflect the individual contribution and demonstration of knowledge.

By including another assessment type to this activity, it is possible to more accurately assess the individuals. For example, as well as taking part in the presentation, if each member of the group writes a short paper on a specific section of the presentation, they will be assessed from two perspectives.

One other point to make here is that reusing the same test papers year on year limits the validity of that assessment type as it is possible that students can access previous years' papers and plagiarise that work. Using different assessment papers, and multiple assessment types, reduces the possibility for such plagiarism.

Inclusivity

A very important consideration to make when planning assessment strategies is the level to which they meet the needs of all students. Some students may have learning difficulties or physical disabilities or special educational needs. A one-size-fits-all approach to assessment will discriminate against them. A mixed methodological approach to assessment will mean that they will have an equal opportunity to be assessed to the same degree as their peers.

This inclusive approach to assessment can take many forms. It could be as simple as using different assessment techniques to meet the different student needs or it could mean putting in place support and assistance, and making 'reasonable adjustments' to alter the assessment type to meet their needs. For example, a student with a broken arm who is unable to complete a written paper could be assessed orally or they could be supported by provision of a scribe (someone to write for them) or given an extension of time.

It is important to remember when planning assessment and considering a variety of assessment techniques that you are always looking to assess the attainment of learning outcomes. Assessment that does not do this is pointless. The validity of assessment must always be considered.

Learning activity 1

Take a few moments to re-read Unit 5.3 and answer the following questions:

- What kind of assessments do you think are the most relevant for primary children?
- Were they predominately low or high order?
- Which assessment types are the least relevant for primary children and why?
- There is a huge difference between the two statements below. Read them both and try to understand the difference between them.

Assessment **must** discriminate **between** students based on their ability or disability and their potential to demonstrate the attainment of learning outcomes.

Assessment **must not** discriminate **against** students based on their ability or disability and their potential to demonstrate the attainment of learning outcomes.

Review questions

1. Why is ensuring inclusivity such an important element of the learning and assessment process?

5.4. Guiding Principles of Assessment for Learning

The teaching and learning component of this degree programme is vitally important, and the assessment that is carried out during that period of learning will contribute to the essential knowledge that is required to become an effective teacher. The skill of self-assessment is invaluable to all teachers and will be used everyday throughout your teaching career.

5.4.1. Applying assessment methodologies

Expected learning outcomes

By the end of the lesson, you will be able to:

- Apply appropriate techniques of assessment for learning in the teaching and learning situation.

The teaching and learning situation

The teaching and learning situation is a specific component of your four-year degree programme and as is explained in detail in the Practicum module. Practice teaching will occur every year. In year one of the programme, you will take visit a practice teaching school for a total of five days in Bloc 3 of Semester 2.

Table 5.6. Year 1 Practicum schedule

Year 1	Semester 1	**Bloc 1: Lesson study**	10 days (2 weeks)	February
	Semester 2	**Bloc 2: Lesson study**	5 days (1 week)	August
		Bloc 3: Practice/partner school	5 days (1 week)	August

During the lesson study sessions in semester 1 and semester 2, you will take part in micro-teaching activities. These are an opportunity for you to gain practical experience by teaching your peers. You will be instructed to teach a certain part of a lesson and then you will receive feedback from your peers and have the opportunity to reflect on the experience.

You will also have the opportunity to observe your peers teaching through micro-teaching activities and you will be able to give them feedback. You will also be carrying out observations during your school placements. Observation is a useful assessment tool that can support your understanding and help you develop an awareness of the teacher's role in the classroom and the impact of the teacher's action on learning. Observations provide a platform for discussion, analysis and reflection on what makes an effective teaching and learning experience.

During your practice school experience (Bloc 3), you will observe and take notes on what happens during a portion of the lesson, recording identified teacher competencies in your Practicum Journal. There will also be opportunities to reflectively discuss the observations, linking theory to practice, and to grow in your ability to self-assess your own learning.[112]

Learning activity 1

Review your Practicum Student Teacher Textbook and remind yourself of the expectations of this first year on the programme. Make some notes and if you have any questions, highlight them now in preparation for your next Practicum lesson.

[112] See the Practicum student teacher textbook for more information on this section of teaching assessment

5.4.2. Self-assessment and peer assessment techniques

Expected learning outcomes

By the end of the lesson, you will be able to:

- Describe self-assessment and peer-assessment; and
- Evaluate their teaching ability by using self-assessment and peer-assessment.

Self-assessment and peer assessment are integral components in the teaching and learning element of this programme. Through the guidance of the teacher educators, you will develop skills to effectively evaluate yourself and your peers. These will include the ability to self-reflect on your learning and establish your own learning goals and support your peers in effectively establishing their own learning goals.

Extract from Practicum Student Teacher Textbook

3. Practicum Journal

The process of consciously reflecting on your learning will help you to make connections between what you are doing in the Practicum and your other classes, to solve problems that come up, and to learn from your experiences. Throughout your teaching careers, this process of reflection and evaluation will be critical if you are to continuously grow in the teaching competencies outlined in the Myanmar TCSF towards becoming a leader teacher.

There are many benefits to be gained by keeping a reflective journal. Taking the time to write every day of the Practicum will help you to:

- bring together theory and practice;
- better understand what you are learning in your Educational College learning areas;
- identify your own strengths and weaknesses as a student teacher;
- begin to develop your own teaching and learning philosophy;
- come up with ideas to improve your teaching competencies; and.
- take ownership of your own professional growth and learning.

During each Practicum bloc, you will be writing in your Practicum Journal on a daily basis to reflect upon what you are learning through the Lesson Study and the practice school visits for observation, assistant teaching, and the student case study. The daily journal entries do not have to be lengthy; you should aim for approximately 250 words per entry.

Self-assessment as a daily activity is a useful habit to get into and is something you will already informally do to some degree. Your Practicum journal will be a valuable tool in developing your self-assessment skills.

[114] https://www.reading.ac.uk/engageinassessment/

The University of Reading in the UK has an excellent web-based resource that contains a lot of information pertaining to self-assessment and peer assessment. It is recommended that you take some time to visit the website and review the information provided there. The following information has been adapted from that website.

Peer assessment and feedback

Peer assessment is initially something that students are uncomfortable with, but with practice and through the use of rules it can become second nature. The ability to provide peer assessment and peer feedback are invaluable skills that will support your learning, and support the learning of your peers throughout this programme. They are also essential life skills that will complement your teaching skills thorough your career.

The development of the knowledge, confidence and skills required to effectively and fairly provided feedback to and assessment of your peers also contributes to your life outside of the classroom as they promote a mindful approach to communication.

There are many benefits to be seen both within and outside the classroom by the use of peer assessment and feedback.

Deeper learning and understanding of the subject

In order to be able to effectively provide peer assessment, you must first have a good understanding of the subject you are assessing. By taking part in peer assessment or by encouraging your students to take part in peer assessment, you are prompting the need to attain a deeper knowledge of the subject being assessed.

Through the process of assessing your, peers it is natural that you will learn more about that subject, and you will experience different approaches to learning the subject through your interaction and observation of your peers. By establishing assessment criteria, you will also be directly considering what constitutes a high quality of work, which will support both your learning and understanding of the subject.

Transparency and cohesion

The process undertaken when carrying out peer assessment must be transparent. This means that assessment criteria must be established and agreed upon before assessment commences. Feedback must be provided, and constructive and forward-thinking suggestions and comments all contribute towards a group of students that are honest and open with each other in a transparent and positive manner. Students who give each other feedback often develop strong cohesions and linkages that will benefit their collaborations and future engagements and shared learning throughout their time at school. This is equally as relevant for you and your peers at the teacher Education College.

Effectiveness

Peer assessment is a very effective way of ensuring that all students receive regular and relevant feedback and assessment. By encouraging peer assessment in the classroom, the teacher can reduce their workload and support the collective learning of their students in a positive, engaging and interesting way. Many students respond very well to feedback and assessments from their friends and peers, and can sometimes relate better to them than feedback from their teacher. Peer assessment can be very useful in alleviating the pressures on a teacher who has a large class, and can be effective in supplementing the other assessment methods used.

Self-assessment

Self-assessment is also something that students can initially feel uncomfortable about. It is not always easy to be truly honest with yourself when considering your work. Sometimes it is easy to be too harsh and critical of your work although if self-assessment is being used to provide some summative assessment or grade, there is a temptation to be overly complimentary of your work as well. The effectiveness of self-assessment very much depends on how it is implemented, managed and what the expectations of the outcome are.

For example, if you asked your students to self-assess and told them that the outcome of their assessment would be the sole determining factor in them passing or failing a course, then it is likely that they would all score themselves highly, regardless of their performance!

In order for students to be able to honestly appraise themselves and carry out meaningful and useful assessment, you must give them clear boundaries and definitions.

Why is self-assessment important?

Self-assessment encourages us, and our students, to identify strengths and weaknesses, successes and areas for improvement. This knowledge and awareness is an important component of the learning process and supports the cementing and understanding of ideas and information, and contributes towards improvements in future learning. Self-assessment is integral to the student-centred approach to teaching and learning, and is as much a learning exercise as it is an exercise in assessment (see AfL in Lesson 5.1.1.). Ultimately, it is a valuable life skill that promotes mindfulness and self-awareness.

Self-assessment also considers factors above and beyond the simple remembering of knowledge. By assessing yourself, you can pinpoint gaps in your knowledge and understanding that might not be evident through other forms of assessment.

When introducing self-assessment to students, you must first clearly define the objectives of the assessment and the parameters within which the assessment will be carried out. This process also supports the learning and understanding of the students, as they must also reflect on the criteria and learning outcomes to be assessed.

Self-assessment encourages students to engage in their own teaching and learning, and it is likely that through conducting self-assessment they will establish deeper understanding of the subject and make new realisations through their reflection.

Self-assessment can be a great motivator as it allows the students to become more responsible for their learning and take ownership of the areas that they need to improve upon through an intrinsic desire to do well and better themselves.

How to manage self-assessment

Self-assessment is something we do naturally all the time, often without noticing. But in the context of education, it will take one of two forms – formal or informal.

Informal self-assessment can be something as simple as reading over your work before submission or reflecting on a class that you have just completed. Throughout this programme in both the student textbooks and in the classroom, there are lots of opportunities to reflect and consider your learning, achievements, understanding and performance. Often this is informally carried out.

Formal self-assessment is also encouraged throughout this programme and the completion of learning logs and the reflective Practicum journal, as demonstrated above, all contribute to that process. Formal self-assessment can also take place in the classroom and students can be provided with self-assessment forms to complete after the completion of assessment or learning activities. As a teacher, you will be expected to regularly self-assess your performance in the classroom, and it is a good habit to get into. At the end of every lesson, take a few minutes to reflect on what went well and what could have been improved upon. This will support your own development as a teacher. At many universities around the world, daily reflection and self-assessment is mandatory.

Learning activity 1

Carry out a quick self-assessment. Ask yourself and try to honestly answer the following questions:

- My strongest area of understanding on this programme so far is…
- The area where I need to make the most improvement is…
- The area or subject I am most interested or excited by is…
- The area or subject I find the least interesting or most difficult is…

Based on your answers, think about how this information could be useful to you. What changes can you make to ensure that you benefit from your strengths and what support do you need to address your weaknesses? Who can help you with this?

Review questions

1. Why are self-assessment and peer-assessment so important in the learning process?

5.5. Appropriate Techniques of Assessment (1)

Testing is a form of assessment, and there are a variety of ways that tests can be implemented in the teaching and learning process. The data and information that can be collected through testing can be used for a number of reasons, for example, to assess students' knowledge of a subject and level of learning performance or to allocate a final grade at the end of the year.

5.5.1. Understanding educational tests

Expected learning outcomes

By the end of the lesson, you will be able to:

- Apply the understanding of differences between nature and definition of test and measurement; and
- Organise effectively the understanding of major functions and purposes of educational tests.

Test versus measurement

There are fundamental differences between the concepts of test and measurement. So far in this unit, we have used the generic term 'assessment' throughout. **Assessment** is the process of collecting data and information about learning, relative to a known quantity. A **test** is a specific form of assessment that is carried out in a controlled environment. 'All tests are assessments, but not all assessments are tests'.[114] A test is set by the teacher to assess students' knowledge of a subject and level of learning performance.

[114] Kizlik B. (2014). *Measurement, Assessment and Evaluation in Education.* Retrieved from: https://www.cloud.edu/Assets/PDFs/assessment/Assessment%20_%20Evaluation_Measurement.pdf

A measurement is a value assigned to an assessment of learning. The value is often numerical and can be used to accurately establish a level of learning, either by one student independently or in comparison with their peers. A measurement is collected using some form of standardised instrument, for example, distance can be measured with a physical standardised instrument such as a ruler or tape measure. If you were to measure the size of your classroom using a tape measure, you would be collecting data using a standardised instrument based on an established set of standards. The measurement could be recorded in feet, inches, meters or even millimetres but it is important to note that the data you have collected during this exercise is a measurement of the room, not an assessment of the room. This means that the measurement of learning can be seen to be the data that has been collected using a standardised instrument of measurement, in the context of education in this example the instrument could be a test.

Formal educational tests can take two forms. A **standardised** test is normally summative and is conducted and graded in a consistent manner to ensure that students are graded only on their performance on that actual test. This can be classified as AoL. Non-standardised testing is more informal and can take a multitude of forms that are relevant to the circumstances of the assessment. Non-standardised tests are usually formative and classified as AfL or AaL. A test with significant consequences to the student taking the test is known as a 'high stakes test'. Examples of this include entry and final examinations.

There are four types of measurement scales, which can be ranked from simple to complex. Depending on the variables present, and which method of measurement is used, different kinds of data will represent the different measurement scale. The measurement scales are considered hierarchical, in that each scale fulfills the function of the previous scales, plus additional functions relative to the scale level.

Four types of measurement scale

Nominal scale

This is the simplest level of measurement and can be used to classify data into a minimum of two named categories. Nominal scales are used to 'label' data or variables without a quantitative value or specific order. For example:

What gender are you?	
Male	
Female	

What state / region do you come from?			
Kachin		Magwe	
Sagaing		Kayah	
Chin		Yangon	
Shan		Ayeyarwady	
Mandalay		Kayin	
Rakhine		Tanintharyi	
Bago		Mon	

The nominal scale is fundamental to quantitative research, and assessment and nominal scale data can be collected mainly through multiple-choice questions (as shown in the examples).

Ordinal scale

Each level of the scale retains the functions of lower order scales but adds extra complexity. The ordinal scale thus retains the labels of the nominal scale but adds a degree of rank or a value of importance or significance to the measure. Ordinal scales are generally used to demonstrate measurements of frequency although the distance between the variables is not shown or calculated. Ordinal scales are often used in the rating of something, for example:

Are you happy with your progress on the Educational Studies programme?	
Very unhappy	1
Unhappy	2
No opinion	3
Happy	4
Very happy	5

As you can see from the above example, the order of the labeling is important in ordinal scale measurement (whereas in the example for nominal scale it did not matter what order the regions of Myanmar were listed). 'Very unhappy' is worse than 'unhappy', which is worse than 'happy', and so on. Ordinal scale data can easily be transferred into graphical representation to demonstrate the findings.

Interval scale

The third most complex scale retains all the functions of nominal and ordinal scale measurements and adds one further function. The interval scale allows us to see the exact difference between the variables. Interval scales are the first opportunity to use statistical analysis, and mean, median, mode and central tendency can be calculated from the data in this scale. Most of the tests used in educational measurements, such as achievement tests and aptitude tests, are recorded using an interval scale. However, interval scale has no pre-determined starting point, known as 'true-zero'. An example of this could be:

'If an IQ test produces scores ranging from 0 to 200, a score of 0 does not indicate the absence of intelligence, nor does a score of 200 indicate possession of the ultimate intelligence.'[115]

This also means that under the properties of an interval scale, someone with an IQ of 100 is not necessarily twice as intelligent as someone with an IQ of 50.

A good example of an interval scale is temperature as it is possible to measure the difference between the values (temperatures): 40 degrees Celsius is 10 degrees different to 30 degrees Celsius and 10 degrees different to 50 degrees Celsius. However, zero degrees Celsius does not mean that there is no temperature, and because of this, 20 degrees Celsius is not 'twice as hot' as 10 degrees Celsius. This is because without a 'true-zero', we are not able to multiply or divide the data, we can only add or subtract. Thus, ratios cannot be calculated using the interval scale.

Ratio scale

As the name suggests, this more complex measurement scale can be used to assign order, values and intervals between values with the addition of 'true-zero'. This is the most precise measurement scale and allows for a wide range of descriptive and inferential statistics to be calculated.

However, ratio scales are not often used in educational measurements as they are more often associated with physical measurements such as distance, height or weight. Someone who is 6 feet tall is twice as tall as a child who is 3 feet tall. Or someone who has travelled 10 miles has travelled twice as far as someone who has travelled five miles; both commenced their journey at 'true-zero'

[115] Example taken from B.Ed. first year, Educational Test and Measurement.

Summary of levels of measurement[116]

Table 5.7. Summary of levels and offers of measurement scales

Offers	Nominal	Ordinal	Interval	Ratio
Sequence of variables	✗	✓	✓	✓
Mode	✓	✓	✓	✓
Median	✗	✓	✓	✓
Mean	✗	✗	✓	✓
Difference between variables can be calculated	✗	✗	✓	✓
Addition and subtraction of variables	✗	✗	✓	✓
Multiplication of variables	✗	✗	✗	✓
Presence of 'true-zero'	✗	✗	✗	✓

Learning activity 1

Based on your learning so far in this subject, write a short critique of the statement given at the start of this lesson:

'All tests are assessments but not all assessments are tests.'[117]

What is your understanding of this statement?

[116] Table based on https://www.questionpro.com/blog/nominal-ordinal-interval-ratio/
[117] Kizlik B. (2014). *Measurement, Assessment and Evaluation in Education*. Retrieved from: https://www.cloud.edu/Assets/PDFs/assessment/Assessment%20_%20Evaluation_Measurement.pdf

5.5.2. Types of achievement tests

Expected learning outcomes

By the end of the lesson, you will be able to:

- Classify the types of achievement tests according to nature of content and various function, types of methods applied; and
- Understand and use planning the test.

Evaluation of assessment data and tests

Evaluation of testing data is used to make decisions and value judgments that support decision-making. For example, an educational evaluation aims to discover the extent to which the learning objectives have been achieved, and thus measure the quality of teaching and resources allocated to the teaching.

Student evaluation considers the attainment of learning through assessment. Assessment tools such as standardised tests are used in this instance, and the goal is not just to 'pass or fail' students but to gauge understanding of attainment that can support improved instruction and improved learning. In order to develop effective and useful educational tests, a series of questions must first be asked:

Why are we testing?

1. What is the reason for the test?
2. What stage of the learning are we testing at?

    a. Diagnostic
    b. Formative
    c. Summative

What are we testing?

1. Are we testing the attainment of learning objectives?
2. Are we checking students if students can:

    a. Remember?
    b. Understand?
    c. Apply?
    d. Analyse?
    e. Evaluate?
    f. Create?

3. Are we testing the whole syllabus or a section or just one learning objective?

How do we make sure that the test is valid and representative?

1. Do we use a tool to ensure the test is developed fairly?

Validity and reliability in testing

Once the pre-testing questions have been answered, it is important to ensure that the test is developed in a way that is both representative of the subject area being tested, and valid and reliable.

An effective and efficient test is one that is both valid and reliable.

Validity

The validity of a test refers to whether the test measures what it was intended to measure. The most common use of validity in testing is referred to as ‘content validity’. There are three measures of validity:

Content validity

This refers to how well a test measures the learning outcomes or behaviours it was intended to test. For example, if a Maths test were written in French, it is likely that many students would perform much worse than if the test had been written in Myanmar or English.

Criterion validity

This relates to the extent that the test results agree with external criteria such as national averages. If an end of year examination produced significantly different results to the national average, it would be assumed that the exam had low criterion validity.

Construct validity

This refers to whether the measured test results relate to or match the anticipated. This is often used in testing where changes in behaviours can be observed and tested rather than simply knowledge acquired.

The main concern when developing educational tests should be that the content of the test is valid, in that the items being tested are a fair representation of the learning objectives that need to be assessed.

Reliability

The reliability of a test can be measured by how consistently the scores in that test are attained, regardless of who will be scoring the test. Reliability is related to either the scoring of the test (scorer reliability) or the test itself (test reliability).

For example, if two separate teachers were to score the same test completed by one student, and the score given by each of them is very different, then the test is considered to be of a low reliability (scorer reliability). The type of testing methods used has a large influence on the reliability of that test, for example, a multiple-choice test will have a high degree of reliability, as ultimately there is only one correct answer that can be scored (test reliability). However, an ‘open-question’ essay test might be scored differently by different teachers, and students may get different scores if they repeat the test (test and scorer reliability).

A well-prepared and agreed scoring system or scoring scheme based on the objectives of the test can support greater reliability.

Achievement testing

This is the systematic process of ascertaining the learning achievements of students after a period of learning. Although often assumed to be at the end of a programme or course, with the intention of assigning grades, achievement testing can also be carried out during a programme to understand the level of learning in a formative manner.

The basic principles of achievement testing should be that the learning objectives are clearly defined, and that a representative sample of those learning objectives is assessed in an appropriate manner with the goal that the results will be used for either initial assessment, formative assessment or summative assessment. Summative achievement testing can be both norm-referenced and criterion-referenced tests.

Learning activity 1

Write one sort of assessment that you could use to assess the teaching and learning in Lesson 5.5.2. The assessment must demonstrate high validity, be reliable, and be related to the learning outcomes of this lesson:

- Classify the types of achievement tests according to nature of content and various function, types of methods applied; and
- Understand and use planning the test.

What methods of assessment or type of test would you use?

Improving the validity and reliability of a test

There are many ways in which you can improve the validity of a test:[118]

1. The goals and objectives of the test should be clearly defined.
2. The assessment measure of the test should match the goals and objectives.
3. The test should be reviewed by a third party, and checked against other tests being used to ensure validity.
4. Regularly review tests and check for validity, in instances where validity is found to be low or questionable, it may be necessary to edit the test questions.

[118] https://chfasoa.uni.edu/reliabilityandvalidity.htm

There are also ways in which you can improve the reliability of a test:

1. Increase the length of the test (within reason) as generally the more questions there are in a test, the higher the reliability.

2. Ensure that the test takers are given the test under the same conditions, that is, location, length of time for the test, available resources, and for example, a test taker taking the test in a quiet, well-lit classroom may perform better than another test taker completing the same test in a busy restaurant.

3. Ensure that test takers are fully informed of the expectations of the test: How many questions to answer, what format the test will take, how long they have. The process of testing is to measure knowledge and understanding, not how well the test taker can decipher test instructions. Allowing students to take practice tests, in the same environment as the real test, will increase reliability.

4. Ensure that everyone involved in the marking and grading of the test is given the same information and sufficient information. They should be experienced in marking, and knowledgeable about the subject being assessed. A clear set of grading and marking instructions that may include answer sheets will contribute to better scorer reliability.

5. Regularly review tests and check for reliability, in instances where reliability is found to be low or questionable, it may be necessary to edit the test questions.

Review questions

1. Describe the four different types of measurement scales.
2. How is the validity of a test measured?

5.6. Appropriate Techniques of Assessment (2)

5.6.1. Types of assessment tools

Expected learning outcomes

By the end of the lesson, you will be able to:

- Explain various types of assessment tools; and
- Discuss the importance of keeping accurate records for both formative and summative purposes.

There are two main ways to measure the achievements of students' learning. The first and historically most used is norm-referenced testing, where students are compared against each other. The second is criterion-referenced testing where performance is measured against a goal, and no comparison is made with other students.

Norm-referenced tests (NRT)

NRT has been the standard method for assessing students in educational institutions across the world for many years. The test can be used in two ways. The first is that students are graded on their test answers against each other. So, if a class of 30 students were asked the same open-ended question, their answers would be hierarchically graded from best to worst. Each student may have answered the question correctly but in this form of assessment there are degrees of correctness.

The other way this method is used is once grading has taken place. The test scores of a group of students are analysed and compared against each other. The pass-fail grade is established based on the grade scores achieved, for example, 60% pass, 40% fail. The lowest scoring 40% of the class would then fail based solely on their performance against their peers, regardless of the scores they achieved.

NRT is useful if you wish to rank the achievements of students against each other, to establish higher or lower performing students in a 'league table'. In situations where testing is required to establish the highest performing students on a test, then NRT is valuable. Some universities require students to sit for entrance exams. As there is a limited number of places available, a cut-off score cannot be used to accurately determine the number of students to be admitted as there is no guarantee how many candidates will attain that score. Using NRT, students would be ranked and then the top students (depending on how many places are available) will be considered to have passed the test. NRT does not ensure that learning has occurred or that learning outcomes have been achieved. Under the rules of NRT there will always be a 'top of the class' and a 'bottom of the class' regardless of how good or bad the actual scores are.

NRT tests are generally neither too difficult nor too easy. The questions are of an 'average difficulty' to enable the test results to be interpreted across a wide range of test takers.

Criterion-referenced tests (CRT)

CRT measures the knowledge, skills and understanding of students and their attainment of learning outcomes after a period of learning against a pre-determined set of criteria. Each student is assessed in exactly the same way and is graded using the same method. Most importantly, they are assessed on individual merit, not against the achievements of other students. A good example of CRT is the driving test. Typically a learner driver will have to pass various written and practical tests to obtain their driving licence. Each learner driver will be tested in a very similar environment and will only acquire their driving licence if they pass the tests to an agreed level. The number or level of other students taking the test will have no bearing or influence on their opportunity to pass.

The results from using this type of assessment are easy to record and can be used to establish the success of a teacher or school. One useful feature of CRT is that there is a pass or fail element to the test in that there is a cut-off score: any student who scores below that score will fail.

CRT is usually used in high-stakes testing, such as end of year exams, as it is a more accurate reflection and assessment of learning than NRT.

Comparison of NRT and CRT testing[119]

Table 5.8. A comparison of the use and relevance of NRT and CRT testing

	Norm-referenced testing (NRT)	Criterion-referenced testing (CRT)
1	Uses a relative standard, that is, measures the extent of individual differences	Uses an absolute standard, that is, measures what an individual student can or cannot do
2	Determines the extent to which a characteristic exists in relation to others	Determines the degree to which a skill has been mastered
3	Scored using percentiles (ranking), and measured with reference to the normal curve	Measured by scores and ability (mastery) on an individual basis and not influenced by the performance or scores of others
4	Is used to differentiate between individuals and the score variability is important, that is, is used to rank students	Is used to determine the level of proficiency and level of knowledge of individuals, and score variability is not important, that is, can be used to measure improvement of performance of an individual student over time
5	Contains items that are neither too easy nor too difficult, and covers a broad area to be assessed	Contains whatever items are necessary to measure the achievement of learning, usually in a specific area
6	Is concerned more with the performance of groups, rather than individuals in the test	Solely concerned with the performance of individuals
7	More appropriate for assessing the performance of larger groups or whole schools	More appropriate for student evaluation of achievement of specific learning objectives
8	Results are used for guidance, classification and grouping decisions	Results can be used for improving teaching and learning methodologies

[119] Table based on B.Ed. first year Educational Test and Measurement and from information at: https://www.emporia.edu/~persingj/nrtvscrt.htm

Learning activity 1

Consider the information about CRT and NRT. Which do you think is the fairest way of assessing students? Why do you think that?

Ipsative assessment

There is a third type of test, called **Ipsative** assessment, which is used more as a formative measurement of performance. This kind of assessment compares the performance of a student against their own previous performance. Although this is not useful for summative assessment, it is very useful in supporting students in improving their learning. Encouraging students to focus on their own performance and not be distracted by the performance of others can be motivational and empowering and is useful in lower-performing students.

5.6.2. Keeping accurate records

Expected learning outcomes

By the end of the lesson, you will be able to:

- Discuss the importance of keeping accurate records for both formative and summative purposes.

On-going formative and summative assessment of students' learning is an integral part of the teaching cycle. It is important for teachers and students to be aware of how they are performing, and where their strengths and areas for improvement lie. In order to assess and inform students of their performance, a teacher must make and keep accurate records of all their students.

The amount of data that teachers must collect is quite staggering, and can at first seem intimidating. Among other things, teachers need to record:

Attendance, diagnostic testing results, formative testing, surveys, checklists, observations, behavioural records, tests, quizzes, written assignments, summative tests, and portfolios.

It is important for a teacher to be organised and methodical in the way that they collect, store, and assess the information or data that they have available to them. How they use that data to inform and support their students is equally important.

The data collected from students in the form of formative or summative assessments should be used constructively to inform and support learning. Test results should be given to students in a timely manner while they are still relevant in order to reward students for their accomplishments, and to support their understanding of where they can make improvements.

Teachers can use the NRT and CRT data they have collected to better meet their students' learning needs by grouping the students based on need. Teachers can use the results of testing to address the problems of lower-performing students through targeted differentiated teaching.

Information and data on students' performance can also be shared with parents to ensure that they can take an active role in supporting their children in the improvement of their learning and grades, and to ensure that they have opportunities to deliver praise, reward and motivational support.

High stakes tests require accurate recording of data and effective analysis of the data to ensure that students are awarded the correct grades and that they are rewarded appropriately.

Learning activity 1

Which type of information from assessment do you think is currently being recorded in the schools in Myanmar? Do you think different information could be collected that is more useful?

Review questions

1. Why and when is norm-referenced testing used?
2. Why and when is criterion-referenced testing used?

5.7. Types of Test Questions

Written tests are a valuable tool in the assessment of students' knowledge and understanding. There are different types of written question, and their use depends on why the assessment is being carried out. Writing good questions is a skill, as poorly written questions can confuse students and potentially lead to lower grades.

5.7.1. Different test questions that can be used in assessment

Expected learning outcomes

By the end of the lesson, you will be able to:

- Identify different type of written tests.

Written tests are by their very nature an opportunity for students to demonstrate their learning in a high-order manner. This **open question** type of assessment can be used in both formative AaL and summative AoL situations. Written tests usually take one of two forms: Short answer questions and long answer questions. Both versions of the test give students the chance to organise their knowledge of a subject in a coherent and structured manner to demonstrate their understanding in their own words.

There are benefits and limitations to using written tests as a way of assessing students' knowledge.

One of the main benefits of using written tests is that a student cannot correctly answer the question if they do not have the necessary knowledge. Although it is possible to guess, the likelihood of them being correct is lower than it would be if they were to guess the answer to a multiple-choice question. Another benefit is that the written test gives each student the opportunity to independently express their knowledge, and so two different answers from two different students may be both correct.

One of the limitations of the written test is that not all students are confident in their ability to transfer their knowledge accurately onto paper. Written tests are not suitable for students that have low levels of reading and writing skills. Long answer verbal questioning may be more suitable for them. The biggest difficulty that teachers will face in implementing written tests as an assessment method is maintaining a consistency of marking or grading. Marking a written test is a subjective process, and two different teachers may grade one written test differently based on their expectations and knowledge of the subject.

A written test involves students responding to a question or questions which may stand alone or which may be connected to supplementary information such as a case study or passage of text. The questions that the student must answer are usually not provided prior to the test although in some instances they are, and generally require the student to answer without additional resources. In some circumstances, ‘open book’ written tests are used (that is, one in which relevant resources may be used), and these are intended to assess the ability of the student to gather, judge, assess and apply information to answer a question rather than just recall information.

Short answer questions

Short answer test questions are used in assessment to check the students’ ability to recall knowledge or demonstrate understanding of complex information in a simple and concise way. Short answer questions are easy for teachers to compile, and are easier to mark more objectively. Multiple questions can be used in one test to cover a wide range of knowledge in the time allocated. The questions are short enough for students to understand the information, to answer the question without ambiguity, and to provide a structure to their answer. It is more difficult to guess the answer to a short answer test question than a multiple-choice question or gap-fill question. Short answer questions may ask a student to provide a sentence or short paragraph.

Examples of short answer questions:

- Define formative assessment.
- Why do teachers use both formative and summative assessment?
- What considerations should you make when giving feedback?
- Complete the following sentence: Diagnostic assessment is used because…

Long answer questions

Open-ended long answer questions are used for the same reasons and in a similar manner to short answer questions. They allow the student to demonstrate their ability to recall knowledge of complex information. There are usually fewer limitations on the answer, although word limits are often imposed in a written assignment, for example. In an examination environment, the answers to long answer questions are usually constrained by the time allocated to the assessment. The constraints imposed in this situation support the standardisation of testing, and allow teachers to compare the results of students across a range.

Summative assessment of learning in the form of formal examinations often uses both types of written question, with a certain amount of time allocated to complete both types of question. In this instance, students will be required to answer all the short answer questions, and then select which long answer question they will answer from a small selection. These options allow the examiner to test general knowledge of the subject in the form of short answer questions and more specific knowledge of a particular area of learning, and allow the student the opportunity to demonstrate the full breadth of their understanding and knowledge.

Long answer questions are easy for teachers to prepare, but they are more difficult to grade or mark than short answer questions.

There are traditionally two types of long answer question:

1. Extended response long answer questions do not give any indication as to the limitations of the answer, for example the length, time taken or the range and scope of the answer. No reference is made to any additional information that will direct the answer.

2. Restricted response questions indicate the limitations expected of the answer, for example the question may make suggestions as to the word count, number of examples to be provided or indicate the form that the answer will take in response to stimuli such as a quote or passage of information.

Examples of long answer questions

1. *'According to the 2015 Education for All Global Monitoring Report, there are about 58 million children without access to primary school and 100 million who do not complete primary education. Even in wealthier countries, many young people leave school without worthwhile qualifications.'*

Basing your answer on the above statement, explain why so many children in the world do not complete primary education.

2. Explain what role education can have in reducing poverty and inequity.

3. Write an essay of at least 250 words on any one of the following statements:
   a) Parents are as important as teachers to the success of students.
   b) Inclusive teaching methods are beneficial to everyone.
   c) Summative assessment is less important than formative assessment.

4. What values should a teacher hold?

Learning activity 1

Write a short critique of the four examples given above, consider their relevance and highlight the strengths and weaknesses of the different types of question. Take into consideration the concept of inclusivity and inclusive assessment.

5.7.2. Developing written tests

Expected learning outcomes

By the end of the lesson, you will be able to:

- Develop a good question item.

When developing test questions, it is important to be fair, and to give the students as much opportunity as possible to demonstrate their knowledge and learning. This also applies to the way that test questions are graded.

The questions given in a written test must always:

1. Relate to a subject that has been covered during the teaching and learning components of the class. Students should not be expected to be able to answer questions with new information that has not been already covered.
2. Be written in a clear, unambiguous way so that students can understand exactly what they are expected to do. The longer the question, the greater the opportunity for confusion. Any limitations to the expected answer must made be clear to the student. This could be the number of words used or the specific information to respond to.
3. Be written at a level suitable to the grade of the students being tested and with the expectation that a good answer to the question can be written within the time allowed.
4. Demonstrate the criteria on which the question will be evaluated. For example, the wording of the question should indicate the level of answer required: ‘evaluate’, ‘explain’, critique, and so on.
5. Demonstrate the number of marks allocated to it, so that students can make an informed decision on the amount of time and length of answer to dedicate to the question. When allocating marks to questions, it is important to consider how points can be allocated if only some elements of the expected answer are given.

Table 5.9. Features of different types of question

Type of test	Syllabus coverage	Reliability	Ease of design	Ease of marking
Short answer	Medium	Medium	Medium	Medium
Long answer	Low	Low	High	Low

Written tests are invaluable as an assessment tool, especially for carrying out summative assessment. However, they affect the data that can be collected, and how that data measures learning. Figure 28 demonstrates the different elements of assessment. For example, low-order structured question assessments such as multiple-choice questions can assess a greater amount of the syllabus due to their nature, whereas long answer, high-order questions are limited in the scope of the syllabus that can be covered. Multiple-choice questions are more difficult to prepare than long answer questions, but are also more objective.

Remember that the reliability of a test refers to the extent to which it can be consistently measured. A highly reliable test can be marked by different teachers who will consistently give the same grade. In structured questions, such as multiple-choice questions, the reliability is high. Reliability is lower in more open questions such as long answer questions.

Remember that the validity of a test refers to whether the test measures the skills or knowledge that it is intended to. For example, a test with a low validity score would be one that includes questions that are too complicated or questions that are about a subject not yet studied in the class.

When writing long and short answer questions, it is important to ensure that the question is assessing something that has already been taught. Students should not be expected to answer a question that has not been covered in class. The questions should aim to test higher-order thinking skills, and this can be reflected in the wording of the test. Use words that are listed in Bloom's revised taxonomy to create the question. The wording of the question should be unambiguous and should direct the student down the path you wish them to take with their answer. The following rules, adapted from Clay (2001), should be followed when writing test questions:

- Questions must be comprehensive and allow students the opportunity to demonstrate the breadth of their knowledge.
- The question must be worded to allow both weaker and stronger students to answer.
- The direction you wish the student to take with their answer to the question must be explicitly explained.
- The answer you expect to be given to the question must be achievable within the allotted time.
- Consider how you will grade the answer to the question.

There are many ways that students can demonstrate their knowledge and understanding through answering short and long answer questions. The following examples are commonly found in this type of question:

1. **Agree or disagree:** To what extent do you agree or disagree with the following statement…Provide reasons for your answer.
2. **Analyse:** Analyse the following passage…Explain your findings.
3. **Classify:** Read the following passage and then classify the component parts. Give reasons for why you have grouped them in the way you have.
4. **Compare or contrast:** Demonstrate the similarities or differences between the following statements…
5. **Cause and effect:** Establish a link between the following items and describe their relationship…
6. **Define and give an example of:** Define the theory that is being presented in the following passage and provide other relevant examples…
7. **Describe:** Describe how the following example can demonstrate a theory of…
8. **Illustrate:** Give examples of how this theory can be demonstrated…
9. **Focused summary:** Summarise the following passage, paying particular attention to…

Marking or grading written tests

The more open-ended a question is, the more complex and wide-ranging the answers can be. Grading open-ended extended response questions can be difficult and time-consuming. In order to mark written tests in a fair and objective manner, it is important to develop a strict and rigorous mark scheme. This scheme must be agreed upon and followed by all the teachers marking the tests.

Before grading a written test, you must first answer the question yourself, basing your answer on the learning that your students have received. Your answer to the question will be a good benchmark from which to grade the tests.

Make sure your assessment is based on the mark scheme. Grading involves a great deal of subjectivity and can be influenced by many things, such as your relationship with the student. Try to avoid interpreting the answers based on what you imagine the student is trying to say. Grading and feedback should be carried out as soon as possible after the test.

Learning activity 1

Develop nine independent questions using the nine examples listed above as a starting point. The questions must all be on the same subject and the answers to the questions should be variations on each other. For example:

1. **Agree or disagree:** To what extent do you agree or disagree with the following **statement:** 'Long answer questions have a lower reliability than short answer questions.'
2. **Analyse:** Analyse the following statement: 'Long answer questions are easy for teachers to prepare, but they are more difficult to grade or mark than short answer questions.'

Review questions

1. Complete the following sentence: Short answer test questions can be more difficult to answer than long answer test questions because…
2. When developing a written test, what five considerations must you make?

5.8. Importance of Keeping and Using Accurate Records for Improvement of Learning

Teachers are required to collect large amounts of data and information from their students in a variety of ways and from a number of sources. This unit and the learning carried out in the classroom will introduce the different ways that data can be collected and the reasons why that data is important.

5.8.1. Keeping accurate records of assessment

Expected learning outcomes

By the end of the lesson, you will be able to:

- Discuss ways of collecting data.

Teachers are required to collect data through the different methods of assessment used during the teaching cycle. This data comes from a variety of sources and is used for a variety of reasons. For example, the findings from an informal formative assessment carried out during a lesson can inform the students on how successful the lesson has been and how much knowledge they have gained. The collective findings from a summative formal assessment at the end of the year can inform the teacher of how effective their teaching and use of the curriculum has been over the year.

The majority of data collected, however, occurs daily through the on-going formative assessments carried out during each lesson. It is important that this data is used and acted upon to ensure that teaching and learning is successful and that the needs of the students are being met.

Formative data can be collected through question and answer sessions, quizzes, quick tests and a variety of ad-hoc assessment methods such as 'show of hands' and observations. Teachers can quickly assess their students through informal observations of the behaviour of the students. Much of the formative data that a teacher collects can be classified as qualitative, in that it can be used more as a 'narrative' of the assessment for learning. Summative data on the other hand is more quantitative in nature, in that it is a quantifiable evaluation of achievement of learning.

Carrying out multiple methods of assessment and collecting multiple types of data supports students' learning and development. As has been discussed in this unit, over reliance on one form of assessment is not an inclusive approach to teaching – it can create false results or present difficulty in the interpretation of results. A combination of qualitative and quantitative data is a holistic approach to assessment and provides a more rounded overall picture of the situation of each student and the class as a whole.

Collecting data to measure performance can be carried out in many ways such as through the assessment of student work such as presentations, written tests, verbal answers, portfolios, and practical demonstrations of learning.

Data can also be gathered by using a summative assessment that has been developed to enable teachers to make informed NRT or CRT assessments of students' learning against a pre-determined set of standards. This usually takes the form of primary evidence of achievement through the sitting of exams, the production of a thesis or dissertation and the presentation of a *viva voce.*

These direct methods of collecting data are carried out in collaboration with the student in the knowledge that they are demonstrating their learning and providing evidence of their performance. This data can be used to assess the students' progress. Indirect methods of data collection, while important, cannot be used on their own as an assessment tool, but more as a supportive tool to contribute towards assessment decisions. Indirect methods, such as observation, consider the attitude, behaviour and contribution of the student to their own learning.

Some of the ways that data can be collected[120]

Method of assessment	Form of assessment
Assignments	Questioning
Attendance records	Observations
Class questioning	Questioning
Drawing	Skills tests
Essays	Questioning
Exams	Questioning
Learning contracts	Questioning
Practical tests	Observations, simulations, skills tests
Presentations	Observations, skills tests
Projects	Observations, simulations, skills tests
Reports	Questioning
Short quizzes	Questioning
Speed tests	Skills tests
Take-home exams	Questioning

Learning activity 1

One thing to bear in mind when considering data collection is that the data collected should be relevant and useful. Collecting data that will not be used is a pointless exercise. Planning how and why data will be collected is therefore very important. Make some notes on this area of understanding and prepare a short checklist of things to consider or points to address if you were planning the collection of data. This will be useful for the exercise you will carry out in the classroom for this lesson.

Review questions

1. Why is it useful to statistically analyse and graphically represent assessment data?

[120] Table based on B.Ed. second year, Educational Test and Measurement.

5.9. Basic Statistical Knowledge on Educational Tests and Measurements

Effective and efficient statistical procedures are required in an educational context to be able to accurately assess and measure the achievement of learning. In order to confidently establish tests and to carry out statistical analysis, it is important to understand the basic concepts of statistics.

5.9.1. The nature of statistics

Expected learning outcomes

By the end of the lesson, you will be able to:

- Understand and verify the quality of classroom test; and
- Understand nature of statistical analysis in education.

In semester 2 of your first year on this programme, you will cover statistics in Maths, and learn how to teach the subject to primary students. However, it is important to understand how you will use statistics when assessing the learning of students. This unit will support your understanding of the basics of statistics and will contribute towards your understanding when you cover the topic in more detail next year in Maths.

Statistics are used in the analysis of assessment to provide generalisations, and infer and communicate information from a sample of a large number of data sets.

To begin, it is first important to define some of the terms used in statistics:[121]

Population – refers to a number of individuals who share or have in common, one or more characteristics.

Parameters – refer to the characteristics of a population.

Sample – refers to a collection of individuals that represent a portion of a given population. Statistics in this instance can therefore be defined as the 'characteristics of the sample'.

In order for statistical analysis to be possible, there must be a body of data. In this unit, we will use the same data set throughout to make things as simple as possible. This will be referred to as 'Data Set 1'.

Data Set 1: Test scores of 25 students

Twenty-five students sat a test which was scored out of a maximum of 100 points. Each student has been given a letter in place of their name. Their scores are recorded below. The list is arranged alphabetically in the first instance.

Table 5.10. Data Set 1

A	B	C	D	E	F	G	H	I	J
75	72	77	68	71	80	78	63	87	72

K	L	M	N	O	P	Q	R	S	T
67	70	66	70	72	82	83	76	76	70

U	V	W	X	Y
62	65	84	68	62

[121] Based on B.Ed. first year, Educational Test and Measurement.

Data often needs to be manipulated to make it useful. In a large data set, the data could first be collated in size order and then grouped prior to being transferred into a graph. This is called the frequency of distribution. It records the number of students that scored within a range of values and groups the students according to their score.

Table 5.11. Frequency distribution of Data Set 1

Score	87	86	85	84	83	82	81	80	79	78	77	76	75
Frequency	1	0	0	1	1	1	0	1	0	1	1	2	1
Score	74	73	72	71	70	69	68	67	66	65	64	63	62
Frequency	0	0	3	1	3	0	2	1	1	1	0	1	2

As it stands, this table does little to simplify the data. By taking this information and inserting it into groups, we will be able to see a clearer picture.

Table 5.12. Grouped frequency distribution of Data Set 1

Class intervals	61-63	64-66	67-69	70-72	73-75	77-78	79-81	82-84	85-87	**Total**
Frequency	3	2	3	7	1	4	1	3	1	25

It is now possible to see some themes and start to extract understanding from the information. For example, from the grouped frequency distribution of Data Set 1, it is possible to ascertain the range of results.

Range = (Highest Score) – (Lowest Score)

Range = 87 – 62

Range = 25

From Figure 30, it is also possible to ascertain the exact limits of the class interval 85-87:

Exact lower limit (L) = 84.5

Exact upper limit (U) = 87.5

The size of the class interval (CI) can be calculated as:

CI = U – L

CI = 87.5 – 84.5

CI for the interval 85-87 = 3

From Figure 31, it is also possible to ascertain the mid-point (x) of a class interval

$$x = \frac{(U+L)}{2}$$

$$x = \frac{(87.5+84.5)}{2}$$

$$x = \frac{(87.5+84.5)}{2}$$

$$x = 86$$

From the information in Figure 31, it is also possible to complete the following equation:

$$CI = \frac{Range}{Number\ of\ Class\ Intervals}$$

The measure of central tendency

The central tendency of a data set is the value that represents the central position within the data set. Often it is useful in statistical analysis to discover the 'typical' performance of a set of data, for example in Data Set 1, it might be useful to discover how the class performed on the whole. The average performance of the class – the mean average – can be discovered.

Mean average

The mean average of a data set usually lies within the centre of that data set though different averages such as median and mode can also be calculated, and their usefulness depends on the needs of the analysis. The main reasons for calculating the average of a data set can be:[112]

1. To discover the typical condition of the group or data set;
2. To be able to compare the typical condition with another group or data set; and
3. To be able to estimate the typical condition for many individuals, when we have a limited range of information available on those individuals.

The mean average is used in statistical analysis to represent the average of a set of data, and is often useful when analysing test scores. The mean is the sum of all the numbers in the data set, divided by the number of items in the data set, for example, using Data Set 1 again. Where:

μ represents the population mean
N represents the population size
∑ represents the summation symbol
X represents the individual observations

N = (75+72+77+68+71+80+78+63+87+72+67+70+66+70+72+82+83+76+76+70+62+65 +84+68+62)

$$N = 1816$$
$$X = 25$$

The mean value of the data set can be calculated as

$$\mu = \frac{\sum X}{N}$$

$$\mu = \frac{1816}{25}$$

$$\mu = 72.64$$

[122] based on B.Ed. first year, Educational Test and Measurement.

It can then be said that the mean score of the students that took the test was 72.64 out of 100 or 72.64%. This can be of some use when providing information on the performance of the students in a class but this method of averaging does have its limitations. The mean average is heavily influenced by outliers. In Data Set 1, the highest score was 87 and the lowest score was 62. The remaining scores were fairly evenly distributed between those scores. Higher or lower scores which are significantly different to the other scores have a significant influence on the mean average.

The mathematically correct way to calculate the mean is as follows:

$$\mu = \frac{\sum_{i=1}^{N} X_i}{N}$$

Where:

μ represents the population mean.
N represents the population size.
$\sum$ represents the summation symbol.
X_i represents the individual observations.

If the data to be averaged comes from a sample of the data set, then the sample mean can be found using the following equation:

$$\overline{X} = \frac{\sum_{i=1}^{N} X_i}{N}$$

Where:

$\overline{X}$ represents the sample mean.
N represents the sample size.
$\sum$ represents the summation symbol.
X_i represents the individual observations.

Learning activity 1

To support your understanding of these calculations, a much smaller data set (Data Set 2) is provided. Using this simplified data, try to work out the population mean.[123]

Data Set 2 contains only five entries (that is, five students sat a test) and their scores out of 10:

Data Set 2

Table 5.13. Data Set 2

Student	A	B	C	D	E
Score	10	5	7	8.2	4.3

information, it is possible to calculate the population mean:

$$\mu = \frac{\sum X}{N}$$

$$\mu = \frac{\square}{\square}$$

The mean value of the data set is therefore:

$$\mu =$$

This simple data set (Data Set 2) will be used to demonstrate how to calculate a sample mean.

[123] based on B.Ed. first year, Educational Test and Measurement.

If a sample of three is selected from Data Set 2 at random, without replacement from the original population of five, then there will be 10 possible samples that could be calculated by using the combinations problem.

$$5C_3 = \frac{5!}{3!2!}$$
$$= \frac{5x4x3x2x1}{3x2x1x2x1}$$
$$= \frac{120}{12}$$

= 10 possible samples

The sample mean can be calculated using the following formula:

$$\bar{X} = \frac{\sum X}{N}$$

Where:

$\bar{X}$ represents the sample mean.
n represents the sample size.
$\sum X$ represents the summation of scores.

Table 5.14. Possible variations of samples

Samples	ABC	ABD	ABE	ACD	ACE	ADE	BCD	BCE	BDE	CDE
Scores	10,5,7	10,5,8.2	10,5,4.3	10,7,8.2	10,7,4.3	10,8.2,4.3	5,7,8.2	5,7,4.3	5,8.2,4.3	7,8.2,4.3
$\bar{X}$	7.3	7.7	6.4	8.4	7.1	7.5	6.7	5.4	5.8	6.5

The sample mean can be found using the following formula:

$$\mu\bar{x} = \frac{\sum \bar{X}}{k}$$

$$= \frac{68.8}{10}$$

$$= 6.88$$

$$= 6.9$$

This shows that the average of all possible samples is the same as the mean of the true population that you should have calculated in Learning activity 1 (6.9).

Median average

In large data sets that do not have significant outliers, the mean average is a useful statistical analysis tool. In data sets that do have significant outliers it is often useful to find the median average.

The median average is used in statistical analysis to represent the middle of a set of data. For example, if we consider the scores in Data Set 1, where the mean average was 72.6 rounded up to 73, the median average can be calculated by arranging the scores in order of size:

62, 62, 63, 65, 66, 67, 68, 68, 70, 70, 70, 71, 72, 72, 72, 75, 76, 76, 77, 78, 80, 82, 83, 84, 87
The middle value, in the instance of odd numbered data sets or calculated as the middle in even numbered sets, can be seen to be:

62, 62, 63, 65, 66, 67, 68, 68, 70, 70, 70, 71, 72, 72, 72, 75, 76, 76, 77, 78, 80, 82, 83, 84, 87
Which in this instance, is not dissimilar to the mean average originally calculated.

This calculation can be demonstrated as follows:

N represents the number of observations

If N is odd then:

Median = Md = $(\frac{N+1}{2})$th observation

If N is even then:

Median = Md = Mean of the middle two values

= $\frac{1}{2}[(\frac{N}{2})$th observation+$(\frac{N+1}{2})$th observation]

To support your understanding of these calculations, a simplified example of finding the median is given below using a much smaller data set (Data Set 2).

Data set 2 contains only 5 entries, (that is, five students sat a test) their scores out of a 10 are arranged in size order below:

Table 5.15. Data Set 2 in order of score

Student	E	B	C	D	A
Score	4.3	5	7	8.2	10

As this data set contains an odd number of entries, the middle entry (the third observation in order) is the median average (shown in the shaded column).

Median = Md = $(\frac{5+1}{2})^{th}$ observation

Md = $(\frac{6}{2})^{th}$ observation

Md = 3^{rd} observation

Md = 7

[124] based on B.Ed. first year, Educational Test and Measurement.
[125] based on B.Ed. first year, Educational Test and Measurement.

Learning activity 2

If a data set with an even number of entries is used (Data Set 3), try to work out the median average.

Data Set 3

Table 5.16. Data Set 3

Student	E	B	C	F	D	A
Score	4.3	5	7	7.8	8.2	10

Using this data set the following calculation can be used:

Md = [$\frac{1}{2}$ ($\frac{\square}{2}$)th observation+($\frac{\square}{2}$)th observation]

Md = ($\frac{+}{2}$)

Md = ($\frac{\square}{2}$)

Md =

Mode average

The third averaging tool that can be used in statistical analysis is the mode average. This average considers the frequency of a number or score within a data set. In the instance, where there is more than one number that occurs the most frequently, there will be two modes given, as is the case with Data Set 1.

62, 62, 63, 65, 66, 67, 68, 68, **70, 70, 70,** 71, **72, 72, 72,** 75, 76, 76, 77, 78, 80, 82, 83, 84, 87
In this instance, the mode can be seen to be both 70 and 72.

Validity and reliability

The data collected from test results can support the teacher in evaluating the quality of the test. The **reliability** and **validity** are important and their presence is an indication of a

'good' test. A test could be considered good if it measures what it is supposed to measure, and does so consistently. For example, a person sitting the same test twice would get a similar score both times.

Reliability

The reliability of a test refers to the consistency of the test or instrument of measurement. For example, to measure the length of a classroom you would use a tape measure. Regardless of how many times you measured the room or what time of day you measured the room, you would always get the same result. A reliable test refers to how likely it is that the test taker will score the same or similar score if taken again or how likely it is that two independent markers would each grade the test with the same score. The more closed the assessment method the more reliable a test is. That is, two markers could grade a long answer question very differently but it is more likely that they would give the same grade to a multiply choice test. The reliability of a test is improved by the construction and use of well-designed marking criteria.

The second important variable that determines the quality of a test, and thus the quality of the data collected from that test, is **validity**. The validity of a test refers to the characteristics that a test is measuring, and considers how well the test measures them. In education, the validity of a test depends on whether the test measures the skills or knowledge that it is intended to. A test with a low validity score would be one that includes questions that are too complicated or questions that are about a subject not yet studied in the class. The validity of a test is relevant to the situation, so a practical test that is valid to assess practical knowledge would be less valid if it were used to assess background or theory knowledge.

When designing tests and deciding which tests to use, it is important to consider the validity and reliability of the tests. It is more difficult to collect meaningful data that is representative of the students' learning if the tests being used are of low validity and reliability.

Learning activity 3

Think of the different uses that this kind of statistical analysis can have in an educational context. Why might it be useful to develop frequency tables or grouped frequency tables of data collected in a school? Why might the measure of central tendency by important?

5.9.2. Analysing data through the use of graphs

Expected learning outcomes

By the end of the lesson, you will be able to:

- Understand how to evaluate data using graphical analysis.

Graphical representation of statistical information

Small data sets can easily be analysed without the use of any specialist tools. However, when data sets contain a lot of entries the use of graphical representation can provide a quick and easy to interpret visualisation of the information. A graph is generally used when it would take up less space than the text required explaining the data. Graphs are useful for observing and demonstrating trends and relationships between variables.

When using graphs there are rules that must be adhered to:

- The graph must be needed, in that the data is too complex to record in text.
- The graph must be easy to read, accurately labelled and at a scale that can demonstrate the relevant information.

There are several types of graph that can be used.

Pie Chart

This is perhaps the simplest graphical format, as well as being the easiest to understand. The pie chart is so named as it looks like a pie – a circle divided into slices that are representative of the data. The area of each slice or section is proportional to the magnitude of the component it represents.

Pie charts are produced on computers quickly and easily – Microsoft Excel will convert a table of information into a pie chart within milliseconds. You will cover this learning in the ICT curriculum. In the absence of a computer, it is possible to create a pie chart using a protractor and compass.

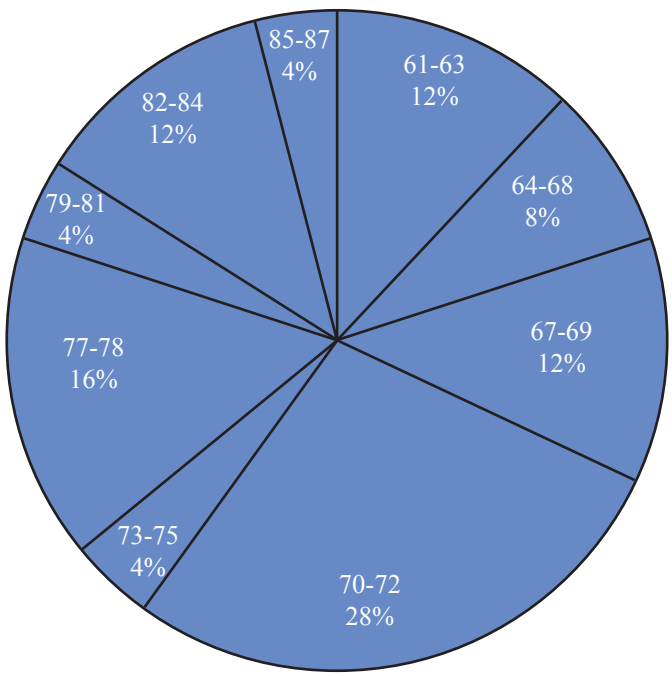
It is known that a circle is comprised of 360º – this represents the whole data set. In Data Set 1 from Lesson 5.9.1, this would be 25, as there are 25 students.

$360º = 25$

Based on the findings of the grouped frequency distribution of Data Set 1, there will be nine sections in the pie chart.
To calculate the angle at which each section will be drawn, the following equation must be used, where x = the angle of the sector.

$$x=(\frac{\text{frequency}}{\text{whole set}})360º$$

Figure 5.6. Pie chart taken from grouped frequency distribution of Data Set 1



A pie chart of the data presented in the grouped frequency distribution of Data Set 1 would look like this. However, other than to recognise that the majority of students scored in the 70-72 range, this chart does little to make the data easier to understand. If the data were separated into larger class intervals, and therefore fewer sectors, it might be more useful. This is presented in Figure 5.6.

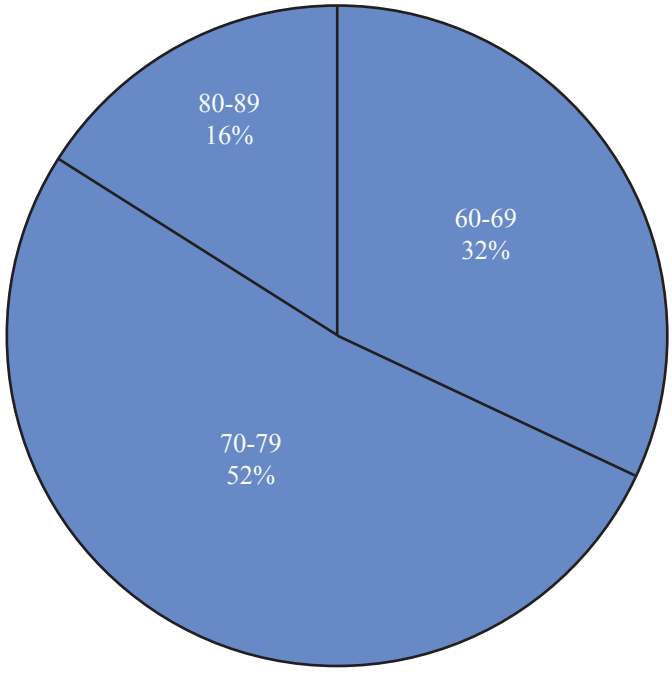
Grouped Frequency Distribution (Version 2) of Data Set 1

Table 5.17. Grouped frequency distribution (version 2) of Data Set 1

Class intervals	60 - 69	70-79	80-89	**Total**
Frequency	8	13	4	25

The second pie chart is easier to understand than the first:

Figure 5.7. Pie chart taken from Figure 5.6.



Learning Activity 1

Taking the information from the data set below, use the equation given above to develop a pie chart showing the share of answers to the question: 'What is your favourite colour?'

Table 5.18

Favourite colour	Blue	Red	Green	Yellow	Black
Number of students	10	20	30	15	25

Bar Chart

Bar charts are one of the most common types of graphs and one of easiest to create. In a normal bar chart the bars are drawn with equal width. The height of each bar represents and is proportional to the magnitude of the information being presented.

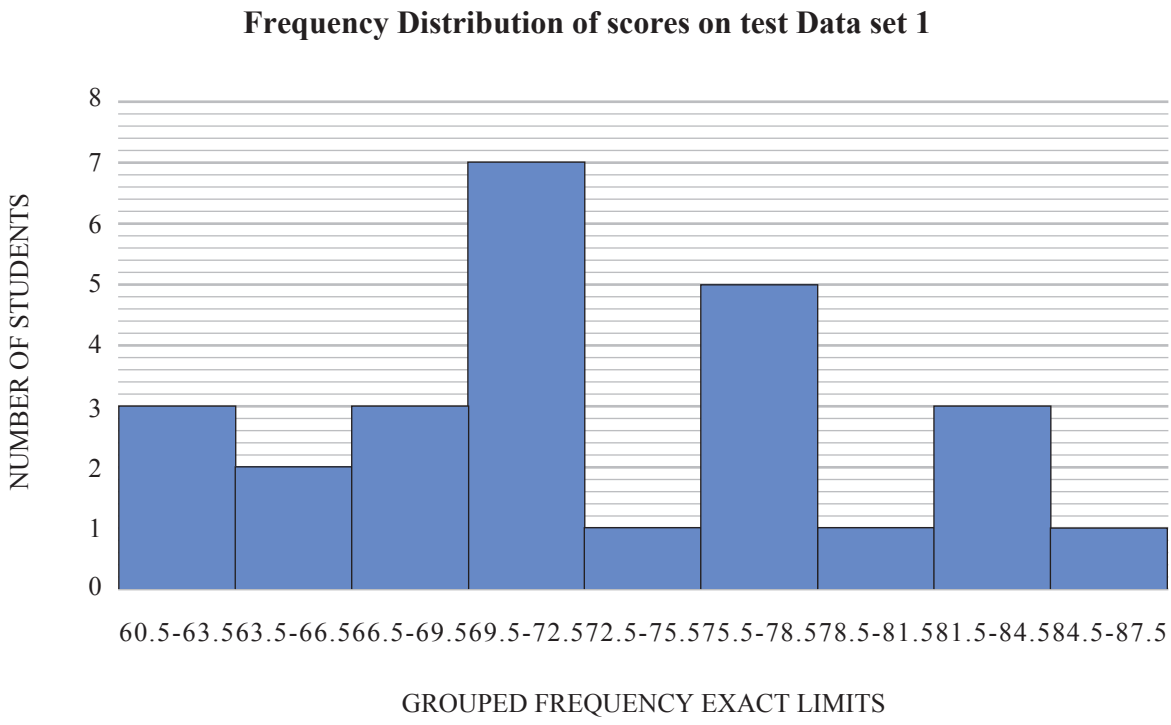
In the absence of a computer it is possible to create a bar chart using only a pencil and a ruler.

A simple bar chart can be created based on the grouped frequency data presented in Figure 31. This kind of bar chart is known as a histogram. In order to accurately represent the grouped data, the plots must be made based on the exact limits (x):

Table 5.19. Grouped frequency distribution of Data Set 1 based on exact limits

Exact limits (x)	60.5-63.5	63.5-66.5	66.5-69.5	69.5-72.5	72.5-75.5	75.5-78.5	78.5-81.5	81.5-84.5	84.5-87.5	Total
Frequency (f)	3	2	3	7	1	4	1	3	1	25

Figure 5.8. Histogram based on Figure 3.5 data



Frequency polygon

To be able to compare the data represented in a histogram, it is possible to plot a graph from that information. This graph is known as a frequency polygon. It is created by placing a data point at the top and centre of each bar and connecting the points with a line (Figure 41). It is also possible to plot multiple data sets on the same chart for easy comparison: See Figure 42 where three data sets have been plotted.

Remember, the mid-point can be found using the following equation:

$$x = \frac{(U + L)}{2}$$

Figure 5.9. Frequency polygon of Data Set 1

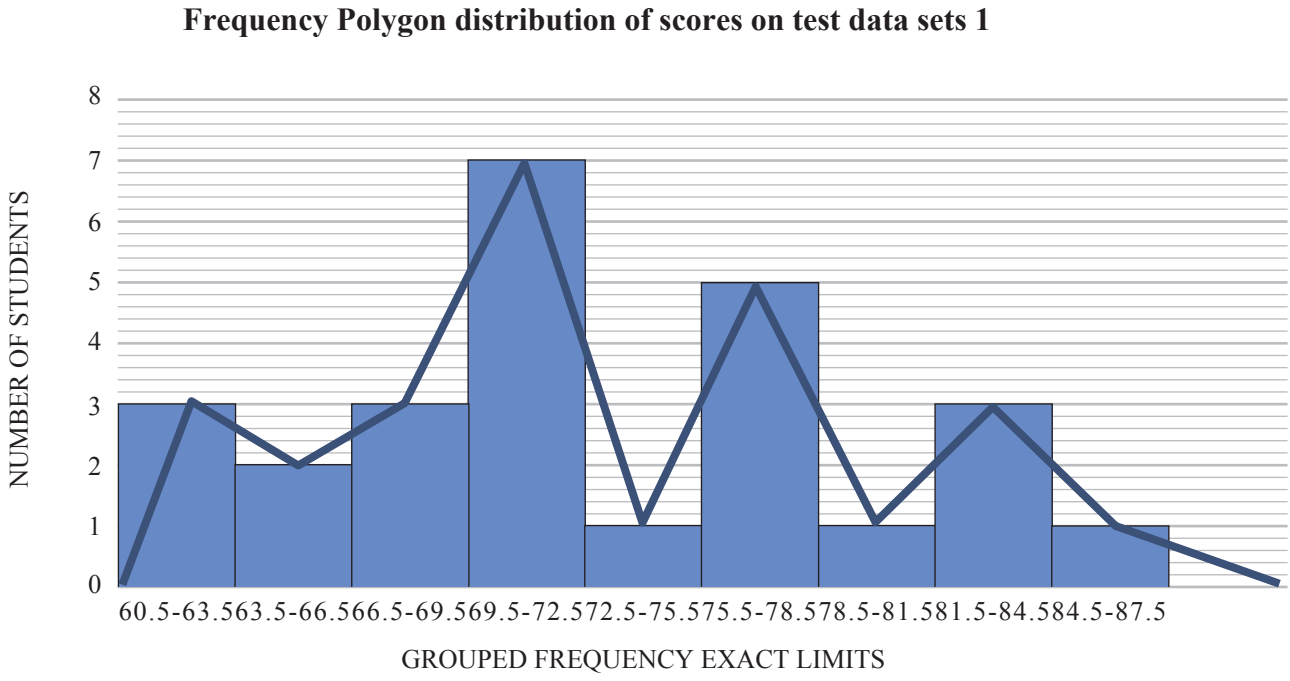
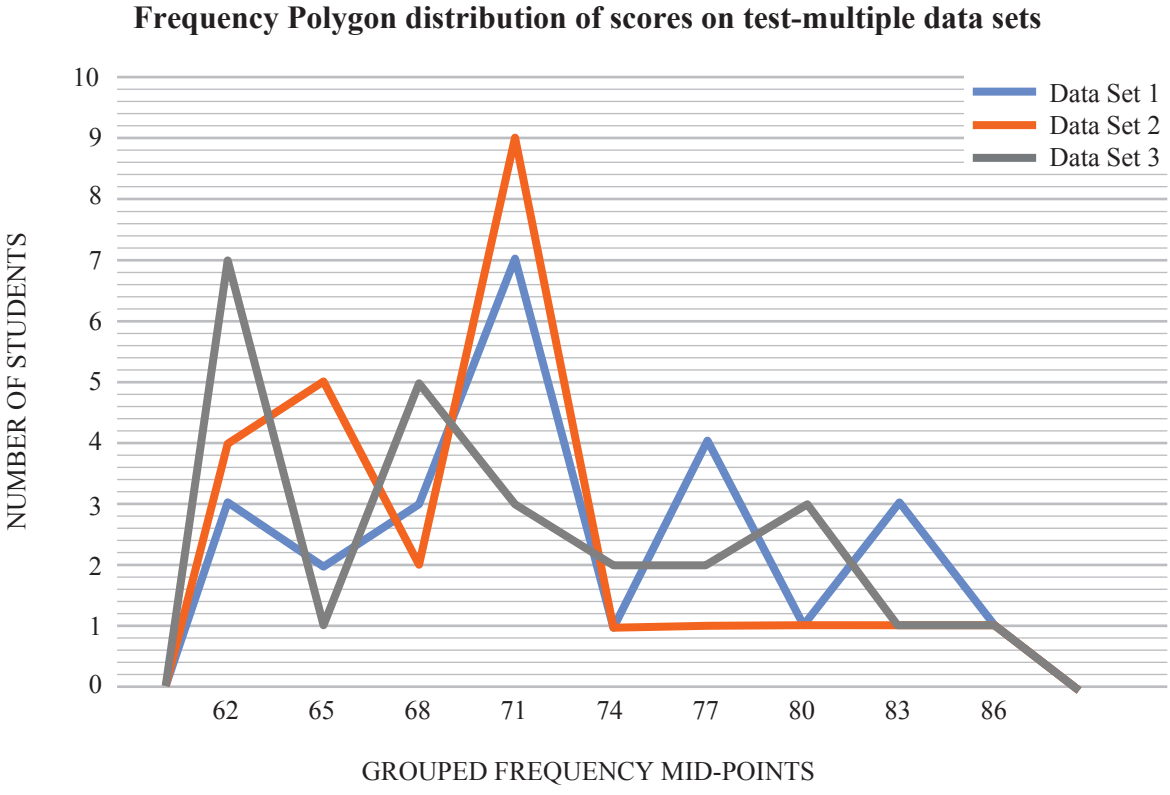


Figure 5.10. Frequency polygon of Data Set 1



Learning Activity 2

Taking the information from the data set provided below, draw and accurately label a bar chart demonstrating the answers to the question: 'What is your favourite color?'

Table 5.20.

Favourite colour	Blue	Red	Green	Yellow	Black
Number of students	10	20	30	15	25

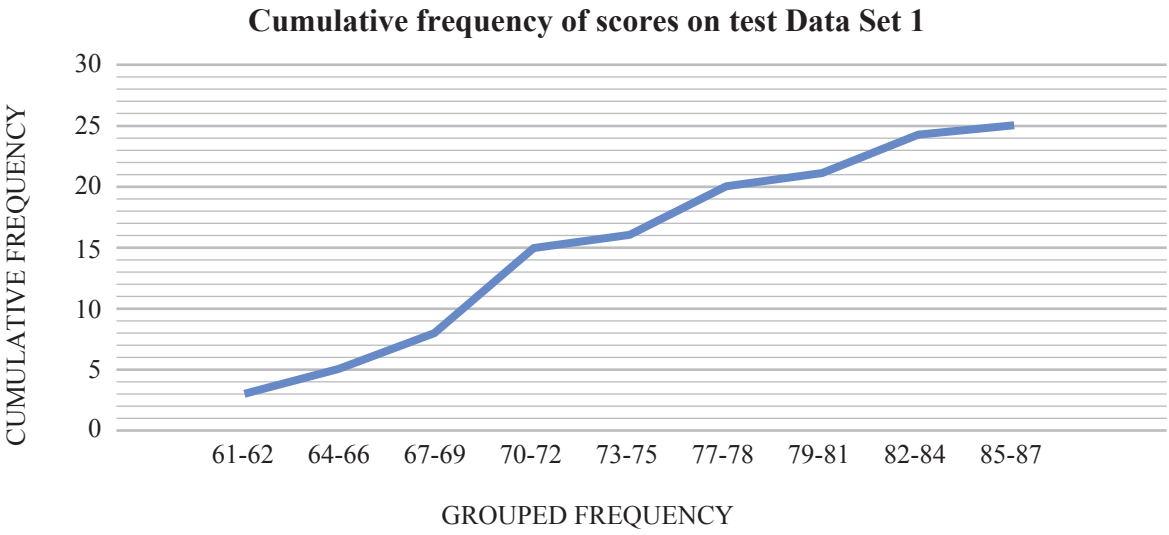
Cumulative Frequency Curve

The cumulative frequency curve is used when it is necessary to see the number of instances that occur above or below a particular value. This is calculated by adding up the cumulative scores from the data set. For example, we know that 25 students scored 87 or less. This calculation is shown in Figure 43.

Table 5.21. Grouped cumulative frequency of Data Set 1

Class intervals	61-63	64-66	67-69	70-72	73-75	77-78	79-81	82-84	85-87	**Total**
Frequency	3	2	3	7	1	4	1	3	1	25
Cumulative Frequency	3	5	8	15	16	20	21	24	25	

Figure 5.11. Cumulative frequency of Data Set 1



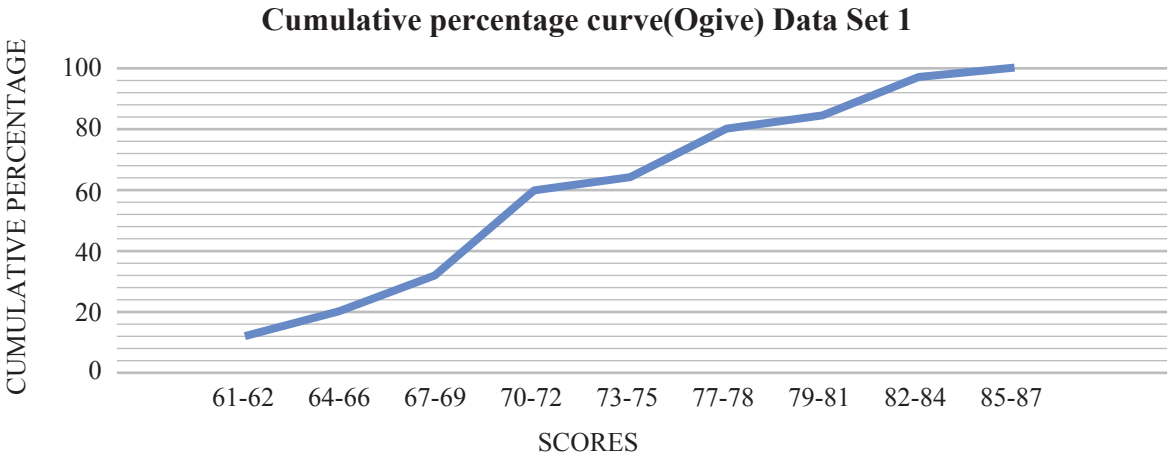
This information can also be assessed as a percentage. See Table 5.22.

Table 5.22. Grouped cumulative percentage of data set 1

Class intervals	61-63	64-66	67-69	70-72	73-75	77-78	79-81	82-84	85-87	**Total**
Frequency	3	2	3	7	1	4	1	3	1	25
Cumulative Frequency	3	5	8	15	16	20	21	24	25	
Frequency percentage	12	20	32	60	64	80	84	96	100	

This information can be presented in a cumulative percentage curve, also known as an Ogive curve. This type of graph is useful if we need to ascertain percentile rankings. See Figure 46.

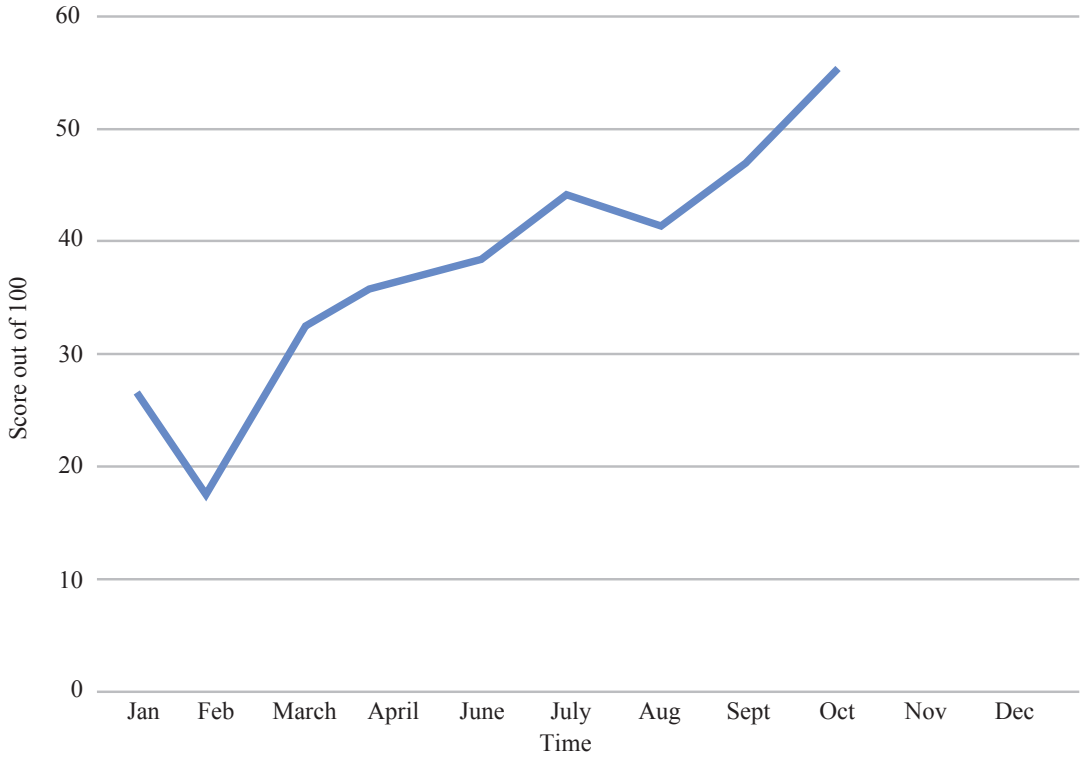
Figure 5.12.Cumulative percentage (Ogive) curve



Line Graphs

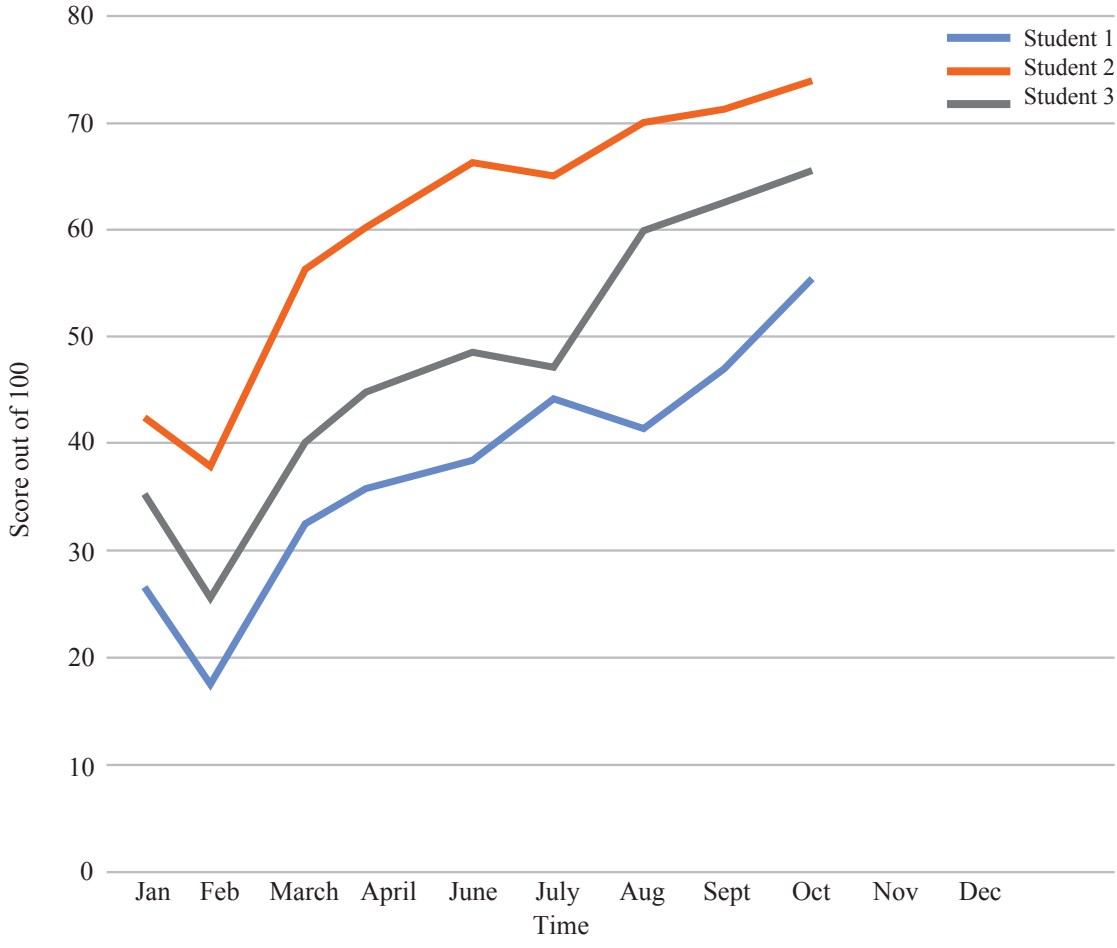
Line graphs are particularly useful for tracking changes over time. For example, the grades of one student could be tracked using a line graph to demonstrate improvements in learning over the year. When preparing a line graph, the x axis (the horizontal axis) is used to represent the constant, for example time, and the y axis (vertical) represents changeable values.

Figure 5.13. Single line graph based on the performance of a student in tests over the year



A line graph such as this could be used to compare the performance of different students.

Figure 5.14. Line graph for comparison of multiple students over the year



Learning Activity 3

Reflect on the learning you have acquired in this unit. Your teacher educator will be using these methods in class. Before your lesson, familiarise yourself with the different types of statistical analyses and graphical representations that can be used.

Review questions

1. How do you establish the central tendency of a data set?
2. Why might an Ogive curve be useful in the statistical analysis of assessment scores?

Unit Summary

Key messages

- Assessment is used by teachers and students before, during or after a period of learning to measure the extent to which the learning outcomes attributed to a lesson or series of lessons, have been achieved.

- Different outcomes can be achieved through assessment, and these take the form of assessment of learning (AoL), assessment for learning (AfL) and assessment as learning (AaL).

- **Diagnostic assessment** of the learning needs of students is essential, and this assessment is carried out by a teacher to measure the prior knowledge of students before the commencement of teaching. This is also essential in establishing any disabilities or other factors that could negatively influence a student's ability to have equal access to learning. Diagnostic assessment is essential to ensure inclusivity in the classroom.

- **Summative assessment** generally refers to assessment that is carried out at the end of a period of learning. It is classified as an 'assessment of learning', and can be an informal or formal assessment.

- **Evaluative assessment** is a form of accountability and supports the monitoring and evaluation of learning. Evaluative assessment outcomes, for example in the form of exam scores, are used as a tool to measure the effectiveness and quality of teaching.

- **Assessment for learning (AfL)** is a measure of learning that is carried out during the learning process and is used to inform the teacher what the students have learned so far. Effective use of AfL enables teachers to be more reactive to the learning needs of their students and is an integral component of student-centred teaching.

- **Formative assessments** are used throughout and in conjunction with the learning process. They are classified as AfL and can be both informal and formal. Formative assessment happens all the time, often unconsciously. An experienced teacher is continually informally and formatively assessing the students in their class.

- **Authentic assessment** is a type of formative assessment that requires students to demonstrate the skills and competencies that have been learned in class, in a real-life environment. The integration of knowledge and theory into practical application is a useful learning opportunity but also an excellent way of assessing learning and the transfer of theory into practice.

- **Self-assessment** of learning by the students is often referred to as AaL. This formative assessment allows students to assess their work, establish areas where they can make improvements and carry out self-learning to address the gaps they have identified in their learning. This empowerment of students to take greater responsibility in their learning is integral to the concept of student-centred learning.

- **Peer assessment:** Feedback and assessment can also be given between students, and is also categorised as AaL. This peer feedback is useful as it supports students in developing independence and enables them to see the situation 'through the eyes of their teacher'. Peer assessment and feedback supports the development of critical and reflective thinking skills and can be used in conjunction with other methods of assessment and feedback.

- **Balanced assessment:** It is important to ensure that all the different assessment types and methods are balanced throughout the learning and teaching process to ensure that the learning needs of students are met.

- **Objective assessment** seeks to establish the level of learning by requiring a student to provide a single correct answer although this is limited to a certain extent in that it is assessing knowledge at its lowest order, that is, the remembering of facts.

- **Subjective assessment** allows students to demonstrate not only their knowledge and understanding of a module at a higher order but also allows them to answer the question creatively and reflectively.

- **Formative and summative assessment** can use both objective and subjective assessment methods.

- **Bloom's taxonomy** is a hierarchical model that describes the different levels of learning in the cognitive domain (the part of the brain that deals with intelligence). The model was originally developed in 1956 and was revised in 2001.

- **Feedback** is the driving force of the assessment process, and is a tool that supports the learning and development of students, as it allows students to reflect on their learning and apply that knowledge to improve through a supportive, two-way, formative, continuous process.

- **Open assessment** tasks have potentially many right answers. These types of task are called 'low control' or 'free' and it is possible that two students could get high marks for completely different answers. Open assessment tasks are more associated with higher-order thinking as demonstrated in Bloom's revised taxonomy, such as applying knowledge, analysis, and creative thinking.

- **Closed assessment** tasks, also known as 'controlled', generally have only one correct answer, and are usually associated with the testing of knowledge and lower-order cognitive thinking as demonstrated in Bloom's revised taxonomy.

- **Inclusivity** in education does not necessarily refer to students with disabilities, but takes a broader approach to consider diversity. An inclusive learning environment aims to 'eliminate social exclusion that is a consequence of attitudes and responses to diversity in race, social class, ethnicity, religion, gender and ability. As such, it starts from the belief that education is a basic human right and the foundation for a more just society.'[126]

- **Multiple methods of assessment:** By assessing students in different ways, you give the students a better opportunity to demonstrate their knowledge and understanding in a number of ways, and you can support their motivation.

- Assessment **must** discriminate **between** students based on their ability or disability and their potential to demonstrate the attainment of learning outcomes.

[126] IBE-UNESCO. (2016). Training Tools for Curriculum Development – Reaching Out to All Learners: A Resource Pack for Supporting Inclusive Education. Geneva: International Bureau of Education.

- Assessment **must not** discriminate **against** students based on their ability or disability and their potential to demonstrate the attainment of learning outcomes.

- **The teaching and learning situation** is a specific component of your four-year degree programme and is explained in detail in *the Practicum Handbook.* Practice teaching will occur every year. In year one of the programme, you will visit a practice teaching school for a total of five days in bloc 3 of Semester 2.

Table 5.23.

Year 1	Semester 1	Bloc 1: Lesson study	10 days (2 weeks)	February
	Semester 2	Bloc 2: Lesson study	5 days (1 week)	August
		Bloc 3: Practice/partner school	5 days (1 week)	August

- Peer assessment supports:
  - A deeper learning and understanding of the module;
  - Transparency and cohesion; and
  - Effective assessment.

- Self-assessment supports:
  - Increased self-awareness;
  - Knowledge attainment;
  - Knowledge gap analysis; and
  - Greater engagement in the learning process.

- A **test** is a specific form of assessment that is carried out in a controlled environment.

- A **measurement** is a value assigned to an assessment of learning. The value is often numerical and can be used to accurately establish a level of learning of the student, either independently or in comparison with their peers.

- A **standardised** test is normally summative and conducted and graded in a consistent manner to ensure that students are graded only on their performance on that test. This can be classified as AoL.

- **Non-standardised testing** is more informal and can take a multitude of forms that are relevant to the circumstances of the assessment. Non-standardised tests are usually formative and classified as AfL or AaL.

- A **high stakes test** is a test with significant consequences to the student that is taking the test. Examples of this include entry and final examinations.

- There are four types of **measurement scales** which can be ranked from simple to complex.
  - **Nominal scale:** This is the simplest level of measurement and can be used to classify data into a minimum of two named categories. Nominal scales are used to 'label' data or variables without a quantitative value or specific order.
  - **Ordinal scale:** The ordinal scale retains the labels of the nominal scale but adds a degree of rank or a value of importance or significance to the measure. Ordinal scales are generally used to demonstrate measurements of frequency.
  - **Interval scale:** The interval scale allows us to see the exact difference between the variables. Interval scales are the first opportunity to use statistical analysis, and mean, median, mode and central tendency can be calculated from the data in this scale. Most of the tests used in educational measurements such as achievement tests and aptitude tests, are recorded using an interval scale.
  - **Ratio scale:** The ratio scale introduces the concept of 'true-zero' and is the most precise measurement scale that allows for a wide range of descriptive and inferential. statistics to be calculated.

- **Validity:** The validity of a test refers to whether the test measures what it was intended to measure. There are three different measures of validity:
  - **Content validity** refers to how well a test measures the learning outcomes or behaviours it was intended to test.
  - **Criterion validity** relates to the extent that the test results agree with external criteria such as national averages.
  - **Construct validity** refers to whether the measured test results relate to or match anticipated results.

- **Reliability:** The reliability of a test can be measured by how consistently the scores in that test are attained regardless of who will be scoring the test.

- **Achievement testing** is the systematic process of ascertaining the learning achievements of students after a period of learning. Although often assumed to be at the end of a programme or course, with the intention of assigning grades, achievement testing can also be carried out during a programme to understand the level of learning in a formative manner.

- **Norm-referenced tests (NRT):** Used if you wish to rank the achievements of students against each other, to establish higher or lower performing students in a 'league table'. Situations where testing is required to establish the highest performing students on a test such as university entrance exams.

- **Criterion-referenced tests (CRT):** Assessments that measure the knowledge, skills and understanding of students and their attainment of learning outcomes after a period of learning against a pre-determined set of criteria. Each student is assessed in exactly the same way, under the same circumstances, and is graded using the same method. Most importantly they are assessed on individual merit, not against the achievements of other students.

- **Ipsative assessment** compares the performance of a student against their own previous performance.

- **Data collection:** Teachers often need to record, among other things:
  - Attendance, diagnostic testing results, formative testing, surveys, checklists, observations, behavioural records, tests, quizzes, written assignments, summative tests, portfolios.

- **Written tests** involve students responding to a question which may stand alone or be connected to supplementary information such as a case study or passage of text. They usually take one of two forms:

- **Short answer questions** give students the chance to organise their knowledge of a module in a coherent and structured manner to demonstrate their understanding in their own words but they must be concise in their writing in order to be able to answer the question within the parameters indicated.
- **Long answer questions** give students the chance to organise their knowledge of a module in a coherent and structured manner and demonstrate their understanding in their own words in more detail with reference to supporting information.

- When developing **test questions**, it is important to be fair, and to give the students as much opportunity as possible to demonstrate their knowledge and learning. They must:

  - Relate to a module that has been covered during the teaching and learning components of the class;
  - Be written in a clear unambiguous way so that students can understand exactly what they are expected to do;
  - Be written at a level suitable to the grade of the students being tested;
  - Demonstrate the criteria on how that question will be evaluated; and
  - Demonstrate the number of marks allocated.

- **Marking and grading:** In order to mark written tests in a fair and objective manner, it is important to develop a strict and rigorous mark scheme. In the event that more than one teacher is marking similar tests, this scheme must be agreed upon and followed.

- **Formative data** can be collected through question and answer sessions, quizzes, quick tests, and a variety of ad-hoc assessment methods such as ‘show of hands’ and observations.

- **Summative data** can be collected from summative assessments of students against a pre-determined set of standards. This usually takes the form of exams, the production of a thesis or dissertation or the presentation of a viva voce.

- **Statistics** are used in the analysis of assessment as a way of providing generalisations, and inferring and communicating information from a sample of a large number of data sets.

- **Population** refers to a number of individuals who share or have in common, one or more characteristics.

- **Parameters** refer to the characteristics of a population.

- **Sample** refers to a collection of individuals that represent a portion of a given population.

- **The measure of central tendency** is the value that represents the central position within the data set. Often it is useful in statistical analysis to discover the 'typical' performance of a set of data.

- **Mean:** The mean average of a data set usually lies within the centre of that data set. The mean is calculated as the sum of all the numbers in the data set, divided by the number of items in the data set. In large data sets that do not have significant outliers, the mean average is a useful statistical analysis tool.

- **Median:** In data sets that do have significant outliers, it is often useful to find the median average. The median average is used in statistical analysis to represent the middle of a set of data.

- **Mode:** This average considers the frequency of a number or score within a data set.

- **Graphical representation of statistical information:** Small data sets can easily be analysed without the use of any specialist tools, however when data sets contain a lot on entries the use of graphical representation can provide a quick and easy visual interpretation of the information. A graph is generally used when it would take up less space than the text that would be required to explain the data. Graphs are useful for observing and demonstrating trends and relationships between variables.

- **Pie chart:** The pie chart is so named as it looks like a pie – a circle divided into slices that are representative of the data. The area of each slice or section is proportional to the magnitude of the component it represents.

- **Bar chart:** In a normal bar chart the bars are drawn with equal width. The height of each bar represents and is proportional to the magnitude of the information being presented.

- **Histogram:** A form of bar chart, that demonstrates the findings of grouped frequency data.

- **Frequency polygon:** A line graph created by placing a data point at the top and centre of each bar of a histogram and then connecting the points with a line.

- **Cumulative frequency curve:** The cumulative frequency curve is used when it is necessary to see the number of instances that occur above or below a particular value.

- **Cumulative percentage curve (Ogive curve)** contains the cumulative percentage data from a grouped cumulative percentage table, and is used when it is necessary to see the number of instances that occur above or below a particular percentage value.

- **Line graphs** can be used to visually represent data, and are particularly useful for tracking changes over time. For example, the grades of one student could be tracked using a line graph to demonstrate improvements in learning over the year. When preparing a line graph, the x axis (the horizontal axis) represents the constant, for example time, and the y axis (vertical) represents changeable values.

Unit reflection

Look at the other modules in this programme with assessment in mind. Think about the cognitive level you are being assessed at, and understand why you are being asked questions that are being worded in a specific way.

Each assessment type has its strengths and weaknesses and each is not always suitable for all situations. In the future, you will have to make the right decisions when selecting assessment methods based on the multiple circumstance of learning. Consider the importance of fair and effective non-discriminatory assessment that meets all the needs of all the students.

Be mindful about how you provide feedback to others outside the classroom, and consider the effect that the feedback you provide, as well as the feedback you receive, has on you and the people that you interact with. The ability to provide good quality feedback is an invaluable skill that will serve you well as teachers. Take note of the feedback you receive in other modules and recognise the different types introduced during this lesson.

One criticism of teaching and learning from both teachers and students is that there is often too much testing: 'testing for the sake of testing'. It is useful to consider the importance of assessment and testing but also to be aware of the relevance, and often overreliance on testing as a routine. It is good practice as a teacher to be mindful of the amount of testing that takes place in the classroom, and whether it really is being used as a useful assessment of learning or as a stick to keep students in check, and whether the assessment of learning could be better carried out in more inventive and interesting ways.

The concepts of validity and reliability are complicated and sometimes difficult to understand. Validity and reliability are not just used to refer to educational testing but any form of testing. For example, when a medical professional is testing the recovery of a patient in hospital after an operation, the validity and reliability of the test are important.

It is important to remember that tests and examinations are not an opportunity to trick the students; they are a chance for the student to demonstrate their knowledge and learning fairly – remember that there are various types of test that will give students the best opportunity to do this.

Finally, collecting data is not the end of the process, but what you do with the data is most important. Often too much data collection can confuse matters and distract you from the original goal of data collection.

Are the results of a simple statistical analysis of any use? It is important to design your methodology by asking yourself the questions: ;What information do I need to collect to be useful?' and 'What do I need this information for?, This preparation can ensure that the right data is collected, that unnecessary data is not collected and that the data can be useful in making decisions or analysing the information investigated.

Further reading

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This website from the University of Reading in the UK has some interesting and useful information on peer and self-assessment and feedback: Engage in Assessment. (n.d.). Retrieved from University of Reading website: https://www.reading.ac.uk/engageinassessment/

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This paper from the Australian Council for Education Research contains a comprehensive investigating and analysis of an 'evidenced-based' approach to education:
Matters, G. (n.d.). *Using Data to Support Learning in Schools Students, teachers, systems*.

Glossary

Terms	Elaborations
Assessment for learning (AfL)	A measure of learning carried out during the learning process to inform the teacher what the students have learned so far.
Authentic assessment	A type of formative assessment that requires students to demonstrate the skills and competencies that have been learned in class, in a real-life environment.
Bar chart	A chart in which the height of each bar represents and is proportional to the magnitude of the information being presented.
Bloom's taxonomy	A hierarchical model that describes the different levels of learning in the cognitive domain (the part of the brain that deals with intelligence). The model was originally developed in 1956 and was revised in 2001.
Closed assessment	Tasks, also known as 'controlled', which generally have only one correct answer.
Construct validity	Refers to whether the measured test results relate to or match anticipated results.
Content validity	Refers to how well a test measures the learning outcomes or behaviours it was intended to test.
Criterion validity	Refers to the extent that the test results agree with external criteria such as national averages.
Criterion-referenced tests (CRT)	Assessments that measure the knowledge, skills and understanding of students and their attainment of learning outcomes after a period of learning against a pre-determined set of criteria.
Cumulative frequency curve	A curve used to show the number of instances that occur above or below a particular value.
Cumulative percentage curve (Ogive curve)	Used when it is necessary to see the number of instances which occur above or below a particular percentage value.

Terms	Elaborations
Diagnostic assessment	Assessment carried out by a teacher to measure the prior knowledge of students before the commencement of teaching.
Evaluative assessment	A form of accountability thatsupports the monitoring and evaluation of learning. Evaluative assessment outcomes, for example in the form of exam scores, are used as a tool to measure the effectiveness and quality of teaching.
Formative assessment	Assessment used throughout and in conjunction with the learning process. Can be informal or formal. An experienced teacher is continually informally and formatively assessing the students in their class.
Frequency polygon	A line graph created by placing a data point at the top and centre of each bar of a histogram and then connecting the points with a line.
High stakes test	A test with significant consequences. Examples of this include entry and final examinations.
Histogram	A form of bar chart that demonstrates the findings of grouped frequency data.
Interval scale	Allows us to see the exact difference between the variables. Interval scales are the first opportunity to use statistical analysis, and mean, median, mode and central tendency can be calculated from the data in this scale.
Ipsative assessment	Compares the performance of a student against their own previous performance.
Line graph	Can be used to visually represent data, and is particularly useful for tracking changes.
Mean	The mean average of a data set usually lies within the centre of that data set. The mean is calculated as the sum of all the numbers in the data set, divided by the number of items in the data set.
Median	The median average is used in statistical analysis to represent the middle of a set of data.

Terms	Elaborations
Mode	This average considers the frequency of a number or score within a data set.
Nominal scale	The simplest level of measurement which can be used to classify data into a minimum of two named categories. Nominal scales are used to 'label' data or variables without a quantitative value or specific order.
Non-standardised test	More informal testing which can take a multitude of forms that are relevant to the circumstances of the assessment. Non-standardised tests are usually formative and classified as AfL or AaL.
Norm-referenced test (NRT)	Used if you wish to rank the achievements of students against each other, to establish higher or lower performing students in a 'league table'.
Objective assessment	Seeks to establish the level of learning by requiring a student to provide a single correct answer.
Open assessment	Tasks that have potentially many right answers. These types of task are called 'low control' or 'free' and it is possible that two students could get high marks for completely different answers.
Ordinal scale	The ordinal scale retains the labels of the nominal scale, but adds a degree of rank or a value of importance or significance to the measure. Ordinal scales are generally used to demonstrate measurements of frequency.
Pie chart	The pie chart is so named as it looks like a pie – a circle divided into slices that are representative of the data. The area of each slice or section is proportional to the magnitude of the component it represents.
Population	Refers to a number of individuals who share or have in common, one or more characteristics.
Ratio scale	The ratio scale introduces the concept of 'true-zero' and is the most precise measurement scale that allows for a wide range of descriptive and inferential statistics to be calculated.

Terms	Elaborations
Reliability	The reliability of a test can be measured by how consistently the scores in that test are attained regardless of who will be scoring the test.
Sample	Refers to a collection of individuals that represent a portion of a given population.
Standardised test	A summative test conducted and graded in a consistent manner to ensure that students are graded only on their performance on that test. This can be classified as AoL.
Statistics	Used in the analysis of assessment as a way of providing generalisations, and inferring and communicating information from a sample of a large number of data sets.
Subjective assessment	Allows students to demonstrate not only their knowledge and understanding of a module at a higher order but also allows them to answer the question creatively and reflectively.
Summative assessment	Generally refers to assessment that is carried out at the end of a period of learning. It is classified as an 'assessment of learning', and can be an informal or formal assessment.
Validity	The validity of a test refers to whether the test measures what it was intended to measure. There are three different measures of validity (see **content validity, construct validity, criterion validity**).

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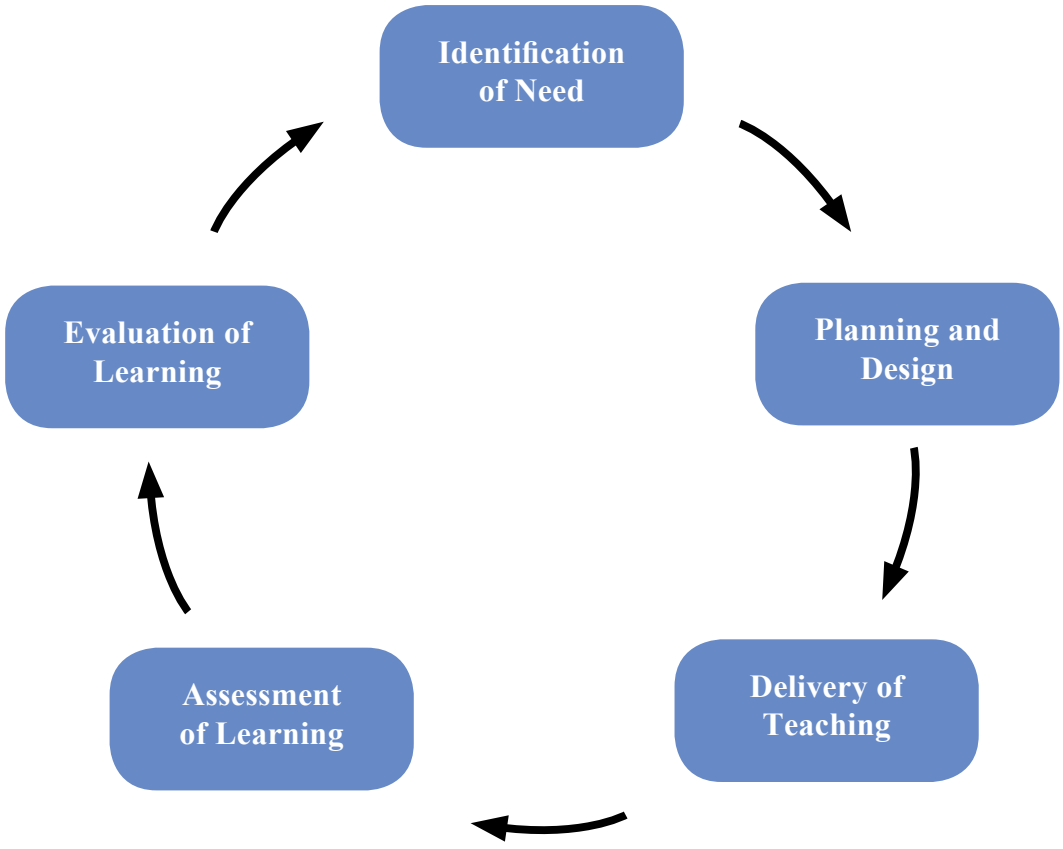
Annexes

Handout 1: Teaching Cycle



Handout 2: Assessment Tasks

Example 1: _____

Draw a line between the matching words below

Hands	Slippers
Head	Gloves
feet	Hat

Example 2: _____

Explain in no less than 100 words what formative assessment is.

Example 3: _____

Put the following items in the correct order:

A football, a pea, the sun, the moon, the earth, a grain of sand.

Example 4: _____

Answer the following questions:

a) What are some of the components that make up a car?
b) What are the main characteristics of assessment?

Example 5: _____

Answer the following questions:

a) What year was Bogyoke Aung San assassinated?
b) If I have 30 sweets and I want to share them equally between my 12 friends, how many sweets does each friend get?

Example 6: _____

List these countries by population from highest to lowest:
Bangladesh, China, India, Myanmar, Laos, Australia

Example 7: _____

Which of these is not a mammal?

a) Ayeyarwady dolphin
b) Pangolin
c) Hornbill
d) Dugong

Example 8: _____

Complete the sentences:

a) Smoking is bad because_____
b) Eating fruit is good because_____

Example 9: _____

Fill in the gaps in this quote by former UN Secretary-General U Thant, using the words below:

others	*origin*	*respect*	*human*

'Every _____ being, of whatever _____, of whatever station, deserves _____. We must each respect _____ even as we respect ourselves.'

Handout 3: 'Follow Instructions' Test

Name _____ Score _____

(You have three minutes to complete this test.)

1. Read all the instructions carefully before doing anything.
2. Write your name in the correct place on this page.
3. Answer in fewer than 10 words: 'What is formative assessment?'
4. Circle the spelling mistake in this sentence.
5. Draw a small square in each corner of the paper.
6. Put an 'X' in each square.
7. Put a circle around each square.
8. Sign your name under your name at the top of this paper.
9. Loudly call out your first name when you get this far along.
10. Answer in no more than five words: 'What is summative assessment?'
11. Put a circle completely around the answer to number nine.
12. Underline the words 'formative' and 'summative' in this paper.
13. Draw a circle around the word 'sentence', every time it appears on this paper.
14. Define 'feedback' in two words.
15. Draw a rectangle around the word 'corner' in instruction five.
16. If you have followed the instructions carefully to this point, call out: 'I have.'
17. On the reverse side of this paper, add 8950 and 9305.
18. Put a circle around your answer and put a square around the circle.
19. If you are the first person to reach this point, loudly call out: 'I am the first person to reach this point, and I am the leader in following directions.'
20. Underline all even numbers on the left side of this paper.
21. Loudly call out: 'I am nearly finished. I've followed all the directions.'
22. Now that you have finished reading everything, all you need to do is complete instructions 1 and 2! Do not complete any of the remaining instructions. Keep quiet so that others in your class will continue to read without disturbance from you. Do not make any sign to give a clue to them that you have finished the test.
23. Congratulations! You have passed the test!

Handout 4: Developing Test Questions

When developing test questions, it is important to be fair, and to give the students as much opportunity as possible to demonstrate their knowledge and learning. This also applies for the way that test questions are graded.

The questions given in a written test must always:

1. Relate to a module that has been covered during the teaching and learning components of the class. Students should not be expected to be able to answer questions with new information that has not been already covered.

2. Be written in a clear unambiguous way so that students can understand exactly what they are expected to do. The longer the question, the greater the opportunity for confusion. Any limitations to the expected answer must made be clear to the student. This could be the number of words used or the specific information to respond to.

3. Be written at a level suitable to the grade of the students being tested and with the expectation that a good answer to the question can be written within the time allowed.

4. Demonstrate the criteria on how that question will be evaluated, for example the wording of the question should indicate the level of answer required: ‘evaluate’, ‘explain’, critique and so on.

5. Demonstrate the number of marks allocated to it, so that students can make an informed decision on the amount of time, and length of answer to dedicate to the question. When allocating marks to questions, it is important to consider whether and how the points can be allocated in the event that some, but not all of the expected answer is given.

Notes

Notes

The Government of the Republic of the Union of Myanmar
Ministry of Education