Myanmar Pre-service Teacher Education Programme

Year 3 Semester 2

EDU3115
Educational Studies

Primary School Specialisation Track

Student Teacher Textbook

PREFACE

The Pre-service Teacher Education Curriculum consists of several components: the curriculum framework, syllabi, Student Teacher Textbooks, and Teacher Educator Guides. This curriculum for the four-year Pre-service Teacher Education Programme 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.

The curriculum follows a spiral curriculum approach which means that throughout the four years, student teachers return to familiar concepts, each time deepening their knowledge and understanding. To achieve this, the four-year Pre-service Teacher Education programme is divided into two cycles. The first cycle (Years 1 and 2) is repeated at a deeper level in the second cycle (Years 3 and 4) to enable student teachers to return to ideas, experiment with them, and share with their peers a wider range of practices in the classroom, with the option to follow up on specific aspects of their teaching at a deeper level.

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 Pre-service Teacher Education programme 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 curriculum development was 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 contribution from the Government of Finland.

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HOW TO USE THIS TEXTBOOK

Who will use this Educational Studies Student Teacher Textbook?

This textbook has been designed to guide you, as a student teacher, through Year 3 of the Educational Studies module. 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?

A total of 140 teaching periods (Semester 1: 84 teaching periods; Semester 2: 56 teaching periods) are allotted for Year 3 Educational Studies of the four-year Education Degree College programme. Classes will be held on the Education Degree College campus.

What is included in the Year 3 Educational Studies Student Teacher Textbook?

The organisation and content of Educational Studies Student Teacher Textbook align with Educational Studies module syllabus of the four-year Education Degree College programme.

Year 3 Educational Studies contains the following topics:

- Educational Studies: Consolidating Understanding
- Pedagogical Theory and Practice
- Strategies for Effective Learning
- Planning and Preparation

- Educational Psychology
- Myanmar's Education Curriculum Reforms and Agendas
- Educational Philosophy
- Educational Assessment
- Supportive and Safe Learning Environment
- Teacher 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 3 Semester 2, Educational Studies, Primary school specialisation track content map

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
7. Educational Philosophy	7.1. Consolidating Understanding of Educational Philosophy	7.1.1. Foundations of philosophy and educational philosophy	• Describe the nature of philosophy • Reflect on historical developments in philosophy • Explain how philosophy is related to education	A3.2 B1.2 C1.2	A3.2.2 B1.2.1 C1.2.1	3
		7.1.2. Educational implications of philosophy	• Reflect on the central ideas of major philosophies and their implications for education • Relate educational philosophies and educational theories • Identify each educational theory's ideas on curriculum, teaching and learning • Explain the meaning and value of Eclecticism	A3.2 B1.2 C1.2	A3.2.2 B1.2.1 C1.2.1	4

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
	7.2. Educational Philosophies and Educational Practice	7.2.1. Educational philosophies in practice	• Identify implicit education philosophies of individuals and systems • Identify philosophical assumptions in Behaviourism, Cognitivism and Constructivism • Relate student-centred, teacher-centred and society-centred values to different philosophies and theories	A1.1 A3.2 B1.2 C1.2	A1.1.1 A3.2.2 B1.2.1 C1.2.1	3
	7.3. Personal Teaching Philosophy	7.3.1. Consolidating and communicating your teaching philosophy	• Reflect on the way your teaching philosophy has developed • Communicate your teaching philosophy in different ways	C1.2 D1.1	C1.2.1 C1.2.2 D1.1.3	4
8. Educational Assessment	8.1. The Four Pillars of Assessment and the Teacher's Role	8.1.1. Unpacking the four pillars of assessment	• Explain the importance of the four pillars of assessment in education • Explain the connection between the four pillars of assessment and student learning	A4.1 B2.1 B2.2 D1.1	A4.1.3 B2.1.1 B2.2.1 B2.2.2 D1.1.2	2
	8.2. Classroom Level Assessment in KG and Lower Primary School	8.2.1. Assessment within the teaching and learning cycle	• Discuss the role of assessment in learning and teaching processes • Design formative assessment within a lesson to monitor student learning progress	B2.1 D1.1	B2.1.1 B2.1.2 B2.1.3 D1.1.1 D1.1.2	1

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
		8.2.2. Designing assessment tools to promote learning	• Apply assessment principles to design diagnostic tools to aid planning for teaching and learning • Design tools to monitor the learning progress of students in KG/ Lower Primary school • Evaluate the benefits and limitations of peer and self-assessment • Construct tools for peer and self-assessment in KG/Lower Primary school	B2.1 B2.2 B3.2 D1.1	B2.1.1 B2.2.1 B2.2.2 B3.2.2 D1.1.1 D1.1.2	4
		8.2.3. Feedback to promote learning	• Design feedback to promote learning for KG/Lower Primary school students	B2.1	B2.1.3	2
	8.3. School-based Assessment: Designing Tools and Analysing Achievement	8.3.1. Designing assessment rubrics for KG and Lower Primary school contexts	• Design rubrics in line with the assessment principles to assess students in KG/Lower Primary school • Analyse and interpret rubric data for students in KG/Lower Primary school	B2.1 B2.2 D1.1	B2.1.1 B2.1.2 B2.2.1 B2.2.2 D1.1.1 D1.1.2	5

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
		8.3.2. Interpreting data using measures of centrality and measures of variability	• Calculate measures of central tendency • Explain the uses and limitations of using measures of central tendency to analyse assessment data • Explain the uses and limitations of measures of variability when analysing assessment data • Compute the value measures of variability	B2.2 D1.1	B2.2.1 B2.2.2 D1.1.1 D1.1.2	3
		8.3.3. Percentile and percentile rank	• Examine the benefits and limitations of using percentiles and percentile ranks to describe learning progress • Calculate the values of percentile and percentile rank	B2.2 D1.1	B2.2.1 B2.2.2 D1.1.1 D1.1.2	2
		8.3.4. Correlation	• Explain how correlations can be used to analyse assessment data • Compute the value of Q-correlation coefficient • Compute the value of Pearson's r correlation coefficient	B2.2 D1.1	B2.2.1 B2.2.2 D1.1.1 D1.1.2	2

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
9. Supportive and Safe Learning Environment	9.1. Social and Physical Environment	9.1.1. Creating an inclusive learning environment	• Outline characteristics of an educational system that is becoming inclusive • Reflect on characteristics of a classroom that is becoming inclusive to identify supporting strategies in KG/ Lower Primary settings • Outline strategies that foster highly productive and positive teacher–student and student–student relationships in KG/Lower Primary classrooms • Design the physical learning environment to maximise KG/Lower Primary student engagement, learning, and inclusion	A3.2 B3.1 C1.1 C1.3 C2.1 C3.1 C3.2	A3.2.1 A3.2.2 B3.1.1 B3.1.2 C1.1.2 C1.3.1 C2.1.2 C3.1.2 C3.2.1	4
	9.2. Role of Technology in the Learning Environment	9.2.1. Technology – inclusion, innovation, and citizenship	• Reflect on how technologies can support inclusion in Myanmar KG/ Lower Primary classrooms • Reflect on personal use of technologies to support creativity and innovation • Review literature-informed characteristics of global citizenship to scope aligned KG/Lower Primary teaching and learning activities and supporting technologies	A2.2	A2.2.2 A2.2.3	3

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
	9.3. Classroom Management	9.3.1. Managing student behaviour and safety	• Generate appropriate procedures for different areas of KG/ Lower Primary classroom activity • Compile a checklist to ensure a safe KG/ Lower Primary classroom learning environment • Outline elements of an evidence-informed framework of effective and inclusive classroom management • Consider how a teacher in a large KG/Lower Primary classroom may use proactive classroom management techniques	B3.1 B3.2 C3.2	B3.1.4 B3.2.1 B3.2.4 C3.2.1	3
10. Teacher Professionalism	10.1. Professional Values and Dispositions	10.1.1. Professional ethics	• Reflect on Practicum experiences to provide examples of how you met professional obligations under the Five Precepts of Education • Reflect on Practicum experiences to compare and contrast personal and professional ethics	C1.1	C1.1.1 C1.1.2	2

Unit	Sub-units	Lessons	Learning outcomes	TCSF		Periods
				Minimum requirments	Indicators	
		10.1.2. Organisational citizenship behaviour	• Define organisational citizenship behaviour • Discuss the benefits of teachers' organisational citizenship behaviour, as identified in the research and from Practicum observations • Reflect on OCB on the part of teachers, peers, and yourself in the Practicum placement, with reference to validated OCB models	C1.3 C2.1 C3.1	C1.3.1 C2.1.1 C2.1.2 C3.1.1	3
	10.2. Professional Growth and Development	10.2.1. Teacher professional development	• Discuss the limitations of traditional teacher professional development • Identify principles and forms of effective teacher professional development • Reflect on the Year 3 experience in terms of professional development opportunities and achievement of Educational Studies learning goals	D1.1 D2.1	D1.1.3 D2.1.1 D2.1.2 D2.1.3	2
		10.2.2. Teacher action research	• Communicate action research findings and reflections on the process and value of teacher action research	D1.1 D2.1 D3.1	D1.1.1 D1.1.2 D2.1.1 D2.1.2 D3.1.2	4
Total number of periods						**56**

This module will prepare student teachers with the competencies required to teach various learning areas and subjects through modelling the values and attitudes promoted in the Basic Education Curriculum for the types of citizens and society Myanmar envisions to create. The purpose of this module is to introduce student teachers to the basic concepts of educational theory, educational technology, educational management, Educational Psychology and educational assessment, and apply them in the teaching/learning process and in real life situations. Student teachers will become aware of the educational trends, different philosophies and learning theories across the regions (local and global) and time (ancient and current). They will also understand the importance of developmental milestones of the students in all domains. Student teachers will master pedagogical knowledge and be able to choose and apply the appropriate pedagogical practices for their teaching depending on learners' needs and learning situation. Moreover, they will be able to distinguish characteristics of test, measurement, evaluation and assessment and apply them in the teaching/learning process. To educate student teachers to become effective professionals, two elements in Educational Studies will be considered: i) the understanding of knowledge and its application situated in the disciplines of education such as psychology and the history of education; and ii) critical reflection about the holistic development of learners to help student teachers develop positive attitudes, behaviour and skills so to develop professional attitudes and values.

The learning area outlines what student teachers in Education Degree Colleges will explore in order to prepare them to be ready for teaching students in primary and middle schools. It is important that teachers use educational knowledge and theory in their professional lives appropriately. It further reassures the teaching as a valuable profession, and the significance of primary and middle school teachers in the learners' development and learning process in their lifespans. The disciplines of education will help inform student teachers about their role as educators situated in the principles for the 21st century.

Learning outcomes for student teachers for Educational Studies

This learning area aims to prepare student teachers to be ready to facilitate students' learning of Primary and Middle school by being able:

- To build a strong foundation on the basic concepts of educational theories and psychology, and facilitate how these concepts can be applied in diverse teaching-learning situations towards becoming well-prepared, efficient and quality teachers; and

- To apply the competencies gained around Educational Studies learning area in their teaching practice to effectively support their students' learning process to achieve the learning objectives across different learning areas and subjects.

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

Table B. Teacher competencies in focus: Year 3 Educational Studies, Primary specialisation track

Competency standard	Minimum requirements	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, social, emotional and physical development
	A1.2 Demonstrate understanding of how different teaching methods can meet students' individual learning needs	A1.2.1 Identify various teaching methods to help students with different backgrounds (gender, ethnicity, culture) and abilities, including special learning needs, learn better
A2: Know appropriate use of 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 Communication Technology (ICT) in teaching learning	A2.2.1 Describe the function and purpose of online and offline educational tools and materials to support the teaching and learning process A2.2.2 Evaluate and match available online and offline ICT tools and materials to curriculum content and pedagogical strategies, including online and offline ICTs 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	A3.2 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 A3.2.2 Be aware of social and cultural background of parents, community elders and leaders when interacting with them

Competency standard	Minimum requirements	Indicators
A4: Know the curriculum	A4.1 Demonstrate understanding of the structure, content and expected learning outcomes of the basic education curriculum	A4.1.1 Describe key concepts, content, learning objectives and outcomes of the primary curriculum for the subjects and grade level/s taught 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 assigned subject/s for the specified grade level/s	A5.1.3 Describe approaches used to promote learning in key areas of literacy, numeracy, science and social studies for the grade levels taught and linked to real life
	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 – culture, size and type 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
	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

Competency standard	Minimum requirements	Indicators
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 B2.1.2 Use assessment information to plan lessons B2.1.3 Use questioning and discussion techniques to check students understanding and provide feedback
	B2.2 Demonstrate capacity to keep detailed assessment records and use the assessment information to guide students' learning progress	B2.2.1 Record students learning progress accurately and consistently B2.2.2 Use varied assessment practices to monitor and record students' learning progress and inform further planning of the curriculum
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' wellbeing and safety within the classroom and school B3.1.4 Follow regulations regarding health and safety (administration of medication, CPR and First Aid training, fire and disaster drills, abuse and neglect, communicable disease)
	B3.2 Demonstrate strategies for managing student behaviour	B3.2.1 Create, explain, display and enforce the agreed classroom rules and procedures to ensure student health and safety B3.2.2 Encourage students to interact with each other with mutual respect and safety B3.2.3 Learn to know each student's background and needs and interact regularly with all students B3.2.4 Encourage well-adjusted behaviour of students by collaborative teamwork and independent learning
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	B4.1.2 Describe strategies to promote parents' involvement in their child's learning at school, at home and in the community B4.1.3 Seek colleagues' perspectives in attempting to respond to learning issues and accept feedback positively

Competency standard	Minimum requirements	Indicators
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 code of conduct, rules and regulations in line with the five traditional responsibilities of the Myanmar teacher C1.1.2 Consistently express positive attitudes, values and behaviours, consistent with what is expected of teachers by students, colleagues, parents and communities
	C1.2 Demonstrate understanding of the underlying ideas that influence one's practice as a professional teacher	C1.2.1 Identify theories and concepts that inform underpin approaches to teaching and learning C1.2.2 Describes own approach to teaching and learning
	C1.3 Demonstrate understanding of the possible effect of local culture and context on student participation in school	C1.3.1 Show interest in and take time to learn about the students' culture, language and community
	C1.4 Demonstrate responsibility and accountability for the use of education resources	C1.4.1 Use school supplies and resources appropriately
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 C2.1.2 Demonstrate model behaviour as a teacher serving and working in school and community responsibly and accountably
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 C3.1.2 Recognise the different social situations and background of students and treat all students equally
	C3.2 Demonstrate respect for diversity of students and the belief that all students can learn according to their capacities	C3.2.1 Organise the classroom to encourage all students' participation in the lesson content, activities and interactions with the teacher
	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	D1.1.1 Use evidence of student learning to reflect on the impact of own teaching practice D1.1.2 Use information from a variety of sources to improve teaching practice and 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

Competency standard	Minimum requirements	Indicators
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 and colleagues, and willingly seek constructive feedback D2.1.2 Participate in professional development activities related to identified goals for improving practice 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: Myanmar Teacher Competency Standards Framework (TCSF) - Beginning Teachers, 2020, pp.79–110.

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.

Competencies gained: This list of the selected Teacher Competency Standards Framework (TCSF) competencies are what you should know and be able to do by the end of the lesson or unit as a beginning teacher.

Learning content: The learning content for each unit is broken down into sub-units and lessons that cover subject content knowledge that is important for teachers 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.

Key messages: At the end of the unit, under Unit Summary, 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 learnt will help you remember and apply that learning, and make connections with other subject areas and real-life. Each unit ends with some suggestions on how you can reflect and follow-up on what you have learnt 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 Degree College's e-library to learn more about the topic.

Key terms: Important words or concepts from the Unit that are highlighted in the beginning of each Unit.

At the end of this textbook, you will find a **Glossary** with the definitions of these key 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 Degree College as you work – together with your peers and guided by your teacher educators – to earn your teaching qualification.

Unit 7

Educational Philosophy

In this unit, you will learn more about the importance of educational philosophy for teaching and learning. Building on the content covered in Year 1 and Year 2, this unit will enhance your understanding of educational philosophy and how this can inform your own teaching practice. You will learn to relate philosophies to educational theories and approaches to teaching. This will help you make informed decisions in your classroom practice. You will also refine your personal teaching philosophy from Year 2 and reflect on how your teaching philosophy has developed.

Expected learning outcomes

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

- Describe the nature of philosophy;
- Reflect on historical developments in philosophy;
- Explain how philosophy is related to education;
- Reflect on the central ideas of major philosophies and their implications for education;
- Relate educational philosophies and educational theories;
- Identify each educational theory's ideas on curriculum, teaching and learning;
- Explain the meaning and value of Eclecticism;
- Identify implicit education philosophies of individuals and systems;
- Identify philosophical assumptions in Behaviourism, Cognitivism and Constructivism;
- Relate student-centred, teacher-centred and society-centred values to different philosophies and theories;
- Reflect on the way your teaching philosophy has developed; and
- Communicate your teaching philosophy in different ways.

Competencies gained

A1.1 Demonstrate understanding of how students learn relevant to their age and developmental stage

A3.2 Demonstrate respect for the social, linguistic, and cultural diversity of the students and their communities

B1.2 Demonstrate capacity to apply educational technologies and different strategies for teaching and learning

C1.2 Demonstrate understanding of the underlying ideas that influence one's practice as a professional teacher

D1.1 Regularly reflect on own teaching practice and its impact on student learning

Key terms

Axiology, Critical theory, Eclecticism, Epistemology, Essentialism, Existentialism, Idealism, Metaphysics, Perennialism, Postmodernism, Pragmatism, Progressivism, Realism, Reconstructionism, schools of thought, teaching philosophy

7.1. Consolidating Understanding of Educational Philosophy

In this sub-unit, you will consolidate your understanding of educational philosophy. You will start by exploring the nature of philosophy. Next, you will explore how philosophy is related to education. You will also examine how educational philosophies relate to educational theories. Understanding this relationship will help you to select and apply principles for effective teaching in many different situations.

7.1.1. Foundations of philosophy and educational philosophy

Expected learning outcomes

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

- Describe the nature of philosophy;
- Reflect on historical developments in philosophy; and
- Explain how philosophy is related to education.

Period 1

The nature of philosophy

In Year 1, you learnt that the word philosophy, literally translated from the Greek language, means 'love of wisdom'. Educational philosophy is a sub-field of philosophy. It combines, draws on and extends established sub-fields of philosophy.[1] Many famous philosophers also developed philosophies of education. To understand educational philosophy, it is therefore helpful to have a basic understanding of the field of philosophy.

1 Moore, T. W. (2009).

Philosophers do not tend to agree on what exactly philosophy is.[2] This makes the nature of philosophy hard to define. The definitions and quotes in Box 7.1 will help you get a sense of the nature of philosophy.

Box 7.1. Philosophy definitions and quotes

"Philosophy is not so much about coming up with the answers to fundamental questions as it is about the process of trying to find these answers, using reasoning rather than accepting without question conventional views or traditional authority."[3]

"Although we may not realise it, whenever we reason, we're thinking philosophically."[4]

"Literally, "the love of wisdom." The word is widely used for any sustained rational reflection about general principles, that has the aim of achieving a deeper understanding. Philosophy provides training in the disciplined analysis and clarification of arguments, theories, methods, and utterances of all kinds, and the concepts of which they make use."[5]

"Philosophy is not simply about ideas—it's a way of thinking. There are frequently no right or wrong answers, and different philosophers often come to radically different conclusions in their investigations into questions that science cannot — and religion does not—explain."[6]

Eric Hoffer: "The beginning of thought is in disagreement—not only with others but also with ourselves."[7]

One common misconception is that philosophy is a solitary activity. The activities of careful examination, discussion and debate play a central role in helping philosophers arrive at new conclusions.[8]

2 Moore, T. W. (2009).
3 Buckingham et al. (2011, p. 12).
4 Buckingham et al. (2011, p. 12).
5 Buckingham et al. (2011, p. 341).
6 Buckingham et al. (2011, p. 17).
7 Buckingham et al. (2011, p. 17).
8 Buckingham et al. (2011).

Learning activity 1. Reflect and describe: The nature of philosophy

The purpose of this learning activity is for you to consolidate your understanding of the nature of the field of philosophy. You may complete this activity individually or with a peer.

1. Examine the definitions and quotes in Box 7.1. Then, describe the nature of philosophy in your own words.
2. Think back at Years 1 and 2 and the nature of philosophy. Think of at least five examples of philosophical questions.

Table 7.1. Definitions and examples

Concept	Definition	Examples of philosophical questions
Philosophy		What is the meaning of life? [9]

Branches of philosophy

Philosophy can be described as a search for better understandings. The field of philosophy focuses on questions that are large and complex. The field of philosophy is centred around philosophical questions, which can be classified according to three main branches:[10]

- **Metaphysics:** Metaphysics is the branch of philosophy that focuses on rationalising the nature of reality. It focuses on questions in relation to, for example, human existence and big issues such as the existence of God.[11]

9 Adapted from Mann, S. B. (2019).
10 Beatty et al. (2009); Johnson et al. (2005).
11 Moore, T. W. (2009); Beatty et al. (2009).

- **Epistemology:** Epistemology is the branch of philosophy that focuses on knowledge of knowing. Different epistemological positions relate to how knowledge is acquired and the subjective or objective nature of knowledge.
- **Axiology:** Axiology is the branch of philosophy that focuses on values and goodness. This branch includes a focus on both ethics (moral principles and conduct) and aesthetics (the nature of beauty).[12]

Learning activity 2. Matching: Branches of philosophy

The purpose of this learning activity is for you to understand the nature of different philosophical questions as related to three major philosophical branches.

Table 7.2 presents very broad philosophical questions. Match each question to the relevant philosophical branch by ticking the box in the table.

Table 7.2. Philosophical questions and branches of philosophy

Philosophical question	Metaphysics	Epistemology	Axiology
What is time?	x		
What are desirable values?			
How does knowledge differ from beliefs?			
What is knowledge?			
What does it mean to say something is real?			
What are the characteristics of a good piece of art?			
How can we know anything?			
Which actions are right or wrong?			
What is the origin of things?			

Learning activity 3. Complete visual continuum: Epistemology

The purpose of this learning activity is for you to think about the possible range of different epistemological perspectives. Remember that epistemology is the branch of philosophy that focuses on knowledge of knowing.[13] This is a dominant branch of philosophy.[14]

12 Beatty et al. (2009).
13 Beatty et al. (2009).
14 Buckingham et al. (2011).

1. Using Figure 7.1, provide more examples of different epistemological perspectives.
2. Try to come up with epistemological perspectives at both ends and the middle of the continuum.
3. You may find it helpful to look back at your responses to Learning activity 2.
4. You may find it useful to start at the extremes before thinking of examples at the middle of the continuum.

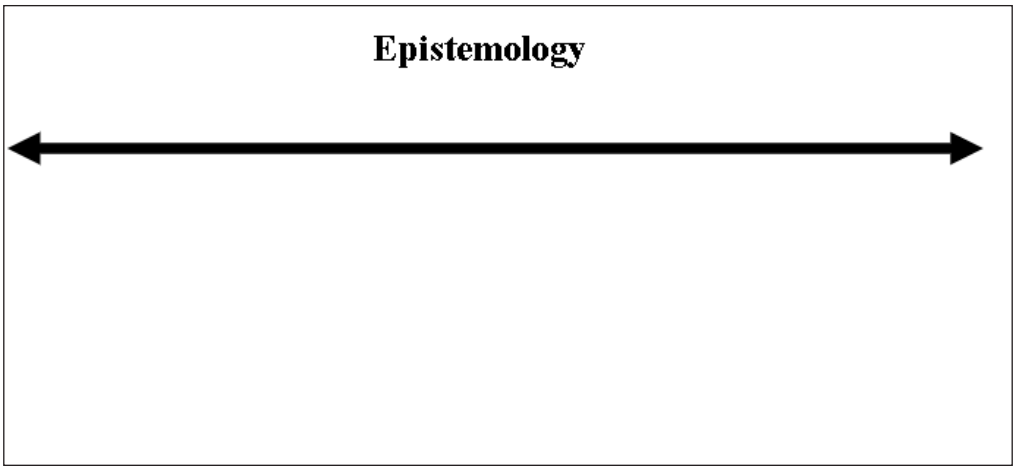


Figure 7.1. Epistemological continuum[15]

Period 2

A brief history of philosophy

The nature of the field of philosophy has evolved substantially since its origin. In this period, you will learn about the history of philosophy. This will help you understand the nature and importance of philosophical questions.

Some conclusions drawn by historical philosophers may seem obvious to us. Yet, many of these conclusions were ground-breaking at the time. Further, thinking about basic ideas can stimulate us to rethink basic assumptions.[16]

15 Image by author, used with permission.
16 Buckingham et al. (2011).

Major Eastern philosophical contributions came from China and the area south of China. In China, the main philosophies were Confucianism and Daoism. A foremost historical Southern Asian philosopher was Siddhartha Gautama, who became widely known as Buddha. His philosophy become known as Buddhism.[17]

Eastern philosophies, mainly Buddhism, have been influential in Myanmar. Yet, understanding the history of Western philosophy is also important. This will help you understand the historical roots of different philosophies and educational theories that will be discussed in this unit. Throughout the unit, you will be invited to apply your personal lens when reflecting on these philosophical perspectives.

From a Western perspective, the history of philosophy can be divided into several stages. A brief overview of key historical developments for each stage is provided here.[18]

The ancient world: 700 BCE – 250 CE

The field of philosophy originated approximately 700 BCE. Philosophy originated when some people challenged conventional or religious answers to questions about human existence. These philosophers used a process of rational thinking to find more satisfactory answers, which laid the foundations for the field of science. Compared to Chinese philosophy, which had a focus on morality and ethics, Western philosophy was heavily focused on the nature of existence.

From a Western perspective, the origins of philosophy are often traced back to Greece. Key influential philosophers of the ancient world are Socrates, Plato, and Aristotle. These three philosophers had contrasting ideas, which are foundational to Western philosophy. However, at this time, Eastern philosophy was already well-established. Key ancient Eastern philosophers are Laozi (Daoism), Kong Fuzi (Confucianism) and Siddhartha Gautama (Buddhism).

An important difference between historical Western and Eastern philosophies is their perspective on religion. While Eastern philosophy seamlessly merged philosophical and religious views, Western philosophy mostly viewed philosophy and religion as incompatible.

17 Buckingham et al. (2011).
18 This is a high level summary based on Buckingham et al. (2011).

The medieval world: 250 – 1500

Under the Roman Empire, Christianity provided the answers to fundamental questions, and the focus on philosophy disappeared almost entirely. However, Eastern philosophies continued to coexist with religions.

Renaissance and the age of reason: 1500 – 1750

Philosophy re-emerged in Europe in the late 15th century. The word Renaissance stands for 'rebirth'. This period (from approximately 1500 – 1800) was characterised by a renewed interest in art, culture and philosophy. One major movement was the Humanist movement, which you learnt about in Years 1 and 2 and Unit 5 of Year 3. Western philosophy during this period is characterised by a focus on humans, as opposed to religion, science and nature.

The age of revolution: 1750 – 1900

During the 18th century, different cultural and philosophical foci emerged across Europe. In France and Britain, there was a strong focus on social and political philosophy. For example, an influential French philosopher was Rousseau. He believed that humans were good by nature and that society restricted their lives. He rejected the idea of a monarchy, and instead proposed that all citizens should govern. His ideas and slogan "liberty, equality, and fraternity" sparked the French Revolution and various political reforms across Europe.

The modern world: 1900 – 1950

At the end of the 19th century, another major development occurred in the field of philosophy. New scientific findings caused further discussions around questions that had traditionally been answered through religion. During this time, science provided answers to many metaphysical questions. Consequently, the focus of philosophy shifted to questions related to morals, politics, logic and linguistics.

Contemporary philosophy: 1950 – present

The period following the Second World War was characterised by political unrest. The popularity of different philosophical perspectives varied. Some approaches focused on highly abstract concepts. These approaches were popular amongst academics and artists, but had little impact on the general public. During this time, many philosophers shifted their focus to pressing questions that were relevant to everyday life. One example of such a pressing issue is the concept of justice.

Learning activity 4. Small group discussion: History of philosophy

The purpose of this learning activity is for you to reflect on key developments in the history of philosophy and their relation to other fields. This will help you understand the origins of different philosophical perspectives.

Think back at the brief summary of the history of philosophy. Think about the relations between historical events and/or developments and the focus of philosophical questions. Then, contribute to a small group discussion. In the discussion, consider how the historical philosophical developments relate to the following fields/concepts:

- Science
- Psychology
- Religion
- Politics
- Education.

Socrates' dialectical method

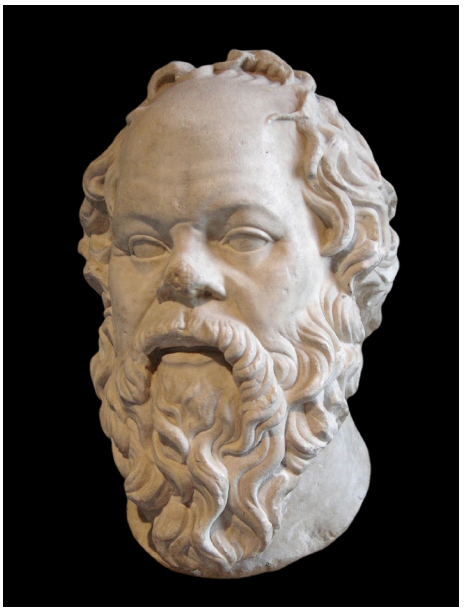


Figure 7.2. Statue of Socrates[19]

Socrates (Figure 7.2) is one of the most famous ancient philosophers. Unlike others at the time, he asked fundamental philosophical questions. His views and philosophical practices led him to be sentenced to death. Read the excerpt in Box 7.2 to learn more about Socrates.

19 Image: Eric Gaba (Sting). Socrates. https://commons.wikimedia.org/wiki/File:Socrate_du_Louvre.jpg, Licence: CC-BY-SA 2.5, https://creativecommons.org/licenses/by-sa/2.5

Box 7.2. Excerpt about Socrates from Buckingham et al., 2011[20]

> Socrates lived in Athens in the second half of the 5th century BCE. As a young man, he is believed to have studied natural philosophy, looking at the various explanations of the nature of the universe, but then became involved in the politics of the city-state and concerned with more down-to-earth ethical issues, such as the nature of justice.
>
> However, he was not interested in winning arguments, or arguing for the sake of making money … Nor was he seeking answers or explanations— he was simply examining the basis of the concepts we apply to ourselves (such as "good", "bad", and "just"), for he believed that understanding what we are is the first task of philosophy.
>
> Socrates' central concern, then, was the examination of life, and it was his ruthless questioning of people's most cherished beliefs (largely about themselves) that earned him his enemies—but he remained committed to his task until the very end. According to the account of his defence at his trial, recorded by Plato, Socrates chose death rather than face a life of ignorance: "The life which is unexamined is not worth living."

Socrates believed that "the highest form of human excellence is to question oneself and others". He became widely known for his method of questioning called the 'dialectical method'. This method helps reveal (often false) assumptions underpinning certain claims or knowledge.[21] This method has been applied in many different fields, and is particularly relevant to education.[22]

Socratic questioning can be described as "a disciplined and thoughtful dialogue between two or more people."[23] One person asks questions, the other answers. The questions are open-ended in nature and aim to unpack underlying beliefs.

20 Buckingham et al. (2011, p. 48).
21 Buckingham et al. (2011).
22 Sutton, J. (2021).
23 Sutton, J. (2021).

Learning activity 5. Socratic questioning: Examining educational assumptions

The purpose of this learning activity is for you to apply Socratic questioning to elicit assumptions about education.

1. Read the section 'Socrates' dialectical method'.
2. Examine the guidelines for Socratic questioning in Table 7.3.
3. Pair up with a classmate for this activity. Choose an educational topic for discussion. For example, you may want to discuss the issue of intelligence or the role of motivation and student achievement.
4. One of you will ask questions, the other will answer. After five minutes, you will swap roles and repeat the questioning process. Record the initial belief statements and conclusions of your discussion in Table 7.4.
5. As a guide, start the process by going through the following steps:[24]
   - Start with a question that asks the other person to state their belief.
   - Summarise their point of view and ask for further clarification.
   - Ask what evidence underpins their reasoning.
   - Challenge assumptions that seem unfounded.
6. Ensure you use the guidelines in Table 7.3 to inform the dialogue.

Table 7.3. Guidelines for Socratic questioning[25]

Guidelines for asking questions	Guidelines for responding to questions
Before starting the dialogue, think of some questions you may ask. Questions must be open-ended, rather than yes/no questions. Different types of open-ended questions can be used: • Clarification: "Can you explain what you mean by that?" • Challenge assumptions: "Are there alternative explanations?" • Evidence and reasoning: "What evidence supports what you are saying?" • Alternative viewpoints: "Could someone else have a different point of view, and why?" • Implications and consequences: "What are the implications of what you are saying for teaching"?	Participate actively in the dialogue.
Allow the other person to think before responding	Think carefully before answering.
Summarise responses and stimulate discussion by asking follow-up questions	Provide answers that are clear and succinct.

24 Based on Sutton, J. (2021).
25 Adapted from Sutton, J. (2021).

Guidelines for asking questions	Guidelines for responding to questions
Invite further elaboration and discovery of underlying beliefs through questions	Be prepared to uncover pre-existing beliefs, which may be inconsistent or contradictory.

Table 7.4. Starting points and conclusions of Socratic questioning[26]

	Starting point	Conclusion
Dialogue 1		
Dialogue 2		

Period 3

Learning activity 6. KWL chart: Philosophy and education

The purpose of this learning activity is for you to reflect on the relation between philosophy and education.

1. Think back at what you learnt in Years 1 and 2.
2. Complete the first two columns in the KWL chart in Table 7.5. In this table, describe what you know and what you want to know about the relation between philosophy and education.

Table 7.5. KWL chart: Relation philosophy and education

K What I Know	W What I Want to know	L What I Learnt

26 Adapted from Sutton, J. (2021).

Relating philosophy and education

In Year 1, you learnt that philosophy of education is a "philosophical reflection on the nature, aims, and problems of education".[27] In periods one and two of this lesson, you learnt more about the nature of philosophy. In this period, you will further reflect on the relation between philosophy and education.

As you learnt in Years 1 and 2, educational philosophy is an area of applied philosophy. This means that it focuses on two aspects:

- Basic philosophical questions, such as the nature of knowledge; and
- Issues that emerge from educational practice, such as the value of standardised assessment.[28]

Since its origins, philosophy and education have been closely related. Many great philosophers are known for their more generic philosophical ideas, as well as ideas specific to education. For example, the prominent philosophers Socrates, Plato, Aristotle, Rousseau and Dewey are known for their contributions to education.[29] Eastern philosophers have always focused on matters of education. These philosophers viewed education as critical to achieving wisdom, establishing rules and providing solutions to broader societal issues.[30]

Educational activities at all levels (including at the policy, district, school, classroom and student level) are underpinned by philosophical perspectives. These philosophical perspectives are often implicit. Yet, being aware of and understanding philosophical assumptions is necessary to guide education practice.[31]

Teachers' beliefs about education impact the decisions they make in the classroom.[32] It is important to realise that educational philosophies are not independent of one's general philosophies of life. For example, a teacher's general beliefs about the nature of reality, knowledge and what is valuable will affect their teaching philosophy.[33] Being aware of the relation between your generic philosophical views and your educational philosophy can help you become a more reflective practitioner.

27 Siegel, H. (2020).
28 Siegel, H. (2020).
29 Siegel, H. (2020).
30 Johnson et al. (2005).
31 Siegel, H. (2020).
32 Diehl, D. E. (2005)
33 Olivia, P. F. (2001), cited in Diehl, D. E. (2005).

We will take a closer look at the different aspects that inform teacher's classroom practice. This will enable you to better understand the relation between philosophy and education.

Teacher's classroom practice is informed by the following interrelated aspects:[34]

- Content knowledge of the subject matter
- Pedagogical knowledge, including knowledge of learning theory and instructional methods; and
- Classroom experience.

Together, these aspects determine a teacher's **teaching philosophy**. Using a philosophical lens to closely examine the values and beliefs underpinning your day-to-day classroom practices is a key professional skill. This can help you identify your own philosophical position and articulate your teaching philosophy. In addition, articulating a teaching philosophy can help teachers understand the big picture of their beliefs and values in relation to humanity and society.[35]

To help you better understand these relationships, we will briefly reflect on the nature of theory, and how this informs teaching practice.

In Years 1 and 2, and Unit 5 of Year 3, you learnt about many different learning theories. Learning theories can be described as "assumptions or predictions about how and why individuals learn" [36] Some of these theories were very broad. For example, foundational theories include behaviourism, cognitivism and constructivism. Other theories are more specific, such as cognitive load theory. Often, a broad theory includes more specific theories.

Within educational philosophy, even more general theories of education have been developed. These general theories of education broadly outline principles for producing a certain type of educated person. Unlike theories of learning, these general theories of education cannot be tested through research. General theories of education include more specific theories of learning.[37]

34 Campoy, R. (2005).
35 Johnson et al. (2005).
36 Campoy, R. (2005, p. 55).
37 Moore, T. W. (2009).

To a large extent, educational philosophy is concerned with critically examining and commenting on educational theories and their foundations.[38] By applying a philosophical lens, teachers will be able to adopt an inquiry mindset. This will help them consider and select the best possible approaches to classroom practice, taking account of multiple points of view.[39]

Learning activity 7. Visualisation: Philosophy and education

The purpose of this learning activity is for you to reflect on the relationship between philosophy and education.

Draw a visual overview of the relationship between philosophy and education in Box 7.3. In your visualisation, include the concepts of *educational philosophy*, *theory*, *educational practice*, and *teaching practice*.

Box 7.3. Draw a visual representation of the relation between philosophy and education

38 Moore, T. W. (2009).
39 Johnson et al. (2005).

7.1.2. Educational implications of philosophy

Expected learning outcomes

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

- Reflect on the central ideas of major philosophies and their implications for education;
- Relate educational philosophies and educational theories;
- Identify each educational theory's ideas on curriculum, teaching and learning; and
- Explain the meaning and value of Eclecticism.

Period 1

Consolidating knowledge of major philosophies

In Year 1 and Year 2, you learnt about various major philosophies. In this period, you will revisit four of the major philosophies. You will learn the central ideas of each philosophy as connected to the three main philosophical branches covered in Lesson 7.1.1.

Before revisiting the major philosophies (also known as **schools of thought**), it is important to realise that the classification of philosophies is contested. Specifically, philosophers within the same school of thought may have differing ideas on the same matter. Further, there appears to be confusion in relation to the classification of philosophers to schools of thought in the literature. These differences are in part due to the different foci of philosophers on branches of philosophy, such as Metaphysics or Epistemology. Consequently, some people have argued that it is more meaningful to examine the ideas of individual philosophers.[40]

40 Barrow, R. (2010).

Idealism

Idealism is one of the oldest philosophies. Idealist philosophers mainly focus on metaphysical concerns, related to for example 'truth' and 'honour'. Idealists believe that the nature of reality is unchanging. This reality is determined by spiritual and mental truths. Essentially, Idealists "see the universe as an expression of a universal mind".[41] They believe that universal knowledge exists in the mind, which can be discovered through processes of self-examination, discovery and rationalising. In the Idealist's view, values and ethical conduct are universal and do not change over time. Major Idealist philosophers include Plato, Descartes, and Hegel.[42]

Realism

Realism has its roots in Idealism. In contrast to Idealism, Realism focuses on the study of reality as objective and fixed, which is external to the mind. In other words, there is an objective truth that exists outside of the mind. The mind can obtain knowledge of this objective truth by sensing, processing and classifying information. Realists believe that values are universal and do not change over time. These values stem from the laws of nature. Major Realist philosophers include Aristotle, Aquinas and Locke.[43]

Pragmatism

Pragmatism originated as a philosophy that rejected ideas of absolute truth. Pragmatists emphasise the importance of an individual's interaction with their environment. They believe that "reality is constructed through transactional experiences where humans interact with the environment, which is constantly changing".[44] This means that knowledge is constantly changing, based on the changing nature of the world and new scientific discoveries. Pragmatists view knowledge as the result of examining one's own experiences and their interaction with the environment. Values are relative and situation-specific, and subject to change. Major Pragmatist philosophers include Peirce, James, and Dewey.[45]

41 Beatty et al. (2009, p. 108).
42 Beatty et al. (2009).
43 Beatty et al. (2009).
44 Beatty et al. (2009, p. 109).
45 Beatty et al. (2009).

Existentialism

Existentialism rejects the central ideas of the previously mentioned philosophies. Existentialists believe that societal structures should not restrict an individual's free will and potential. It proposes that truth and reality are not universal, but rather, are subjectively determined by each individual. Knowledge is the result of freely making personal choices. Consequently, there are no universal values. Each individual creates their own values by making choices. Major Existentialist philosophers include Nietzsche, Jaspers and Sartre.[46]

Learning activity 1. Summarise central ideas: Major philosophies

The purpose of this learning activity is for you to analyse the central ideas of four major philosophies addressed in Years 1 and 2.

1. Read and reflect on the information in the section, 'Consolidating knowledge of major philosophies'.
2. For each of the major philosophies, think about the central ideas in relation to Metaphysics, Epistemology, and Axiology. Then, complete Table 7.6.
3. If needed, revisit the explanation of the three branches of philosophy covered in Period 1 of Lesson 7.1.1.

Table 7.6. Major philosophies and central ideas per philosophical branch

Philosophy	Metaphysics	Epistemology	Axiology
Idealism	Reality is …	Knowing is…	Values are…
Realism			

46 Beatty et al. (2009).

Philosophy	Metaphysics	Epistemology	Axiology
Pragmatism			
Existentialism			

Learning activity 2. Reflect on educational implications: Major philosophies

The purpose of this learning activity is for you to reflect on the educational implications of the major philosophies. This activity will help you understand the implications of abstract philosophical ideas for classroom practice.

Think about the educational implications of the four major philosophies. You may remember some implications from Year 2 of Educational Studies. You can also try to reason from what you have learnt during this period.

Discuss the implications of each educational philosophy in your group. Record your group's responses in Table 7.7. Try to come up with at least two educational implications for each philosophy.

Table 7.7. Educational implications of major philosophies

Philosophy	Educational implications
Idealism	
Realism	
Pragmatism	
Existentialism	

Period 2

Educational philosophies, educational theories and teaching practice (1)

In Year 1 and Year 2, you learnt about various educational theories associated with major philosophies. But what exactly is the difference between a philosophy and a theory, and why is this distinction important for teachers? In this period and the following period, you will learn more about the nature of these educational theories and their relation with educational philosophies.

Learning activity 3. Group discussion: Philosophies, educational theories and teaching practice

The purpose of this learning activity is for you to reflect on the relation between philosophies, educational theories, and teaching practice. Your teacher educator will lead a brief group discussion, informed by the following prompts.

Briefly reflect on Learning activity 2 in Period 1 of this lesson. Use the following questions to guide your reflection:

1. Did you find it easy or hard to identify the educational implications of major philosophies?
2. How do you think these insights could inform your teaching practice?

You will probably conclude that these broad philosophies are insufficiently specific to guide your teaching practice.

From philosophical perspectives to classroom practice

Many textbooks have extrapolated ideas from philosophical perspectives to apply to education. Yet, these philosophical perspectives provide little direct guidance for educational practice. This is in part because they encapsulate many different views, which may not always be compatible. Another issue is that they encapsulate many generic philosophical ideas, not all directly related to education.[47]

In Period 3 of Lesson 7.1.1, you learnt that good teaching practice is theory-informed. You also learnt that theories about how students learn may be broad or specific (see Unit 5). These learning theories are related to general educational theories, which outline principles of what it means to produce an educated person. [48] In this period and the following period, you will more closely examine some of these general educational theories, and their philosophical backgrounds.

47 Barrow, R. (2010).
48 Moore, T. W. (2009).

Consolidating knowledge of teacher-centred educational theories

Two educational theories are associated with teacher-centred approaches to education. These are **Perennialism** and **Essentialism**.

Perennialism

Perennialism is rooted in both Idealism and Realism. It draws on the view of truth as universal and fixed (Idealism) and the purpose of education as a search for truth (Realism). Perennialism dates back to classic philosophy, yet has remained influential in educational practice across the world. According to Perennialism, schools should prepare students to find their place in society. They believe that society has a traditional order, which is not subject to change. All students are to be subjected to a rigorous curriculum with high academic standards. Only the brightest students will demonstrate to be capable of becoming leaders of society. Teachers are educated people with broad subject-matter knowledge. They have authority and are moral role models. Education is determined by enduring truths, and is not modified in response to individual student needs or interests.[49]

Essentialism

Like Perennialism, Essentialism has its roots in both Idealism and Realism. This educational theory gained popularity in the 20th century as a counter-move to Progressivism. It has remained popular across the world, primarily in the United States of America. Essentialism "maintains that the purpose of schools is both to preserve the knowledge and values of the past and to provide children with the skills essential to live successful and meaningful lives in present society."[50] Like Perennialism, Essentialism emphasised the teacher's authoritarian and modelling role. However, the main focus is on preparation of individuals for modern-day society by helping them develop higher-order thinking skills. Education should also preserve culture and help students develop basic skills, such as reading, writing and arithmetic.[51]

49 Arends et al. (2001).
50 Arends et al. (2011, p. 91).
51 Arends et al. (2001).

Learning activity 4. Visualisation: Idealism, Realism, Perennialism and Essentialism

The purpose of this learning activity is for you to consolidate your understanding of the relation between the educational philosophies of Idealism and Realism, and the educational theories of Perennialism and Essentialism.

Create a visual overview in Box 7.4. In your visual overview, include the relation between and an explanation of the following concepts: *Idealism*, *Realism*, *Perennialism*, *Essentialism* and *teaching practice*. Keep in mind that your current understandings of educational philosophy may go beyond what was taught in Years 1 and 2.

Box 7.4. Draw a visual representation of Idealism, Realism, Perennialism, Essentialism and teaching practice

Period 3

Educational philosophies, educational theories and teaching practice (2)

This period will extend your knowledge of the relation between educational philosophies, educational theories and teaching practice. Specifically, you will revisit some of the student-centred philosophies addressed in Years 1 and 2, before consolidating your knowledge of various educational theories.

Consolidating knowledge of student-centred educational theories

Two educational theories are associated with student-centred approaches to education. These are **Progressivism** and **Reconstructionism**.

Progressivism

Progressivism originated in reaction to dissatisfaction with Perennialism. It is rooted in Pragmatism, which highlights the interaction between an individual and their constantly changing environment. Progressivism gained popularity at the end of the nineteenth century, and has remained influential in educational practice across the world. According to Progressivism, schools should prepare students to overcome challenges in an ever-changing world. They believe that to prepare students for life in society, education has to be student-centred and focus on social interaction. This belief strongly reduced the focus on academic knowledge and skills, and emphasised the importance of whole child development. Rather than passively absorbing information, students need to actively learn in collaboration with others and apply knowledge and skills in real-life contexts. To be relevant, education needs to be tailored to students' interests. Teachers are facilitators of learning, who help students learn in interaction with their social and physical environment.[52]

Reconstructionism

Like Progressivism, Reconstructionism (or Social Reconstructionism) is rooted in Pragmatism. Similarly, it rejects the idea of teacher-centred approaches to teaching. Yet, Progressivists hold different views about the purpose of education. They believe

52 Arends et al. (2001).

that education should address the needs of society, not just individual student needs. To address the needs of society, they believe that education should focus on matters of global concern. As a result, curricula should focus on issues related to technology, social rights and environmental issues. Teachers and schools should model solutions to these issues and should essentially mirror society. Teachers play a facilitating role in helping students examine societal issues and real-world problems.[53]

Learning activity 5. Visualisation: Pragmatism, Progressivism and Reconstructionism

The purpose of this learning activity is for you to consolidate your understanding of the relation between the educational philosophy of Pragmatism and the educational theories of Progressivism and Reconstructionism, and how these relate to teaching practice.

Create a visual overview in Box 7.5. In your visual overview, include the relation between and an explanation of the following concepts: *Pragmatism*, *Progressivism, Reconstructionism* and *teaching practice*. Keep in mind that your current understandings of educational philosophy may go beyond what was taught in Years 1 and 2.

Box 7.5. Draw a visual representation of Pragmatism, Progressivism, Reconstructionism and teaching practice

53 Arends et al. (2001).

Learning activity 6. Think-pair-share: Core ideas of educational theories

The purpose of this learning activity is for you to consolidate your understanding of educational theory's ideas on curriculum, teaching and learning.

1. Think about the central ideas of each educational theory in relation to curriculum, teaching and learning. Complete Table 7.8.
2. When you have completed your responses, compare and discuss your responses to those of a classmate. How are your responses similar or different?
3. Based on the comparison with your classmate, try to elaborate on your responses.

Table 7.8. Educational theories and their ideas on curriculum, teaching and learning

Educational theory	Curriculum	Teaching	Learning
Perennialism	Is broad and intellectually demanding and identical for all students. It needs to represent worldly wisdom, including a focus on the classics.	Teachers are role models with authority. They are knowledgeable in all subject areas. All students are taught in the same way, using an authoritarian manner. Teaching involves managing student behaviour to ensure desirable outcomes. Teacher education emphasises subject matter knowledge over pedagogy.	The acquisition of broad subject-matter knowledge. Students performing exceptionally well are rewarded. Through education, learners can find their appropriate place in society.
Essentialism			
Progressivism			
Reconstructionism			

Period 4

Educational philosophy and eclecticism

In this lesson, you have revisited most educational philosophies and educational theories discussed in Years 1 and 2. It is beyond the scope of this unit to cover all philosophical foundations relevant to teaching practice. However, in this period you will revisit one more approach to educational philosophy. This will help you extend your knowledge of different philosophical perspectives, which will inform your teaching philosophy.

Eclecticism

In Year 2, you learnt about another approach to philosophy; **Eclecticism**. An Eclectic approach draws on a number of educational philosophies and educational theories. This provides the opportunity for teachers to tailor their practice to suit the particular learning and teaching context.[54]

Remember the discussion on paradigm wars in Lesson 5.5.1. You learnt that even when strategies may seem to have contradictory foundations, they can be effectively used to complement one another. These strategies often have different philosophical foundations. Yet, a skilled teacher can thoughtfully integrate strategies with different philosophical foundations to improve the effectiveness of their teaching.[55] For example, teachers can use a combination of direct instruction to teach foundational knowledge and problem-based learning to ensure students acquire problem-solving skills.

Learning activity 7. Reflection: Personal educational philosophy

The purpose of this learning activity is for you to reflect on the meaning and value of Eclecticism. This activity will stimulate reflection by inviting you to reflect on educational implications of philosophy and your own philosophical views.

1. Complete the questionnaire in Annex 1.

54 Tellings, A. (2001).
55 Tellings, A. (2001).

2. Your teacher educator will provide a scoring sheet. Record your responses and the associated educational theory/philosophy in Table 7.9.
3. Calculate the totals for each of the philosophical views, then identify your dominant philosophical view.

Table 7.9. Responses to the educational philosophy survey

Question number	Your response(s)	Educational theory / philosophy
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
Total score	Progressivism: Perennialism: Essentialism: Existentialism:	**Dominant educational philosophy:**

Review questions

1. What are the three main branches of philosophy, and what is the key focus of each of these branches?
2. What is educational philosophy?

7.2. Educational Philosophies and Educational Practice

In this sub-unit, you will examine educational philosophies in practice based on your knowledge of different educational philosophies. You will first identify implicit education philosophies of individuals and educational systems. Next, you will revisit Behaviourism, Cognitivism and Constructivism to identify their philosophical assumptions. In the last period of this sub-unit, you will learn how student-centred, teacher-centred and society-centred values relate to different philosophies and theories.

7.2.1. Educational philosophies in practice

Expected learning outcomes

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

- Identify implicit education philosophies of individuals and systems;
- Identify philosophical assumptions in Behaviourism, Cognitivism and Constructivism; and
- Relate student-centred, teacher-centred and society-centred values to different philosophies and theories.

Period 1

Education philosophies of individuals and systems

In Sub-unit 7.1, you learnt about the foundations of philosophy and educational philosophy. You also learnt about the educational implications of philosophy. The focus of these lessons was on what can be called the "normative philosophy of

education". These philosophies are characterised by statements about the desired aims and values of education and what schools and teachers should do or not do.[56] In this sub-unit, you will examine educational philosophies in practice. This requires a different approach, which can be called the "analytical philosophy of education". In this analytical approach, the focus is on identifying the philosophical foundations behind certain educational concepts and practices.[57]

In Sub-unit 7.1, you learnt that all educational activities at all levels (including at the policy, district, school, classroom and student level) are underpinned by philosophical perspectives. These philosophical perspectives are often implicit.[58] In this sub-unit, you will learn to identify these implicit philosophical perspectives.

Learning activity 1. Group discussion: Implicit philosophies of individuals

The purpose of this learning activity is for you to identify the implicit education philosophies of individuals. This will help you understand the philosophical foundations of different educational practices.

Think back to your time in high school. Recall the teaching methods used by three of your former teachers. Think about the implicit philosophies of these teachers, by considering the following aspects:

- The educational goals of teachers
- The content focus of the lessons
- The instructional strategies used by these teachers
- The types of learning activities conducted by students
- The relative role of the teacher and students in classrooms.

Then, contribute to a whole class discussion that links the responses to those questions to the different philosophical perspectives covered in Sub-unit 7.1. In the discussion, consider how teachers' individual philosophies are similar and different.

56 Frankena, W. K. (1966).
57 Frankena, W. K. (1966).
58 Siegel, H. (2020).

Learning activity 2. Think-pair-share: Implicit philosophies of systems

The purpose of this learning activity is for you to identify the implicit philosophical underpinnings of two educational systems.

1. Examine the information about different educational systems in Annex 2.
2. For each educational system, identify the implicit philosophies and explain your reasoning in Table 7.10.
3. When you have completed your responses, compare and discuss your responses to those of a classmate. How are your responses similar or different?
4. Based on the comparison with your classmate, try to revise and/or elaborate on your responses.

Table 7.10. Implicit philosophies of educational systems

System	Implicit philosophies and justification
Singapore	
Finland	

Period 2

Philosophical assumptions in foundational learning theories

In Years 1 and 2 of Educational Studies and Unit 5 of Semester 1, you learnt about foundational learning theories. In this period, you will explore these learning theory's philosophical assumptions. This will help you connect your understandings of learning theories, philosophies, and educational practice.

This period will focus specifically on the three foundational learning theories covered in Unit 5: Behaviourism, Cognitivism and Constructivism. You may want to revisit the main characteristics of each of these learning theories[59] prior to completing Learning activity 3.

Behaviourism

- Learning is a change in behaviour and correct memorisation of material in response to an external stimulus; behavioural principles relate to lower-level learning outcomes.
- Teachers use stimulus and response mechanisms to reward or punish student behaviour and reinforce memory.
- Students are reactive to environmental conditions; they respond to reward and punishment in predictable ways.

Cognitivism

- Learning is about what students know; it is the result of cognitively processing information, which results in new knowledge, skills, and strategy repertoires, including higher-level (complex) learning outcomes.
- Teachers need to design the learning environment to facilitate optimal information processing and opportunities for practice to support transfer of learning.
- Student learning can be predicted to some extent, but individuals vary in their information processing capacity and learning strategy repertoires.
- Students need to actively process information for it to result in learning; this depends, for example on the extent to which they pay attention and their prior knowledge.

Constructivism

- Learning is the result of active knowledge construction of individuals.
- Learning takes place in interaction with the (social) environment.
- Teachers need to create opportunities for interaction and build on current knowledge and understanding.

59 Ertmer, P. A., & Newby, T. J. (2013); O'Donnell et al. (2015).

- Just as students, teachers always keep learning.
- Students are active in the learning process.
- Student learning heavily depends on what they already know and the learning context.
- Due to the unique nature of each individual's experiences, each learner constructs their own knowledge; the outcomes of teaching on student learning are therefore unpredictable.

Learning activity 3. Jigsaw: Philosophical assumptions in Behaviourism, Cognitivism and Constructivism

The purpose of this learning activity is for you to identify philosophical assumptions in Behaviourism, Cognitivism and Constructivism.

1. Your teacher educator will create expert groups. Each expert group will focus on one foundational learning theory.
2. Each expert group will identify philosophical assumptions of their assigned learning theory and create a summary of key points in Table 7.11. In your summary, consider the following aspects: the nature of learning, the role of teachers and the role of learners. Where possible, try to link your responses to the philosophical theory discussed in Sub-unit 7.1.
3. Your teacher educator will regroup all student teachers to allow you to teach your peers about philosophical assumptions in your expert group. Explaining philosophical assumptions to your peers will help strengthen your understandings. Listening to your peer's explanations will extend your understandings of philosophical assumptions to other learning theories. Complete the remainder of Table 7.11 based on the group discussion.

Table 7.11. Identify philosophical assumptions in Behaviourism, Cognitivism and Constructivism

Learning theory	Summary of philosophical assumptions
Behaviourism	
Cognitivism	

Learning theory	Summary of philosophical assumptions
Constructivism	

Period 3

Approaches to teaching and philosophy

In Year 1 of Educational Studies, you learnt that philosophical approaches can broadly be categorised as emphasising student-centred (or learner-centred), teacher-centred, or society-centred values. You also learnt about different philosophies and theories that align with each of these values in Year 1 and Year 2.

In this period, you will consolidate your knowledge of how student-centred, teacher-centred and society-centred values relate to different philosophies and theories. While this is a useful framework to consider the implications of philosophies and theories for classroom practice, it is important to realise that distinctions are often not clear-cut. Rather, it may be more useful to think of the three values as spanning across a continuum.

First, you will briefly revisit the nature of student-centred, teacher-centred, and society-centred values.

Student-centred values emphasise personal growth and the realisation of individual student potential. Students are to actively discover, guide and evaluate their own and their peer's learning.

Teacher-centred values emphasise teachers' authority. Teachers set goals, transfer knowledge and evaluate student learning.

Society-centred values emphasise the purpose of schooling in overcoming societal problems. The focus is on challenging conventional beliefs about values which underpin societal structures.

Revisiting society-centred philosophy

In Sub-unit 7.1, you learnt about existentialism, a philosophy which aligns with society-centred values. You will briefly revisit one more educational philosophy and one educational theory, that align with society-centred values. These were covered in Year 2.

Postmodernism

Postmodernism is a relatively recent view on philosophy, which gained popularity at the end of the 20th century. It is somewhat different to the other major philosophies covered in Sub-unit 7.1, in that it is regarded as a perspective rather than a coherent philosophy. Important postmodernist philosophers include Foucault and Bowers.[60]

Postmodernism originated as a counter-response to the scientific approaches proposed in the Renaissance movement. It rejects the idea of universal truth, claiming instead that people in power construct knowledge to suppress and exploit others. The purpose of schooling in a postmodernist philosophy is to empower students to develop their identities and change societal structures. Thus, students are taught to challenge. There is a strong focus on the interpretation of historical events and individual identity.[61]

Critical theory

Critical theory is an educational theory which has roots in Existentialism and Postmodernism. Just like Reconstructionists, Critical theorists see schools as needing to challenge social structures. This theory emphasises students' individual experiences and identities as determined by their historical context.[62]

Critical theorists reject the idea of transmission of universal knowledge, which they view as constructed by people in power. They challenge the capitalist ideas 'hidden' in curricula, which they believe are imposed to students to create a capitalist society. Rather, critical theorists propagate curricula that are multidisciplinary, and reflect a range of perspectives. Instruction focuses on engaging critical dialogue and engaging learners by drawing on their experiences.[63]

60 Tan, C. (2006).
61 Tan, C. (2006).
62 Tan, C. (2006).
63 Tan, C. (2006).

Learning activity 4. Visualisation: Philosophy, educational theory, and classroom practice

The purpose of this learning activity is for you to critically reflect on the relation between philosophy and educational theory, and how different values result in classroom practice.

1. Examine the diagram of approaches to educational philosophies and educational theories from Year 2 of Educational studies (Figure 7.3). Think back at what you learnt in Sub-unit 7.1 and this period.
2. In groups of 3 or 4, create a revised visualisation based on your updated understandings. In Box 7.6, visualise the relation between the different approaches to classroom practice, educational philosophy and educational theory. In your visualisation, make clear how these relate. For example, you can change the order of the diagram elements, or add descriptions and headers to columns.

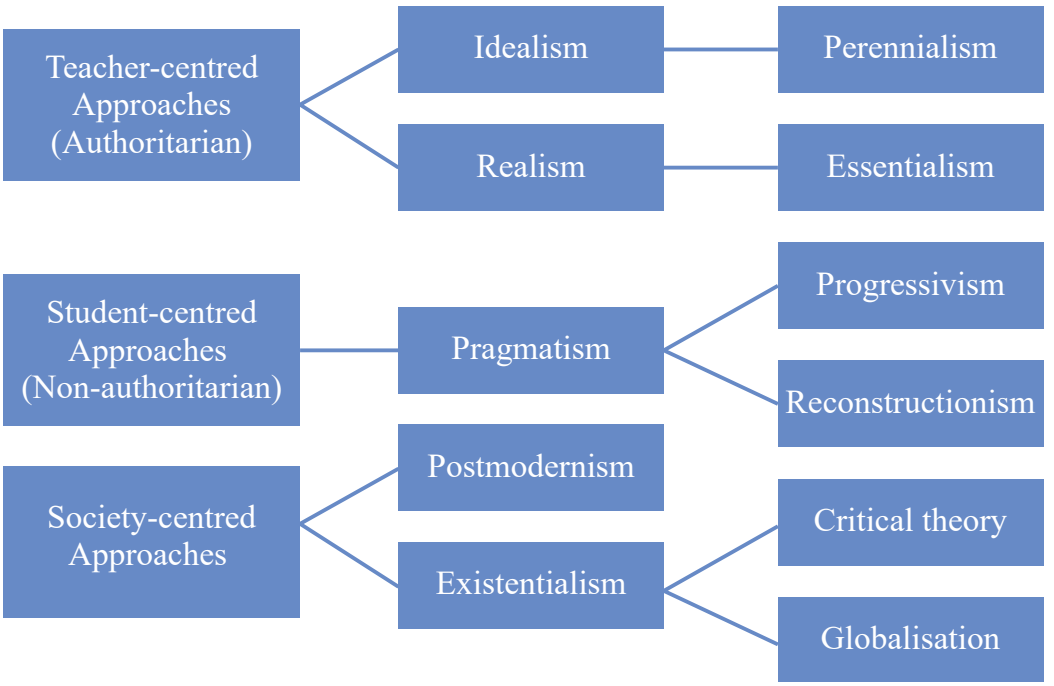


Figure 7.3. Relating approaches to educational philosophies and educational theories[64]

64 Educational Studies Textbook Year 2 Semester 2.

Box 7.6. Draw a visual representation of philosophy, educational theory, and classroom practice

Review questions

1. Which aspects of education are underpinned by philosophical perspectives?
2. Why is a classification of philosophies and educational theories according to approaches to classroom practice problematic?

7.3. Personal Teaching Philosophy

In this sub-unit, you will revisit and refine your teaching philosophy. In Year 2, you learnt that a personal teaching philosophy is a statement which describes a teacher's beliefs, values, ideas and goals. This statement reflects a teacher's professional identity and provides directions for a teacher's classroom practice. In this sub-unit, you will be guided in reflecting on, refining and communicating your teaching philosophy. You will also reflect on the way your teaching philosophy has developed.

7.3.1. Consolidating and communicating your teaching philosophy

Expected learning outcomes

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

- Reflect on the way your teaching philosophy has developed; and
- Communicate your teaching philosophy in different ways.

Period 1

Revisiting your teaching philosophy

In Year 2, you learnt that developing a teaching philosophy is important for various reasons, including:

- Increasing awareness of your own ideas and beliefs as a teacher;
- Understanding your values and ensuring alignment between your values and your professional practice; and
- Using your teaching philosophy to analyse and reflect on your professional practice.

Essentially, your teaching philosophy should reflect your beliefs, values and attitudes about teaching and learning. These beliefs directly affect your practice and professional growth as a teacher.[65]

In Year 2, you wrote your first teaching philosophy statement. It is important to realise that your teaching philosophy is likely to continue to change throughout your career as a teacher. For example, your teaching philosophy is likely to be influenced by your experience in the classroom, your knowledge of pedagogy, and your knowledge of subject matter content. This knowledge and experience accumulates over the span of your career.

Reflection on your professional knowledge and experience is a powerful tool for developing your teaching philosophy over time.[66] As explained previously, using a philosophical lens to closely examine the values and beliefs underpinning your day-to-day classroom practices is a key professional skill. This can help you identify your own philosophical position and articulate your teaching philosophy. In addition, articulating a teaching philosophy can help teachers understand the big picture of their beliefs and values in relation to humanity and society.[67]

Learning activity 1. Reflection: Your teaching philosophy

The purpose of this learning activity is for you to reflect on your teaching philosophy as formulated in Year 2. This will help you identify aspects you may wish to revise or refine.

1. Examine the aspects listed in Table 7.12. In Year 2, you used these aspects to plan for writing your personal teaching philosophy.
2. Read the personal teaching philosophy statement you developed in Period 4 of Sub-unit 7.2 (Learning activity 6).
3. Use the aspects listed in Table 7.12 to reflect on your personal teaching philosophy. Identify which aspects you do not feel you need to change, which aspects you do feel you need to change, and formulate an action plan for revising these aspects. Use the last row to reflect on any other aspects of your teaching philosophy. For example, you may want to reflect on your views on the use of teaching materials.

65 Campoy, R. (2005).
66 Campoy, R. (2005).
67 Johnson et al. (2005).

Table 7.12. Reflect on your personal teaching philosophy

Aspect	I do not feel the need to change…	I do feel the need to change…	I will change this by…
Aim of education			
Who should be educated?			
How students learn			
What should be taught?			
Differentiation according to students' backgrounds, interests, and abilities			
Role of the teacher			

Aspect	I do not feel the need to change…	I do feel the need to change…	I will change this by…
How the teacher should teach			
Role of the student			
Other			

Period 2

Refining your teaching philosophy statement

In Year 2, you were presented with several brief examples of teaching philosophy statements. You were then invited to write your statement by focusing on several key aspects of a teaching philosophy (see Table 7.12). In this period, you will refine your teaching philosophy statement.

There are many different ways to write your teaching philosophy statement, and there is no need to follow strict style guidelines. Yet, you can elevate the quality of your teaching philosophy statement by taking account of some generic guidelines:[68]

68 Van Note Chism, N. (1997-98); Grundman, H. G. (2006).

- It is concise and well-written; aim for a length of approximately 300-400 words.
- It is written in first-person language and represents your unique values, beliefs and attitudes; adopting this style will help you make the statement personal as well as reflective.
- Your statement should include concrete statements and examples; this will enable the reader to visualise how you might enact your philosophy in the classroom.

Learning activity 2. Essay: Refining your teaching philosophy

The purpose of this learning activity is for you to refine your teaching philosophy statement.

- In this activity, you will use your responses to Learning activity 1 in Period 1 to refine your personal teaching philosophy statement developed in Year 2. You may find it helpful to start a new document if you feel that you need to make many changes.
- In addition, you can elevate the quality of your teaching philosophy statement by taking account of some generic guidelines outlined in the section, 'Refining your teaching philosophy statement'.
- Your teacher educator will assess your teaching philosophy statement at the end of the lesson using the rubric displayed in Table 7.13.

Table 7.13. Rubric for assessing a teaching philosophy statement

Criteria for success	Advanced	Satisfactory	Emerging
1. Reflects personal teaching philosophy in relation to the following aspects:			
Aim of education			
Who should be educated?			
How students learn			

Criteria for success	Advanced	Satisfactory	Emerging
What should be taught?			
Differentiation according to students' backgrounds, interests, and abilities			
Role of the teacher			
How the teacher should teach			
Role of the student			
2. Adheres to the following style and format guidelines:			
appropriate length (approximately 300-400 words)			
Clearly written and easy to follow			
written in first-person language			
uses concrete statements and examples			
3. Other observations:			

Period 3

Communicating your teaching philosophy

In Year 1, you communicated your emerging teaching philosophy in a presentation format. In Year 2 and Period 2 of this lesson, you learnt how to write a teaching philosophy statement. However, there are other ways to communicate your teaching philosophy. In this period, you will practise communicating your teaching philosophy in different ways.

Being able to communicate your teaching philosophy is a key professional skill. Being able to communicate your teaching philosophy may plan an important role in the job application process. Communicating your teaching philosophy in various ways can also help encourage further reflection on your professional identity and values as a teacher.[69]

Learning activity 3. Role-play: Your teaching philosophy in a job interview

The purpose of this learning activity is for you to practise verbally communicating your teaching philosophy.

- In this activity, you will role-play a job interview together with a peer. You will take turns in being the interviewer and interviewee. The role-play should be centred around the question: "What is your teaching philosophy?"
- Notes key points of your peer's responses in Table 7.14. Then, copy your peer's recordings of your responses to the table.
- Reflect on your and your peer's responses. Would you hire your peer for a teaching job? Why or why not?

69 Grundman, H. G. (2006).

Table 7.14. Role-play communicating your teaching philosophy in a job interview

Key points of my peer's responses	Key points of my responses (as recorded by my peer)

Learning activity 4. Creative expression: Your teaching philosophy

The purpose of this learning activity is for you to practise communicating your teaching philosophy in a creative way. This will help you understand how to clearly communicate your teaching philosophy and will encourage further reflection.

Express your teaching philosophy in a creative way in Box 7.7. For example, you may want to use a poem, create a visual representation, or describe your teaching philosophy using a metaphor or quote. In your creative expression, try to incorporate all relevant aspects of a teaching philosophy (as described in Table 7.12).

Box 7.7. Express your teaching philosophy in a creative way

Period 4

Your teaching philosophy: Philosophical grounding and reflection

The final lesson of this unit will focus on closely examining the philosophical grounding of your teaching philosophy. In addition, you will get the opportunity to further refine your teaching philosophy statement and reflect on the way your teaching philosophy has developed.

Regularly revisiting your teaching philosophy is a powerful tool to create your unique identity as a teacher. It is also a helpful way to examine consistency between the kind of teacher you desire to be, the philosophical grounding of your individual views, beliefs and attitudes, and your professional practices. If you observe inconsistencies, you may wish to revise either your philosophy or practices to ensure alignment.[70]

70 Beatty et al. (2009).

Learning activity 5. Reflection: Philosophical grounding of your teaching philosophy

The purpose of this learning activity is for you to reflect on the philosophical grounding of your teaching philosophy. This will help you connect theory of educational philosophy and teaching practice. These insights can help you further refine your teaching philosophy statement.

1. Use your revised teaching philosophy statement from Learning activity 2 of this lesson for this activity. Reflect on how your responses in relation to the different aspects are grounded in philosophies and educational theories discussed in this unit. For some aspects, you may align more than one philosophy or theory. Record your responses in Table 7.15.
2. When you have completed your responses, reflect on your teaching philosophy overall by responding to the last two questions in Table 7.15.
3. Based on your responses in Table 7.15 and any inconsistencies identified between your teaching philosophy as expressed in Learning activities 2, 3 and 4, you may want to further refine your teaching philosophy statement. At the end of this lesson, you will submit your teaching philosophy statement to your teacher educator for assessment.

Table 7.15. Reflect on the philosophical grounding of your teaching philosophy

Aspect	Philosophy	Educational theory
Aim of education		
Who should be educated?		
How students learn		
What should be taught?		
Differentiation according to students' backgrounds, interests, and abilities		

Aspect	Philosophy	Educational theory
Role of the teacher		
How the teacher should teach		
Role of the student		
Overall, would you characterise your approach to teaching as student-centred, teacher-centred, or society-centred?		
Is your teaching philosophy grounded in one or more philosophies and educational theories? Would you characterise your approach as eclectic, or are there any inconsistencies that need to be addressed by revising your teaching philosophy statement?		

Learning activity 6. Reflection: Development of your teaching philosophy

The purpose of this learning activity is for you to reflect on how your teaching philosophy has developed.

1. In this activity, you will reflect on how your teaching philosophy has developed. Your teaching philosophy as communicated in this lesson in writing, orally and in a creative way is the object of your reflection. You may also want to revisit your responses to Learning activity 1 of this lesson.
2. Use the prompts in Table 7.16 to reflect on how your teaching philosophy has developed over the past year.
3. Once you have completed Table 7.16, contribute to a brief whole-class discussion. What are the differences in how your teaching philosophy has developed compared to your peers?

Table 7.16. Reflect on how your teaching philosophy has developed

Reflection prompts	Response
How would you describe the way your teaching philosophy has developed over the past year?	
What would you say is the most significant change you have made to your teaching philosophy?	
What was the most important thing you learnt over the past year that has contributed to the development of your teaching philosophy? Explain why and how this impacted your teaching philosophy.	

Review questions

1. What is a teaching philosophy?
2. What are the benefits of reflecting on and refining your teaching philosophy?

Unit Summary

Key messages

- Three major branches of philosophy are Metaphysics, Epistemology and Axiology.
- All educational activities at all levels are underpinned by philosophical perspectives.
- A teacher needs to understand the relationship between philosophy, educational philosophy, educational theory and teaching. This understanding will help them to critically evaluate and modify their own teaching practice.
- A teacher's teaching philosophy is determined by a combination of their content knowledge, pedagogical knowledge and classroom experience.
- Major philosophies or schools of thought are Idealism, Realism, Pragmatism and Existentialism. These philosophies have certain big ideas in common, which is why they have been grouped together. However, there are differences in the views of individual philosophers within each philosophy.
- Educational theories associated with major philosophies are Perennialism, Essentialism, Progressivism and Reconstructionism. These theories differ in their views on curriculum, teaching and learning.
- Another popular approach to philosophy is Eclecticism. An Eclectic approach draws on a number of educational philosophies and educational theories.
- All aspects of education are underpinned by philosophical perspectives, but these are often implicit. Individual teachers and educational systems are likely to be founded upon a range of philosophical assumptions.
- Although the philosophical assumptions of Behaviourism and Cognitivism partly overlap, these learning theories advocate very different teaching and learning strategies. Philosophical assumptions in Constructivism partly overlap with cognitivism, yet Constructivism is underpinned by very different perspectives on the nature of learning, the role of the teacher and the role of students.
- Some educational philosophies and educational theories have clear direct implications for classroom practice. Yet, in other cases, the implications are less clear-cut. Different philosophical perspectives may inform a range of approaches to teaching. These can be categorised along a continuum of teacher-centred, student-centred and society-centred.

- A teaching philosophy constantly changes as a result of a teacher's new knowledge and experience.
- Reflecting on your teaching philosophy can help you align your desired and actual professional practices.

Unit reflection

In Unit 6, Lesson 6.1.1, you looked at the most recent developments in the Myanmar education system and aligned recent educational reforms with the NESP priority areas. How do these developments align with the different philosophies and educational theories discussed in this unit?

In this unit, you refined your personal teaching philosophy. How much do you think your teaching philosophy will change once you start teaching? Which factors do you think will affect the development of your teaching philosophy? How much do you think your teaching philosophy will have changed in 20 years?

Further reading

7.1. Consolidating Understanding of Educational Philosophy

De Las Alas, P. (2018, June 21). *Nature, scope & importance of philosophy of education* [Slides]. Slideshare. https://www.slideshare.net/pauldelasalas37/nature-scope-importance-of-philosophy-of-education

7.2. Educational Philosophies and Educational Practice

Siegel, H. (2020, October 23). Philosophy of education. In *Encyclopaedia Britannica*. https://www.britannica.com/topic/philosophy-of-education

7.3. Personal Teaching Philosophy

Center for Excellence in Learning and Teaching. (n.d.). *Writing a teaching philosophy statement*. Iowa State University. https://www.celt.iastate.edu/teaching/document-your-teaching/writing-a-teaching-philosophy-statement

Grundman, H. G. (2006). Writing a teaching philosophy statement. *Notices of the American Mathematical Society, 53*(11). https://www.ams.org/notices/200611/comm-grundman.pdf

Unit 8

Educational Assessment

In this unit, you will deepen your knowledge about assessment and how it can be used effectively to enhance teaching and learning. In Sub-unit 8.1, you will examine the four pillars of assessment and their roles in education. You will analyse the objectives of assessment in relation to each of the four pillars of assessment.

Lesson 8.2.1 investigates the role of assessment in teaching and learning cycles. You will examine how assessment is interwoven with pedagogy to enhance learning. In Lesson 8.2.2, you will examine a range of learning taxonomies. These are frameworks which can be used to map the ways in which learning progresses and to monitor learning progress. You will discuss the benefits and limitations of peer and self-assessment and you will learn about balancing effective assessment with sustainability.

Sub-unit 8.3 focuses on school-based assessment. Lesson 8.3.2 examines the importance of building validity, reliability, objectivity and fairness into judgement-based assessment. You will learn how to create robust rubrics that can be used as tools to maintain objectivity in assessment. You will also learn to analyse rubric data to determine the reliability of the tool. Lesson 8.3.2 focuses on how measures of centrality and measures of variability can be used by teachers to analyse student data. You will evaluate the benefits and limitations of these statistics for understanding student learning. In Lesson 8.3.3, you will calculate percentiles and percentile rank. You will discuss uses of these statistics and how they may be beneficial or harmful for different groups of students. Lesson 8.3.4 focuses on correlations. You will begin by estimating the Q-correlation coefficient. You will then calculate Pearson's r correlation coefficient, and discuss the ways in which correlations can be used to inform teaching and learning.

Expected learning outcomes

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

- Explain the importance of the four pillars of assessment in education;
- Explain the connection between the four pillars of assessment and student learning;
- Discuss the role of assessment in learning and teaching processes;
- Design formative assessment within a lesson to monitor student learning progress;
- Apply assessment principles to design diagnostic tools to aid planning for teaching and learning;
- Design tools to monitor the learning progress of students in KG/Lower Primary school;
- Evaluate the benefits and limitations of peer and self-assessment;
- Construct tools for peer and self-assessment in KG/Lower Primary school;
- Design feedback to promote learning for KG/Lower Primary school students;
- Design rubrics in line with the assessment principles to assess students in KG/ Lower Primary school;
- Analyse and interpret rubric data for students in KG/Lower Primary school;
- Calculate measures of central tendency;
- Explain the uses and limitations of using measures of central tendency to analyse assessment data;
- Explain the uses and limitations of measures of variability when analysing assessment data;
- Compute the values measures of variability;
- Examine the benefits and limitations of using percentiles and percentile ranks to describe learning progress;
- Calculate the values of percentile and percentile rank;
- Explain how correlations can be used to analyse assessment data;
- Compute the value of Q-correlation coefficient; and
- Compute the value of Pearson's r correlation coefficient.

Competencies gained

A4.1. Demonstrate understanding of the structure, content and expected learning outcomes of the basic education curriculum

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

B3.2. Demonstrate strategies for managing student behaviour

D1.1. Regularly reflect on own teaching practice and its impact on student learning

Key terms

Analytic rubrics, bell curve, box and whisker plots (boxplots), construct, criteria, descriptors, distribution, Dunning-Kruger Effect, elaborated feedback, error, evidence, Guttman's Coefficient of Reproducibility, histogram, holistic rubrics, horizontal dimension (of learning), interquartile range, interrater reliability, learning taxonomies, mean, measures of central tendency, measures of variance, median, method of assessment, mode, normal curve, normal distribution, Pearson's r, peer-assessment, percentile, percentile rank, potential development, Q-correlation, quartile, range, rubrics, self-assessment, social moderation, spread, spurious, standards, standard deviation, variability, variable, vertical dimension (of learning), zone of actual development, zone of proximal development

8.1. The Four Pillars of Assessment and the Teacher's Role

In this sub-unit, you will examine the role of the four pillars of assessment in education in Myanmar. You will analyse the National Assessment Policy to understand the purpose and role of each pillar of assessment. You will evaluate the role of each pillar and the connections between assessment and student learning. You will discuss different stakeholders in education and their interest in educational assessment.

8.1.1. Unpacking the four pillars of assessment

Expected learning outcomes

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

- Explain the importance of the four pillars of assessment in education; and
- Explain the connection between the four pillars of assessment and student learning.

Period 1

The four pillars of assessment and student learning

The vision of the National Assessment Policy is that the policy will:

> "…support teachers and education managers to implement a quality assessment system to facilitate and improve student learning achievement in accordance with basic education curriculum." [71]

71 Department of Myanmar Examinations. (2019, p. 5).

Learning activity 1. Reflect and discuss: Evaluating the Vision of the National Assessment Policy

The purpose of this learning activity is to reflect on the vision statement in the National Assessment Policy and to understand the implications for teaching, learning and assessment.

Throughout Year 1 and Year 2 of your course, you have studied different aspects of assessment, and considered some of its complexities. Reflect on the vision of the National Assessment Policy and consider the following:

1. Why is assessment so important in education? What are its roles?
2. How does assessment '*facilitate and improve student learning achievement*'?
3. How does the National Assessment policy support teachers and educational managers to implement a quality assessment system?

Connecting Learning, Teaching and Assessment

In Year 2, Lesson 8.1.3, you discussed the four pillars of assessment, their purpose and the tools and instruments that are used to implement assessment. You also examined the Principles of Assessment and how they supported the validity of assessment. Each pillar of assessment has a different role to play in promoting and monitoring student learning.

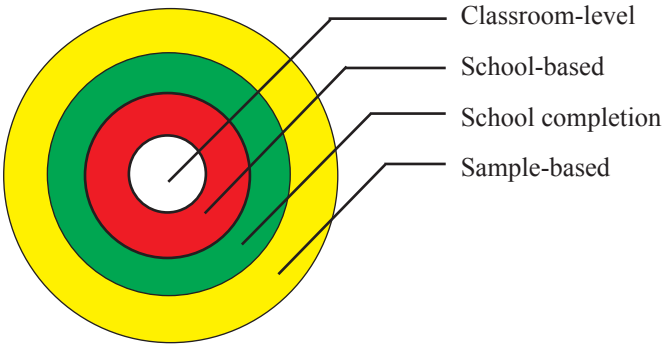


Figure 8.1. The four pillars of assessment[72]

72 Department of Myanmar Examinations. (2019).

Unpacking the four pillars of assessment

Pillar 1 is at the core of assessment and learning. *Classroom-level assessment* is closely focused on the day-to-day learning within the classroom. Teachers administer assessment to support the learning of each student. They use a range of assessment methods to identify what individual students know and can do and support them to develop to the next stages in learning. Assessment at this level is very student-centred and primarily formative.

Pillar 2 is school-based assessment. It may be formative and summative. However, the purpose is to measure student learning throughout the year. This assessment is used for reporting student progress to parents and students. It can also be used to determine whether a student is ready to move to the next grade.

Pillar 3 is Primary, Middle and High school completion assessment. This level of assessment is summative in nature. The purpose of this assessment is to determine the extent to which students have met the **standards** expected at the level of schooling they are completing. It is used to measure the achievement of students within districts, states and regions.

Pillar 4 is different from the other pillars. It is sample-based. This means that only some students – a representative sample of a particular population of students will be assessed. At this level, the focus of assessment is on the general population of students, not individuals. In doing this type of assessment, governments can monitor education across regions and the nation. The purpose of this type of assessment is to understand the strengths and challenges that Myanmar faces in relation to education, and to develop wide reaching strategies to improve educational outcomes on a large scale.

Learning activity 2. Group discussion: Examining the role of assessment within the four pillars of assessment

The purpose of this activity is to examine the role of assessment at four different levels within education.

You will work in small groups to analyse one of the pillars of assessment. Your teacher educator will allocate a pillar to each group. As a group, you will read the section in the National Assessment Policy that relates to your pillar. You will discuss the following questions and record your group's responses:

1. Definition: Read the definition of your pillar. Discuss what this means to you and your group. As a group, how would you define this pillar?
2. Read the Purpose and Guiding Principles.
   - Explain the purposes of your group's pillar.
   - Why is this important?
3. Read the Scope of your pillar:
   - What types of assessment are used?
   - What is assessment expected to achieve or promote at this level?
4. Read the operational considerations:
   - Who are the stakeholders who have an interest in education at this level? What is their interest in education?
   - Is there anything for which this level of assessment should NOT be used?
   - How should assessment be implemented at this level?
5. As a teacher, what is your interest in this level of assessment? How will it impact on your role in education?

Once the groups have finished discussing the pillars of assessment, you will share your analysis and observations with the class.

Period 2

Linking the four pillars of assessment with the objectives of assessment

The National Assessment Policy for Basic Education outlines a number of Objectives for Assessment of Basic Education. Each of the four pillars have a role to play in working towards the objectives. Here are the objectives for Assessment:[73]

i. To support and sustain the introduction of a modern and effective system in which student assessment is used to make decisions on learning based on **evidence**;
ii. To develop a more balanced system that assesses student learning progress against national learning standards;
iii. To make accountability possible for all who have responsibility in students' learning through tracking changes in learning progress and identifying areas that require improvement;
iv. To facilitate student learning and provide feedback to the teacher to improve the process of teaching and learning;
v. To enable students to demonstrate their achievements through the qualifications they gain as a result of assessments;
vi. To improve the inclusivity and equity of the education system; and
vii. To contribute to broader education sector reforms including improving the quality of basic education curriculum and teacher education.

Learning activity 3. Analysis and evaluation: Aligning objectives for assessment with the four pillars of assessment

The purpose of this activity is to reflect on the objectives of assessment for basic education that are outlined in the National Assessment Policy. You will analyse and evaluate how these objectives fit within each of the four pillars of assessment.

This activity will help you to view the ways in which assessment can be used within each of the four pillars of assessment and why it is used in these ways. You will work in small groups to discuss one of the Objectives for Assessment of Basic Education. Work through the following process (the first objective has been used as an example):

73 Department of Myanmar Examinations, (2019).

1. Define your objective.
   Break the objective into its component parts and define the terms.
   For example: Objective 1: To support and sustain the introduction of a modern and effective system in which student assessment is used to make decisions on learning based on evidence
   Breaking the objective down:
   What is a "modern and effective system" in education?
   What does it mean to support and sustain this system?
   How can student assessment be used to make decisions about learning?
   What is 'evidence'?
2. Your group will then rephrase the objective as a question, for example:
   How can assessment support and sustain the introduction of a modern and effective system in which student assessment is used to make decisions on learning based on evidence?

Write your answers to your question in a table, like Table 8.1. This table provides an example of how you can record your responses. Repeat Step 2 for each pillar of assessment. Each group will report their responses to the class. As a group, present your findings to the class.

Table 8.1. Examination of the objectives of assessment against the four pillars of assessment

Four pillars of assessment	Objective of assessment for Basic Education
	(Write your objective here): How can assessment support and sustain the introduction of a modern and effective system in which student assessment is used to make decisions on learning based on evidence?
Classroom level	A modern and effective system at the classroom level provides world class standards in teaching and learning and prepares students for an unpredictable and fast-changing world. There is access and equity so that all students have the opportunity to learn and to demonstrate what they have learnt. Students develop skills to become life-long learners. What students produce is evidence of what they know and can do. Assessment is crucial to this because it helps the teacher to identify the skills and knowledge students are ready to learn. Teachers can use this to make informed decisions about teaching and learning to meet the needs of their students. It helps teachers to monitor the effectiveness of their own teaching. Teachers can use assessment to make decisions about how they need to improve their practices. They can use assessment to make decisions about the types of professional learning they need.

Four pillars of assessment	Objective of assessment for Basic Education
School-based	A modern and effective system at the school-based level is one that provides a culture of inclusion, fairness and equity. It also provides an environment that prepares students for life in a technological age. At the school-based level, Assessment is vital in providing evidence of how groups of students are progressing in their learning. It enables teachers to analyse patterns of achievement to identify groups of students who are disadvantaged and provides information needed to implement changes in educational programmes.
School completion	A modern and effective system at the school-completion level provides opportunity for equity across different schools, regions and districts. All students have access to quality educational opportunities, regardless of their culture, background or geographical location. Assessment at this level provides information for schools about how their students are progressing in their learning, compared with other students in Myanmar. Assessment at this level enables students to move through important educational milestones. Assessment provides evidence of student learning, which can be used to direct them into appropriate career pathways.
Sample-based	A modern and effective system at the sample-based level ensures that all Myanmar students can access education that prepares them for life in the 21st century. Assessment enables the Government and policy makers to measure the progress of student learning. This provides evidence to inform decisions about funding educational programmes to improve educational outcomes.

Review questions

1. Why is it important for the education system to have the four pillars of assessment?
2. Explain how the relationship between learning and assessment is reflected in the National Assessment Policy.
3. Reflect on the objectives of assessment outlined in the National Assessment Policy. How do these objectives impact on your teaching practices?

8.2. Classroom Level Assessment in KG and Lower Primary School

In this sub-unit, you will discuss the role of assessment at the classroom level. You will consider assessment from a developmental perspective and focus on using assessment to promote learning progress. To do this, you will use learning taxonomies to map learning progress for a specific area of knowledge or skill. You will identify evidence of mastery at different levels of learning and design assessment to monitor student learning progress.

8.2.1. Assessment within the teaching and learning cycle

Expected learning outcomes

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

- Discuss the role of assessment in learning and teaching processes; and
- Design formative assessment within a lesson to monitor student learning progress.

Period 1

Assessment and pedagogy

In Year 2, Sub-unit 2.2, you examined two pedagogical approaches to inquiry learning: The E5 Model and the Social Inquiry Model. Both of these pedagogical models are designed to scaffold students into inquiry methods and higher order thinking. However, to facilitate these processes effectively, teachers need to know the extent of what students know and can do. This enables them to plan for targeted and engaging

learning opportunities for students. They must also monitor the learning progress of each student. This is where assessment plays a crucial role in the classroom.

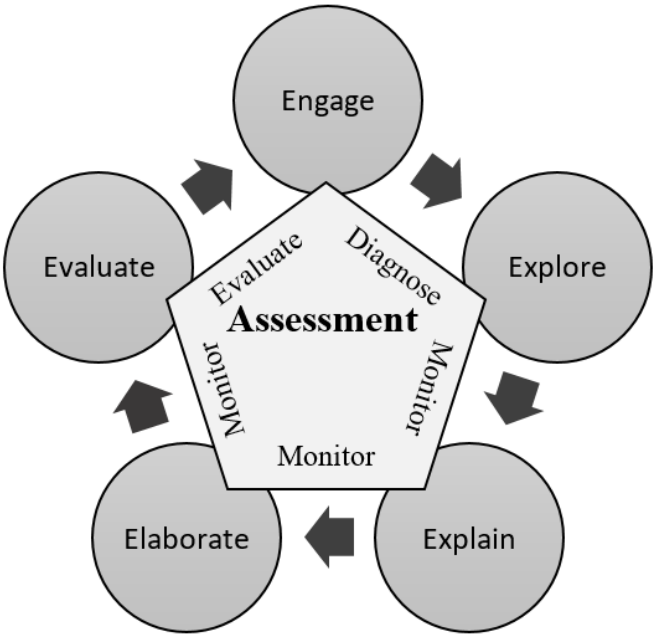


Figure 8.2. Assessment processes are embedded within pedagogical cycles to inform the directions that teaching and learning take[74]

Assessment goes hand-in-hand with pedagogy. The questions about when, why and how an assessment will be used should be informed by pedagogical cycles. In Year 2, Unit 2, you compared two inquiry learning models:

1. The E5 model[75] which is a process that involves five phases of learning: Engagement, Exploration, Explanation, Elaboration and Evaluation.
2. The Social Inquiry Model[76] which involves a process of: Tune in, Find out, Sort out, Go further, Reflect and Act.

Both pedagogical models lead students through processes that enable them to investigate and develop higher order thinking. Assessment is *a core element* in these models because it gives teachers information about student learning. This information

74 Image by author, used with permission.
75 Bybee, et al. (2006); Ansberry, K. R., & Morgan, E. (2005).
76 Murdoch, K. (2019).

then enables teaching and learning to be tailored to the students' **zones of proximal development (ZPD)**.

It is important to remember that assessment is not just about tests. There are many different ways that teachers assess student learning, including well designed questioning techniques, observations, learning activities, individual reflections, individual and group projects, etc.

Learning activity 1. Group brainstorm: Aligning assessment with pedagogical processes

The purpose of this learning activity is to explore the relationship between assessment and pedagogical processes.

You will complete this activity in small groups. As a group, choose EITHER the E5 model OR the Social Inquiry Model (you do not have to do both). Consider the question: What assessment is needed at each phase of the pedagogical cycle? Why? Think about the types of assessment that you might use in KG and early Primary school.

As a group:

1. Brainstorm the purposes of each phase of your model
2. Consider the type(s) of assessment that is needed for the teacher to monitor each phase
3. Write the purpose of assessment at each phase (why is it important)
4. Provide examples of an assessment task that could be given at each stage.

Table 8.2. Aligning assessment with pedagogical models

Pedagogical models					
E5 model (E5) OR Social Inquiry Model (SIM)	**Engagement OR Tune in**	**Exploration OR Find out**	**Explanation OR Sort out**	**Elaboration OR Go Further**	**Evaluation OR Reflect and Act**
Purpose of phase					
Type of assessment					
Purpose of assessment and how the information will be used					
Example of assessment					

Learning activity 2. Group activity: Creating assessment to inform teaching and learning

The purpose of this learning activity is to design a short task that is formative in nature and designed to inform the first stage in the pedagogical model your group has chosen. The task should provide the teacher with information that can be used to plan for future teaching and learning. You will work in groups of three to four people.

The task:

Based on one of the scenarios below, create a short informal assessment task that is designed to:

- Discover what your students already know and what they don't know yet;
- Engage students in an inquiry process; and
- Enable the teacher to monitor student learning progress.

Your group will need to describe:

1. What the students will need to produce that will give the teacher information about what the students already know.
2. How the students will engage in the assessment activity to spark the inquiry process.
3. How the assessment will help them to progress in their learning. (remember that there is likely to be a range of abilities within the class).

Your group should choose ONE of the following scenarios:

Scenario 1: Grade 1 Science

Unit of work: Our Sky

Topic: Natural objects.

You are teaching a Grade 1 Science class a unit of work about our sky. At the beginning of the Unit, you gave the students a quiz game to diagnose what each student knew about the sky and what they can observe when they look at the sky. The students have investigated the different bodies that can be seen in the sky (such as the moon, the sun, planets and stars) and they have learnt about clouds. Now, they will investigate living things that they can see in the sky.

Scenario 2: Grade 1 Social Studies

Unit of work: Myanmar History

Topic: Historic people I admire most

You are teaching Grade1 Social Studies a unit of work about Myanmar's history. The Unit of work is about Myanmar's historic leaders. You designed a multiple-choice quiz about this the different leaders, but since the quiz, it is clear that some students know more than you expected. You will need to find out more about the extent of their knowledge, so you can plan more effectively for learning and teaching.

Here is an example of a different topic and unit of work:

Scenario: Grade 2 Social Studies

Unit of work: Our living area

Topic: Our school

You are teaching Grade 2 Social Studies. The unit of work is about the students' immediate living area and they will focus on their school and the people in it. You will begin the unit of work focusing on different people who work within the school. You suspect that many of the students are unaware of many of the specialist teachers and caretakers who work in the school. Later, the students will need to interview people in the school to learn about what they do and why their role is important.

Example response:

1. What will the students need to produce that will give the teacher information about what the students already know?
   The students will need to produce verbal and written evidence of their knowledge about different members of the school staff and what they do. They will also need to work together to demonstrate how they collaborate and work as a team. Each group of students will need to develop 3 questions that will help them to learn more about what a staff member does in the school. This will demonstrate their current ability to use question techniques to guide an investigation.
2. How will the students engage in the assessment activity to spark the inquiry process?
   This activity will be a competition between groups to see which group can

identify the most staff members and what they do. The students will work in small groups of three students. The teacher will show the class different photographs of staff members at the school. For each photograph, the groups will identify the staff member and what they do. One student will record the group's answer. The teacher will ask each group what their answer is for the question, and the groups will hand in their written responses.

3. How will the assessment help them to progress in their learning? (remember that there is likely to be a range of abilities within the class)
    - It will enable students to collaborate, share knowledge and develop their teamwork skills.
    - It will enable students to develop awareness about what know and what they do not know.
    - It will provide information that will help students begin to develop learning goals that they will work towards as they complete their assignment.
    - It will set up the investigation by starting to write questions to guide the process.

8.2.2. Designing assessment tools to promote learning

Expected learning outcomes

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

- Apply assessment principles to design diagnostic tools to aid planning for teaching and learning;
- Design tools to monitor the learning progress of students in KG/Lower Primary school;
- Evaluate the benefits and limitations of peer and self-assessment; and
- Construct tools for peer and self-assessment in KG/Lower Primary school.

Period 1

Assessment principles: A developmental perspective

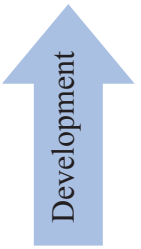
In Unit 3, you studied how students move through stages as they develop ritical thinking,[77] creativity[78] and social and emotional regulation.[79] Learners also move through phases of development as they integrate and manipulate new forms of knowledge and skills. Vygotsky is often referenced in relation to the development of learning. He stated, "learning and development are interrelated from the child's very first day of life."[80]

In Year 2, Sub-unit 8.2, you also discussed the idea that assessment can be used as a tool to find the point where a student is ready to learn (their **zone of proximal development** [ZPD]). According to Vygotsky,[81] this point of readiness to learn sits between the student's **zone of actual development** (what they already know and can do) and their **potential development** (the next step in their learning). If teachers can target their students' ZPDs, and provide support to help them to learn, students are likely to learn more effectively. To do this, teachers need to know how learning usually develops in each learning area they teach.

Mapping learning progress

As students learn, they move through stages of increasing difficulty, complexity and sophistication. **Learning taxonomies**, such as Bloom's Taxonomy, can help teachers to map levels of difficulty for each concept they teach. Learning taxonomies provide information about the order in which broad skills tend to develop.

77 Consider Piaget's stages of cognitive development. Woolfolk, A., & Margetts, K. (2007).
78 Consider Torrance's observations of school aged children. Torrance, E. P. (1967).
79 Such as Erikson's psychosocial model. Woolfolk, A., & Margetts, K. (2007).
80 Vygotsky, L. S., & Cole, M. (1978).
81 Vygotsky, L. S., & Cole, M. (1978).



	Bloom's Revised Taxonomy	Example
High complexity	**Create**	Reading critically to synthesise and interpret ideas and change them into something new
	Evaluate	Weighing up different sources of information to draw conclusions
	Analyse	Extracting and interpreting the important ideas and messages from a text and discussing them in depth
	Apply	Making connections between what is read and real-world experience
	Understand	Comprehending ideas through reading a text
Low complexity	**Remember**	Recognising single words, letters or symbols in print

Figure 8.3. Reading comprehension mapped to Bloom's Revised Taxonomy[82]

There are many other learning taxonomies that may be helpful for teachers to use to map different types of learning. Table 8.3 provides a list of taxonomies that may be used to map different skills and forms of knowledge. Refer to Annex 3 to see descriptions of learning taxonomies and their levels.

Table 8.3. Examples of learning taxonomies

Learning Taxonomy	Description of what the taxonomy measures
Dreyfus' Model of Skills Acquisition[83]	Development of skill-based learning
Krathwohl's Affective Domain[84]	Development of attitudes and beliefs
Structure of Observed Learning Outcomes (SOLO) Taxonomy[85]	Development of increasing complexity in thinking
Bloom's Revised Taxonomy[86]	Development of higher order thinking

82 Krathwohl, D. R. (2002).
83 Dreyfus, S. E., & Dreyfus, H. L. (1980); Dreyfus, S. E. (2004).
84 Krathwohl et al. (1964).
85 Biggs, J. B., & Collins, K.F. (1982).
86 Krathwohl, D. R. (2002).

Sometimes, specific skills that need to develop in different learning areas are researched. The way that learning progresses as students develop the skills is mapped. This forms a sequence of skills and knowledge that learners develop as they become more knowledgeable and skilled in a subject. These maps are known as **learning progressions** because they articulate how learning progresses within a particular subject or domain of learning.

The role of assessment evidence in the learning and teaching process

When teachers know what learning progress *looks* like, they can assess students more accurately. This is because they know the **evidence** that students produce that indicates that they have reached a particular stage of the learning process. Evidence is an observable piece of information, which indicates that a student is able to do something or that they have acquired particular knowledge. Students produce evidence of what they know through what they:[87]

- Do (an observable action)
- Say (e.g., presentations, discussions, conversations, etc.)
- Make (e.g., an artwork, a piece of music, a project, etc.)
- Write (e.g., essays, written responses, letters, emails, etc.)

Evidence is very important in the assessment process, because teachers cannot know for sure what their students understand or what they think. However, teachers *can* interpret this by observing evidence that their students produce and drawing conclusions from that evidence.

Learning activity 1. Application of theory to practise: Mapping development in an area of learning

The purpose of this learning activity is to enable you to understand how learning progresses for a specific skill or knowledge. When teachers know what learning looks like, they can identify where a student's zone of proximal development is likely to be, based on the assessment of the evidence the student produces.

87 Griffin, P. (2018).

You will work in the same small groups that you were working with in the previous period to develop a simple map of learning for a skill within one of the learning domains. You will remain in this group for the next two periods. Your teacher educator will give your group a skill that students in Grade 2 will need to develop. Your group will describe the stages that you would expect students to develop through as they learn this skill (for example, see Figure 8.2).

1. You will create a table on a large sheet of paper (like Table 8.4).
2. As a group, choose a taxonomy to use as a framework or guide for your element of learning (see Annex 3). Write the stages or levels in the taxonomy in the left column.
3. In the middle column, describe each stage of learning for your element. Start with the highest level of skill you would expect your students to develop. What stages or steps will they move through to develop to the highest level of skill? Use the descriptions of the taxonomies in Annex 3 as a guide.
4. In the final column, add the evidence a student would need to produce to demonstrate that they had mastered the skill. Note that you will use your learning progression to create an assessment task in the next period.

Table 8.4 provides an example of a Grade 1 Science activity. The Strand is *Life*, and the topic is *Animals in different places*.

Table 8.4. Example - Creating a progression using a learning taxonomy

Learning Taxonomy: Dreyfus Model of Skill Acquisition	**Learning element. Science: Creating a scientific illustration of a goose**	
Stage in the taxonomy	**Description of learning at each stage**	**Evidence of Learning (what will students do, say, make or write?)**
Expert	The learner understands the task and the elements that need to be included in a scientific illustration. They use their skills of observation to draw what they see, and they use their knowledge of scientific language to describe what they see. They make intuitive judgements about the elements they include and those they leave out.	The student approaches the task scientifically to observe a goose. They draw what they see (not what they *think* they should see). They know which features they need to focus on, and which features are not as important for the task. They use scientific terminology to label the illustration. They may choose to observe and illustrate other relevant elements such as eggs or chicks.

Learning Taxonomy: Dreyfus Model of Skill Acquisition	Learning element. Science: Creating a scientific illustration of a goose	
Stage in the taxonomy	**Description of learning at each stage**	**Evidence of Learning (what will students do, say, make or write?)**
Proficient	The student is able to interpret the task, so they can prioritise different features of the goose that they need to illustrate. They become skilled at observing details as they watch a goose and drawing what they see. They choose particular features to label that are relevant to the task.	The student draws a goose that the distinguishing features are evident. They may include additional images that provide a close-up view of parts of the bird that are important for the task (e.g., feather structure, beak or feet). Important details are labelled using correct terminology.
Competent	The student observes that there are different types of geese that have different features. They may observe different features as the goose moves, flies and nests. The student observes details but may not be able to represent the details accurately. They may not know which details are the most important to include.	The student becomes more skilled at drawing from observation. They realise the extent of the detail they could include. Some students may become frustrated because they cannot draw every detail accurately. They try to include too much detail for some elements, and they may miss other important elements.
Advanced beginner	The learner understands that while geese have wings and beaks, they also have features that distinguish them from other birds, such as size, shape of the beak, etc. The student begins to understand the purpose of labels.	The student adjusts their drawing to show features of a goose that will distinguish it from other types of birds. They label their illustration, identifying some features that are specific to geese.
Novice	The learner follows the rules what they know about birds. They have wings, a beak and two legs. The drawing is unlikely to look specifically like a goose. They may understand that a scientific illustration has labels.	The student draws what they *think* they should see when they observe a bird. The illustration does not have the specific qualities of a goose. They may label common parts of a bird.

Period 2

Designing assessment to monitor learning

In Year 2, Sub-unit 8.2, you discussed the importance of assessment providing valid and reliable information about student learning. You also looked at a method of designing tests that are valid, reliable, and fair. When *any* assessment is well designed, it can help teachers to identify what students know and what they are ready to learn next. When a teacher has this information, they can plan more effectively for learning and teaching.

Teachers should be purposeful in planning assessment to monitor learning. Teachers need to know:

- *When* they will use a particular assessment method or tool to assess student learning.
- *Why* they will use that method or tool.
- *How* the tool will enable students to progress in their learning (what does learning progress look like?).
- *How* they will use the information they gather from the outcomes of the assessment.

Learning activity 2. Collaborative design: Designing tools to monitor learning

The purpose of this learning activity is to begin planning a task that teachers can use to scaffold and monitor student learning progress.

In Learning activity 1, you mapped the stages of learning to observe and support students as they move from one point in their learning to the next. In this learning activity and Learning activity 3, you will use your learning progression to design an assessment task to scaffold and monitor the learning of a class of students.

For this activity, you will work in the same small groups to *plan* the assessment task. Work through the following questions:

1. What will the students be required to do, say make or write for this assessment task (what evidence of learning will they need to demonstrate)? *Make sure that the skill you mapped in the previous period will be assessed*.
2. Why will students be required to demonstrate their learning in this way? Are there additional skills that they will be expected to demonstrate?
3. What steps will students need to complete to do the task (e.g., will there be research in the school library or online? Will they need to draft an essay or design a model before creating the final version?)
4. How long will the students be given to complete the task?
5. Write a task description for the assessment that provides all the information that students will need to complete the task.

Creating assessment to monitor learning

When teachers use assessment to plan for targeted learning and teaching and to scaffold learning over time, they need to use evidence from students that indicates:

- What they *can* do (what they answer correctly);
- What they are *beginning* to be able to do (where they respond correctly sometimes and incorrectly at other times, or they provide partial information); and
- What they *cannot* do yet (responses are either incorrect or absent)

To do this, there are a number of things that teachers need to consider when they design assessment to monitor learning. Table 8.5 outlines a range of considerations that should underpin assessment to monitor student learning.

Table 8.5. Key considerations when designing assessment

Assessment properties	Questions to address	Notes
Curriculum standards	Which curriculum standards will be addressed?	The curriculum standards that need to be addressed should align with the Grade level
Learning outcomes and goals	What can the students already do in relation to the learning outcomes? What will they need to work towards?	These learning outcomes will be addressed during learning and teaching in the classroom. Diagnostic assessment should gauge how far students are in relation to fulfilling the outcomes. Formative assessment should help students move towards the learning outcomes.
Vertical dimensions	Which levels of difficulty that need to be assessed? How does learning progress within the area of learning?	Make sure that the most proficient and the least proficient students can demonstrate what they can do and what they can't do yet.
Horizontal dimensions	What is the breadth of knowledge and skill that need to be assessed?	Will you assess a very narrow part of the learning area or will you assess broadly across different strands?
Method of assessment	How can students best demonstrate what they know and can do?	What forms of assessment are appropriate for the domain of learning and the topic? What will students be asked to do, say, make or write to show what they know and can do?
Inclusivity	Can all students show what they know and can do?	What considerations, accommodations and adjustments will be needed?
Marking guide	How will the teacher make valid, reliable judgements about student learning proficiencies	Will there be a rubric? Marking guide? Will you need to develop a moderation process?

Learning activity 3. Collaborative design: Designing assessment to monitor learning progress

The purpose of this learning activity is for you to consider how you will measure and support student learning progress throughout the assessment process.

Remain in the same group that you worked with for Learning activity 2. In Learning activity 2, you and your group designed a tool to monitor learning. Using the assessment tool that you designed, discuss the skills that students will need to develop to complete the task successfully.

1. What key considerations will underpin your observations of student learning?
2. What does learning progress look like for the skills they will need to develop? (including the skill that you have mapped)
3. What tools will you develop to scaffold the students as they develop the skills? (e.g., Checklists? **Rubrics**? Instructions? etc.)
4. When will you (the teacher) make observations of student progress as they work on their task? What evidence of learning will you look for?
5. How will you know that a student is progressing?
6. What records will you keep of student progress?
7. How will you assess the final product?

At the completion of this lesson, your group will share your assessment task and the underlying design elements that you discussed.

Period 3

Benefits and limitations of peer assessment

In Year 1, you learnt that using peer and **self-assessment** can have various benefits. Amongst other things, it can help build deeper knowledge and understandings of what constitutes high quality work and reduce teacher workload. In the final two periods of this lesson you will:

- apply a critical perspective to evaluate the benefits and limitations of peer and self-assessment (Period 3); and
- learn to construct tools for peer and self-assessment (Period 4).

In Unit 3, you learnt that **peer-assessment** has various *benefits*. For example, it can show students how others have responded to a task, which provides useful insights for assessing and improving their own work. Specifically, research shows peer assessment can have the following benefits for KG and Lower Primary school students:[88]

- Improved student achievement;
- Improved student self-regulation;
- Improved student communication skills;
- Better student understanding of assessment criteria; and
- Empowerment of students in their learning.

Research has also demonstrated that the benefits of peer feedback are not limited to the receiver. Rather, providing peer feedback has also been linked to improved performance, possibly through its effect on self-assessment.[89]

However, given the nature of peer assessment, it is important for teachers to consider social and relational aspects. To avoid undesirable consequences, teachers need to carefully scaffold and monitor peer assessment.

Importantly, students need to be taught how to provide constructive feedback to their peers.[90] If left unguided, students may formulate feedback that is untargeted, unhelpful and potentially even harmful to social relations and self-efficacy. Social relationships may also affect the accuracy of peer feedback; students may be worried that honest feedback will harm their friendships.[91]

Peer feedback needs to address the quality of the work in relation to the learning outcomes and assessment criteria. Accuracy of peer assessment and feedback can be fostered by requiring students to link their feedback to clear assessment criteria and use of exemplars.[92]

88 Harris, L. R., & Brown, G. T. L. (2013).
89 Huisman et al. (2018).
90 Newby, L., & Winterbottom, M. (2011).
91 Harris, L. R., & Brown, G. T. L. (2013).
92 Harris, L. R., & Brown, G. T. L. (2013).

Further, a safe classroom climate is a necessary prerequisite for effective peer assessment. Only when students perceive mistakes as opportunities for improvement will they benefit from peer feedback.[93]

Students used to teacher-centred classroom practices may initially resist peer assessment. This is particularly true if they are used to seeing the teacher as the expert, making them reluctant to take on the role of assessor. Further, student confidence in peer assessment needs to be built over time.[94]

Learning activity 4. Evaluate and describe: Benefits and limitations of peer assessment

The purpose of this learning activity is for you to evaluate the benefits and limitations of peer assessment in KG and Lower Primary classrooms.

1. Your teacher educator will assign you to a group of 3 or 4.
2. Together with the peers in your group, review the section, 'Benefits and limitations of peer assessment'.
3. As a group, evaluate and describe the benefits and limitations of peer assessment. Try to come up with at least 3 benefits and 3 limitations. Based on your evaluation, formulate an evidence-informed recommendation for using peer assessment in classroom practice.

Table 8.6. Evaluate the benefits and limitations of peer assessment

Benefits	Limitations

93 Harris, L. R., & Brown, G. T. L. (2013).
94 Harris, L. R., & Brown, G. T. L. (2013).

Evidence-informed recommendation for using peer assessment in classroom practice

Benefits and limitations of self-assessment

Research evidence points to the following benefits of self-assessment:[95]

- Self-assessment is positively associated with better academic performance;
- Self-assessment capability positively associated with self-regulated learning and vice-versa;
- Self-assessment can enhance self-efficacy; and
- Self-assessment empowers learners as owners of their own learning who self-regulate.

Importantly, self-assessment also has limitations. The most important limitations are discussed next.

One key issue relates to the accuracy of students' self-assessments. Being able to accurately self-assess is important, because only accurate self-assessments will help students understand how they can improve. Students may underestimate or overestimate their own performance, both of which can have detrimental educational consequences.[96] For example, students who have overestimated their capabilities may reduce their efforts to study, resulting in poor performance. On the other hand, students may falsely believe that they are not capable in a certain domain, leading them to abandon more challenging goals.

95 Panadero et al. (2016).
96 Panadero et al. (2016).

The accuracy of student self-assessment largely depends on students' level of knowledge or skills in the to-be-assessed domain. The benefits of inaccurate self-assessment are questionable. [97]

There is consistent evidence that novices generally have poor self-assessment accuracy. Specifically, novices tend to *overestimate* the quality of their work.[98] This phenomenon, also known as the **Dunning-Kruger effect**, has been well studied.[99] The educational implications are that self-assessment is unlikely to be accurate until students have acquired sufficient domain-specific knowledge. In contrast, the self-assessments of more proficient students tend to be more consistent with assessment by teachers or standardised assessments. However, some well-performing students tend to be overly self-critical, reducing in reduced self-assessment accuracy.[100]

Thus, self-assessment can be problematic when used with novice learners. There are various reasons for this. First, if a task is relatively difficult for learners, this requires them to invest their working memory capacity to execute the task. This means that they have no cognitive capacity left to monitor their performance on the task. In other words, self-assessment can cause cognitive overload[101] (see Unit 5 of Semester 1). Second, students may lack knowledge of the nature of quality within the domain, making it hard to evaluate the quality of their work. It is therefore recommended to use simplified and highly scaffolded methods to support novice students in self-assessment.[102]

The use of clear and specific assessment criteria has been associated with increased self-assessment accuracy. Nevertheless, accurately self-assessing work requires training and practice. For example, teachers can enhance students' self-assessment accuracy by providing feedback on self-assessments.[103]

Teachers also need to consider important social and emotional factors when using self-assessment. For example, students may not accurately self-assess to protect their emotional wellbeing, especially when self-assessment is not private. If students are repeatedly confronted with their own poor performance, this would likely result in reduced self-efficacy, motivation and effort.[104]

97 Panadero et al. (2016).
98 Panadero et al. (2016).
99 Kruger, J., & Dunning, D. (1999).
100 Panadero et al. (2016).
101 Sweller et al. (2011).
102 Panadero et al. (2016).
103 Panadero et al. (2016).
104 Panadero et al. (2016).

Similar to peer-assessment, students may also initially resist self-assessment. This is particularly true if they are used to seeing the teacher as the expert, making them reluctant to take on the role of assessor.[105]

Learning activity 5. Group discussion: Benefits and limitations of self-assessment

The purpose of this learning activity is for you to evaluate the benefits and limitations of self-assessment in the KG and Lower Primary classroom.

1. Contribute to a whole class discussion based on your emerging understandings of the benefits and limitations of self-assessment. Can you think of strategies that teachers may use to maximise the benefits and mitigate limitations?
2. Summarise key points of the discussion in Table 8.7.

Table 8.7. Benefits and limitations of self-assessment

Benefits	Limitations
Strategies teachers may use to maximise the benefits and mitigate limitations	

105 Panadero et al. (2016).

Period 4

Constructing tools for self and peer-assessment

As identified in Period 3, the use of clear and specific assessment criteria is important for peer and self-assessment accuracy. For example, rubrics may be used to show the different quality features for performing a task. Importantly, students need to understand the criteria before they can apply them. [106] You will learn more about designing assessment rubrics for KG and Lower Primary school contexts in Lesson 8.3.1.

There are many different tools that teachers can design to support and scaffold the peer and self-assessment process. In this period, you will construct tools for peer and self-assessment in the KG and Lower Primary school. The quality of the tools will directly impact the quality of the peer and self-assessment process. It is therefore important to carefully consider the nature of the prompts in peer and self-assessment tools.

Remember that feedback is most effective when it helps students identify how they can improve in relation to the learning goal.[107] Tools for supporting peer and self-assessment should encourage students to formulate feedback that is goal-related and focused on improvement.

One example of a method that is particularly useful for peer assessment in the KG and Lower Primary classroom is the Ladder of Feedback (Figure 8.4).

106 Panadero et al. (2016); Harris, L. R., & Brown, G. T. L. (2013).
107 Hattie, J., & Timperley, H. (2007).

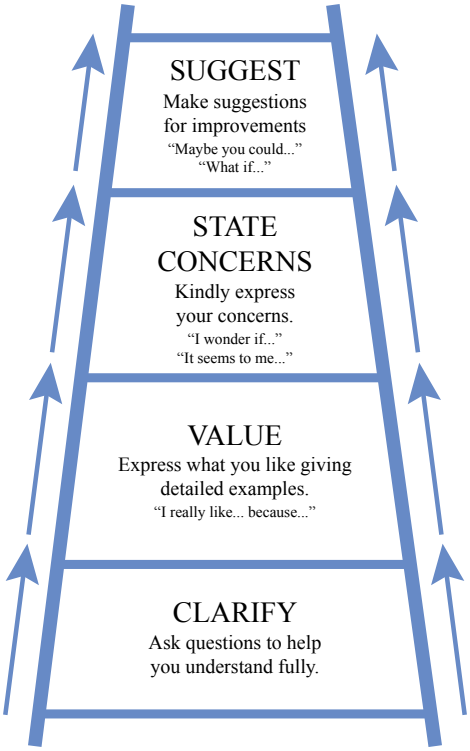


Figure 8.4. The Feedback ladder[108]

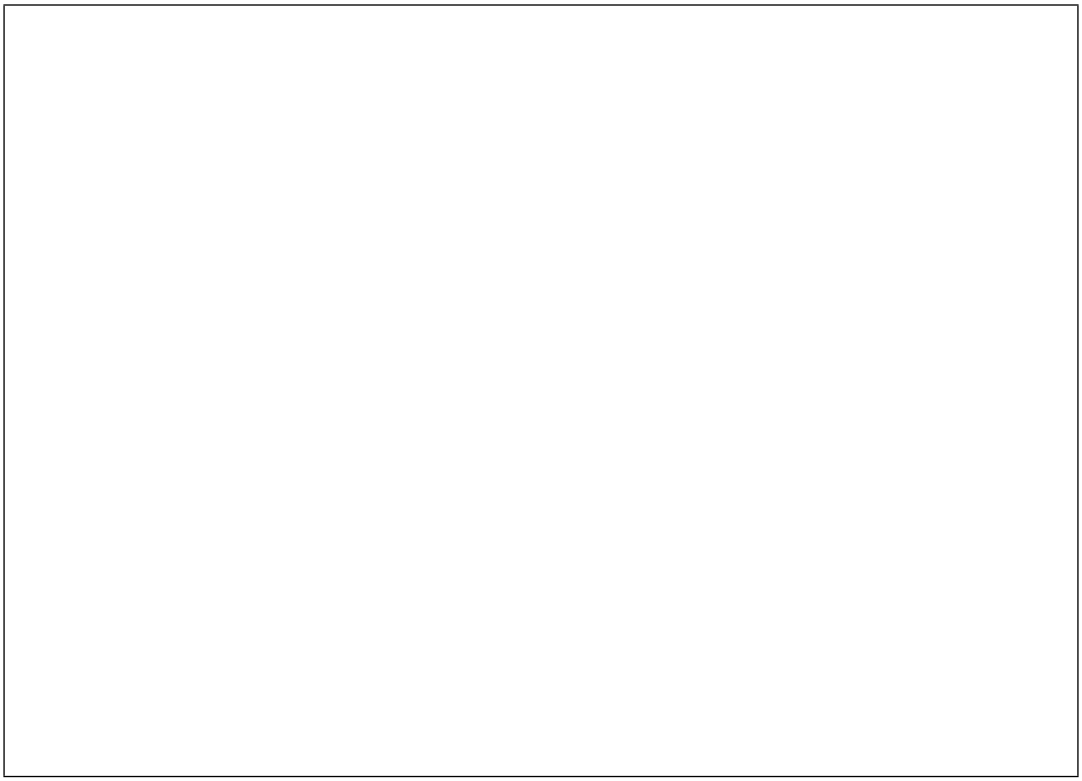
Learning activity 6. Construct tool: Peer assessment

The purpose of this learning activity is for you to construct a peer assessment tool for KG and Lower Primary school students.

1. You will do this activity together with a peer. With your classmate, construct a peer assessment template in Box 8.1. You may choose simple fictitious examples of content and assessment criteria. Try to include the elements of the feedback ladder. Construct sentence starters to guide the peer assessment process.

108 Based on McFarland, M. (2006).

Box 8.1. Peer-assessment template



Learning activity 7. Construct tool: Self-assessment

The purpose of this learning activity is for you to construct a self-assessment tool for KG and Lower Primary school students.

1. Construct a self-assessment tool in Box 8.2. You may choose simple fictitious examples of content and assessment criteria. Construct sentence starters to guide the self-assessment process.
2. When you have constructed your tool, compare your tool to that of a classmate and discuss. How are your tools and prompts similar or different?

Box 8.2. Self-assessment template

8.2.3 Feedback to promote learning

Expected learning outcome

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

- Design feedback to promote learning for KG/Lower Primary school students.

Period 1

Consolidating knowledge of feedback to promote learning

In Year 1, you learnt why feedback is important for learning. In Year 1 and Year 2, you were introduced to various important characteristics of constructive feedback. Building on Years 1 and 2, this lesson will focus on how to design feedback to promote learning for KG and Lower Primary school students. In Period 1, you will learn more about the relation between feedback and learning. In Period 2, you will expand your knowledge of frameworks for feedback design. The knowledge gained in this lesson will help you design feedback to promote learning.

Remember that feedback is information about a person's task performance or demonstrated knowledge or skills.[109] This information can take many different forms. Feedback can be communicated in many different ways, between one or more different people or resources.

The purpose of feedback is to assist students in understanding how to improve the quality of their work in relation to the learning goal. In Year 2 and Unit 3, you learnt that there are three important feedback questions: [110]

- Where am I going?
- How am I going?
- Where to next?

Feedback is one of the most powerful influences on student learning. However, its impact can be positive or negative.[111] When designing feedback to promote learning, it is important to be aware of the different ways in which feedback may affect student motivation and learning. In this period, you will learn more about how and why feedback can be effective or ineffective. In other words, is important to consider *how* feedback will help students reduce the discrepancy between their current performance and the goal.

109 Hattie, J., & Timperley, H. (2007).
110 Hattie, J., & Timperley, H. (2007).
111 Hattie, J., & Timperley, H. (2007); Shute, V. J. (2008).

Learning from feedback

Consistent with a behaviourist approach, the most popular type of feedback in the early 20th century was corrective feedback. The intent of such feedback is reinforcement to facilitate recall of correct responses. Examples of corrective feedback are:[112]

- Informing the learner of the correctness of their response (often in the form of ticks and crosses); and
- Providing the correct response.

The behaviourist approach yielded inconsistent effects on student learning. Moreover, it was limited to behavioural learning goals, making it unsuitable for higher-order learning outcomes. Namely, research evidence showed that more complex learning required more complex feedback.[113]

This led researchers in the second half of the 20th century to closely examine the cognitive mechanisms associated with feedback. This body of research showed the importance of feedback elaboration. **Elaborated feedback** has an instructional purpose; it goes beyond informing the student about correctness. Examples of elaborated feedback include:[114]

- An explanation of the correct response;
- A worked out solution;
- A reference to study material;
- An explanation of a procedure;
- A hint that guides the learner in the right direction; or
- Guidance on how to select relevant strategies to complete a task.

Even more recently, research has demonstrated the importance of considering the student role in feedback.[115] As you learnt in Unit 3, feedback can only contribute to student learning if students engage with it in a meaningful way. Engagement with feedback involves receiving, understanding and using the feedback to revise their knowledge (or cognitive schemas; Unit 5) or strategies. This highlights the

112 Mory, E. H. (2004); Shute, V. J. (2008).
113 Mory, E. H. (2004); Van der Kleij et al. (2015).
114 Shute, V. J. (2008); Hattie, J., & Timperley, H. (2007).
115 Van der Kleij et al. (2019).

importance of individual student characteristics (such as motivation and ability level) and their meta-cognition, (self-regulated learning).

Learning activity 1. T-chart: Learning from feedback

The purpose of this learning activity is for you to think about how and why feedback may or may not result in learning.

1. Together with a peer, explore the possible emotional responses to feedback in Box 8.3.
2. Consider the possible *behavioural*, *cognitive* and *meta-cognitive* responses of students to feedback. Think about the possible student responses to feedback that are likely to have a positive effect on their learning. Then, consider the opposite responses to feedback, which are unlikely to have a positive effect on their learning.
3. Complete the T-chart in Box 8.3. Try to come up with at least five responses on each side of the T-chart.

Box 8.3. T-chart of possible effects of feedback on learning

Feedback is likely to have a positive effect on student learning if…	Feedback is unlikely to have a positive effect on student learning if…

Learning activity 2. Group discussion: Designing feedback to promote learning

The purpose of this learning activity is for you to reflect on how to design feedback to encourage students to respond to feedback in a way that promotes learning.

This activity builds on Learning activity 1. Contribute to a whole class discussion about how teachers can design feedback in a way that promotes student learning. Record the most important conclusions from the group discussion in Box 8.4.

Box 8.4. Principles for well-designed feedback

Period 2

Designing feedback to promote learning

In this period, you will learn more about how to design feedback to promote learning. You will combine your knowledge of the three feedback questions (where am I going? how am I going? and where to next?) with a framework of *feedback levels*.[116]

There are four levels at which feedback can be aimed. The four levels are:[117]

- Self
- Task
- Process
- Self-regulation.

In Year 1, you learnt that feedback focused on the self (ego focused) is highly common in classroom practice, but is generally ineffective for learning. This is because it does not help the learner answer the three feedback questions. An example of feedback at the self-level is praise, such as "you are a very bright!"

Task-level feedback is mainly intended to correct work. For example, the student is told whether their response is correct or incorrect, or how their performance relates to the criteria. Feedback at the task level can be useful, but is mainly useful for surface level learning outcomes (e.g., knowledge or recognition).

Process-level feedback addresses the process that was followed to complete the task. For example, process feedback can relate to a strategy or provide a worked-out example of a solution. Feedback at the process level can be very powerful, because it helps students understand *how* to improve.

Regulation-level feedback is related to meta-cognitive processes in the mind of the learner, like self-assessment and willingness to receive feedback. Feedback at the regulation level can be very powerful, but is particularly useful for more proficient students. It helps students determine *how* to improve and self-direct their learning. Regulation-level feedback often takes the form of a question.

116 Hattie, J., & Timperley, H. (2007).
117 Hattie, J., & Timperley, H. (2007).

Learning activity 3. Feedback design: Feedback questions and levels

The purpose of this learning activity is for you to design feedback for KG and Lower Primary school students using the three feedback questions and three feedback levels.

1. Your teacher educator will assign you to a group of 3 or 4. Read the information about the Grade 2 assessment task below. With your group, design examples of feedback using the three feedback questions and three feedback levels in Table 8.8. Use the scenario below to create feedback statements that can be tailored to the specific content.
2. Try to come up with at least two examples of feedback for each of the table cells. Think about how you will give the feedback (will it be written? Verbal? Demonstration? etc.). Make sure that the feedback language is appropriate for Grade 2 students to understand.

   Scenario:

   Learning area: English, Grade 2

   Topic: My favourite food

   In this unit of work, students have been studying food and how to express what they like and what they do not like. They have just learnt how to understand and answer a question about their favourite food. For their assessment, students work in pairs and take turns to ask each other and answer questions about food.

   They use the following questions:

   - Do you like …..(type of food)...?
   - What is your favourite food?

   You listen to one pair of students. You notice that:

   - Student 1 understands the "Do you like…" questions, but does not always understand the words for some types of food. They could give one-word responses, using "yes" and "no". They could not respond to the question about their favourite food.
   - Student 2 was able to use the formula questions to ask about different types of food, and their pronunciation was excellent. They found the word "favourite" difficult to pronounce. Student 2 knew the English words to describe a range of different foods, including some foods that the class has not learnt.

   Provide three levels of feedback for ONE of the students (task, process and self-regulation) using the guiding questions.

Table 8.8 Feedback levels and questions[118]

	Where am I going?	How am I going?	Where to next?
Task			
Process			
Self-regulation			

Designing sustainable feedback

Students will often express a preference for frequent, individualised feedback.[119] Many teachers believe that designing effective feedback requires them to differentiate feedback to all individual students' needs. In a classroom context, this is simply not manageable.

Teachers around the world spend a significant amount of time providing students with feedback. Providing written feedback can be particularly time consuming. It is common for teachers to want to address every possible mistake or misconception in their feedback. For example, a study among Australian secondary English teachers found that providing feedback profoundly impacted their workload. One teacher even said they would sometimes "spend 15 hours in a weekend giving feedback to students".[120] Providing detailed individualised feedback is both time consuming for teachers and overwhelming for students. Clearly, such a feedback approach is not sustainable.

118 Based on Brooks et al. (2019).
119 Van der Kleij, F. M. (2019).
120 Manuel et al. (2018, p. 14).

It is important to realise that effective feedback practices do not have to be time consuming. The key is to design feedback so that it makes students *think* and *work smarter*. [121] Consider the quote in Box 8.5. This approach will eventually increase student ownership of their learning.

Box 8.5. Feedback[122]

> If we are to harness the power of feedback to increase student learning, then we need to ensure that feedback causes a cognitive rather than an emotional reaction—in other words, *feedback should cause thinking* by creating desirable difficulties. Feedback should be focused; it should relate to the learning goals that have been shared with the students; and it should be more work for the recipient than the donor. Indeed, the whole purpose of feedback should be to increase the extent to which students are owners of their own learning…

Wiliam makes the point that when teachers design feedback effectively, students increasingly become independent and self-regulating. This reduces the need for teachers to continuously provide feedback. Another useful way to reduce student dependence on teacher feedback is use of self-assessment and peer assessment.[123]

Learning activity 4. Think-pair-share: Designing sustainable feedback

The purpose of this learning activity is for you to reflect on and discuss how to design sustainable feedback.

Read the scenario of the English task about food in Learning activity 3 again. Imagine you have now assessed all 42 students in the class. You found that most of the students were at the Novice level[124] for the task (like Student 1). However, some students had reached the Advanced Beginner[125] stage (like Student 2). To make the feedback sustainable, you will need to write general feedback for both levels.

121 Wiliam, D. (2017).
122 Wiliam, D. (2017, pp. 152-153).
123 Wiliam, D. (2017).
124 See Annex 3, Dreyfus' Model of Skills Acquisition. Novice: The learner adheres rigidly to rules which are very specific and not linked to real contexts. Learners do not have the knowledge or understanding to diverge from the rules.
125 See Annex 3, Dreyfus' Model of Skills Acquisition. Advanced Beginner: The learner has gained some experience. They begin to understand how the rules apply within different contexts. They begin to use cues from the context to react or respond. The learner still needs to follow instructions and examples. Each step is equally important to them.

1. In Table 8.9, formulate principles for designing feedback for students at the novice and advanced beginner levels.
2. When you have completed your response, compare your responses to those of a classmate and discuss. How are your responses similar or different?

Table 8.9. Sustainable feedback design principles for students at the novice and advanced beginner stages

Novice	Advanced Beginner

Review questions

1. What roles does assessment play in the teaching and learning processes?
2. How can learning taxonomies and learning progressions support the teaching and learning process?
3. Explain the four levels of feedback and evaluate how well they support student learning.
4. Why are peer and self-assessment important skills for students to develop?

8.3. School-based Assessment: Designing tools and analysing achievement

In this sub-unit, you will examine different ways to gather and analyse assessment data. The sub-unit begins with exploring the role of rubrics in assessment. You will develop techniques to create robust rubrics that maximise validity and reliability. You will also use techniques to analyse rubric data.

In Lesson 8.3.2, you will review the concept of measures of centrality and measures of variability. You will examine representations of spread through analysing box and whisker plots and histograms.

Lesson 8.3.3 presents the concepts of percentiles and percentile rank. You will calculate percentiles and percentile ranks using a linear model. You will take a critical perspective in relation to how percentiles and percentile ranks can and should be used.

Finally, in Lesson 8.3.4, you will calculate correlation coefficients using two methods. The first method, **Q-correlations**, provides a fast and simple way to estimate the correlation between two variables (such as a pre- and post-test). The second method provides a more accurate calculation of correlation using Pearson's r correlation coefficient.

Throughout this sub-unit, you are encouraged to take a critical perspective on the use of statistics in educational assessment. What are the uses of statistics? What are their strengths and limitations in understanding student learning and providing accurate meaningful reports to stakeholders?

8.3.1. Designing assessment rubrics for KG and Lower Primary school contexts

Expected learning outcomes

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

- Design rubrics in line with the assessment principles to assess students in KG/Lower Primary school; and
- Analyse and interpret rubric data for students in KG/Lower Primary school.

Period 1

Judgement based assessment

In Year 2, Sub-unit 8.2 you examined the importance of reliability and validity in assessment. In particular, you focused on strategies to maximise reliability and validity when designing and scoring tests. This sub-unit continues to focus on reliable and valid assessment. Open-ended tasks require a greater level of judgement by the assessor. This makes open-ended assessment tasks more subjective and potentially less valid and reliable than closed-ended questions. However, open-ended tasks are important because they enable students to demonstrate a range of complex skills in many different areas of learning.

There are many different ways to assess student learning. Some methods are more objective because they do not require much judgement by the assessor in determining the quality of the students' work. For example, a multiple-choice question, when written well, is either correct or incorrect. The assessor does not have to make a judgement about *how correct* the responses are.

Other forms of assessment are more subjective. They require the assessor to make judgments about the quality of a student's work. Projects, essays, portfolios, and performances are examples of methods that are more subjective to assess. However, these types of tasks are appropriate for assessing many different types of skills and knowledge. For example, a teacher cannot assess a student's ability to play a musical

instrument by giving them a short multiple-choice quiz. The difficulty is that complex tasks often require greater judgement by assessors. In Unit 3, you examined critical and creative thinking. Often critical and creative thinking tasks are complex and require the assessor to make judgements about the level of quality of the work. These are also areas of learning where a teacher's personal, subjective opinion may hinder their objective judgements.

When assessment requires a person to make a judgement, there can be inconsistencies in the ways in which different teachers assess the students' work. Without tools to guide the assessment process, there may be less transparency about how the assessors have reached their conclusions. This impacts on the fairness of assessment, and it impacts on the reliability and validity of the task. This means that it is important to design tools to increase the reliability, validity and fairness of these types of assessments.

Learning activity 1. Group analysis: Validity and reliability in judgement-based assessment

The purpose of this activity is to reflect critically on the pros and cons of judgement-based assessment.

You will work in groups of three to four people to discuss different types of judgement-based assessment tasks. Each type of assessment task requires the assessor to make a judgement about the quality of the student's work. For each type of assessment task, consider the following:

1. What are the purposes for using these different forms of assessment? (What skills do they assess? What do students learn or gain from doing the assessment task?)
2. What challenges are involved in accurately and objectively assessing student work? (To what extent can a teacher's personal opinions impact on the assessment? Consider aspects of bias, fairness and reliability and validity of judgement).
3. What strategies can teachers use to increase the reliability and validity in their assessment of these tasks? (How can the assessment be made less subjective? What strategies can help to make teacher judgements consistent and fair?)

Table 8.10. Analysis of judgement-based assessment

Type of assessment task	Purpose for using this form of judgement-based assessment	Challenges for assessing accurately and objectively	Strategies to increase reliability and validity in assessment
A painting	Assess understanding and use of colour Assess artistic representation Assess technique and composition	Assessors tend to have opinions about what they like and do not like. Assessors need to be experienced in order to understand all criteria that are being assessed	Create rubrics that have criteria that address technical and artistic conventions. Use moderation to ensure that assessors are marking in the same way.
An inquiry project			
A written recount			
A musical performance			
An oral presentation (show and tell)			
A diorama			
An art portfolio			
Team sport – Soccer			
A problem-based assessment task			

Rubrics and their uses

Rubrics can be used to make open-ended tasks more valid and reliable. Rubrics can also guide the assessment process. In Year 2 (Lesson 8.1.4), you learnt about rubrics and their role in assessment. In this sub-unit, you will examine rubrics in greater depth. You will design them to maximise the reliability and validity of assessment of student learning progress. You will analyse rubric data using charts similar to those you developed in Lesson 8.2.4 in Year 2. You will also use a formula to estimate the reliability of your rubrics.

Rubrics are tools that can help teachers to assess student work more objectively. Rubrics provide a common point of reference through which teachers and students can view and assess evidence of learning. The criteria have descriptors which describe different levels of quality against which a student's work can be measured.[126] To reduce subjectivity in assessment, rubrics should articulate the *behaviours* or **evidence** that students need in order to demonstrate the skills and knowledge that are being assessed.[127] Students demonstrate their learning through what they *do*, *say*, *make* and/or *write.*[128]

There are different types of rubrics that can be used to assess student learning. Two main types of rubrics are **holistic rubrics** and **analytic rubrics**.

- Holistic rubrics provide an overall summary of different levels of quality for the whole piece of work.[129] The assessor views the student's work as a whole.
- Analytic rubrics separate the important skills and knowledge that will be assessed. Each element that is assessed receives a separate score. All the scores are then summed to provide an overall score.[130]

A number of research studies have compared the reliability and validity of assessor's marks for holistic and analytic rubrics. Some studies have found that analytic rubrics are more reliable than holistic rubrics,[131] because they articulate more clearly the elements and skills that must be assessed. This can mean that teachers can assess student work in the same way. However, validity and reliability of rubrics depend

126 Griffin, P., & Francis, M. (2018); Büyükkıdık, S., & Anıl, D. (2015).
127 Griffin, P., & Francis, M. (2018).
128 Griffin, P. (2018).
129 Peeters, M. J. (2015); Büyükkıdık, S., &Anıl, D. (2015).
130 Peeters, M. J. (2015).
131 E.g., Büyükkıdık, S., &Anıl, D. (2015).

on more than just the comparability between the assessor's marks (**interrater reliability**). Validity and reliability will depend on how well:

- The rubrics are designed;
- The content is taught;
- The assessment is implemented; and
- The students can understand what is expected and demonstrate their skills in relation to the criteria.

It also depends on:

- The assessors' expertise and knowledge in the content that is being assessed; and
- The processes that are in place to maximise interrater reliability (e.g., **social moderation**).

Learning activity 2. Group activity: Assessing creativity

The purpose of this learning activity is to consider how teachers can assess concepts and skills that are subjective. Creativity is one area that can be difficult to view objectively.

You will work in groups of 3 or 4 people.

Step 1: Consider the two images below. Discuss with your group: What do you feel when you look at each photo? Which image do you like the best? Why? Does your group agree on which photograph is the best?

Figure 8.5. "Boys at the window"[132]

Figure 8.6. "Let's warm up together"[133]

Step 2: Imagine that these two photographs were entered into a photography competition by two different people. The topic of the competition is "Siblings". Your group has been asked to judge the winning photograph. How will you do this fairly?

a. What criteria would need to be considered in order to assess these two submissions fairly?
b. How will you judge the quality of each photograph against each criterion?
c. Judge which photograph will win the competition using the criteria your group has created.
d. If there is disagreement, discuss your reasoning until you come to a universal decision about the winning photograph.

132 Photograph by Wagner T. Cassimiro, Boys at window, https://www.flickr.com/photos/38469672@N00/4812271639, licensed CC BY 2.0, https://creativecommons.org/licenses/by/2.0

133 Photograph by Wagner T. Cassimiro, Let's warm up together, https://www.flickr.com/photos/38469672@N00/4812269629, licensed CC BY 2.0, https://creativecommons.org/licenses/by/2.0

Discuss the following as a class: Consider how you judged the photographs in Step 1 and Step 2.

- Which process enabled you to view the photographs more objectively? Why?
- Were you able to come to a universal decision about which photograph would win? What enabled you to come to that decision?

Period 2

Using analytic rubrics to assess student progress

Over the course of the next four periods, you will focus on analytic rubrics. Analytic rubrics have a number of uses and benefits that can support student learning, because they articulate the skills and knowledge that will be assessed. Table 8.11 outlines a number of ways in which well-constructed analytic rubrics can be helpful for students and teachers.

Table 8.11. Uses for analytic rubrics

Use For students	Benefit	Explanation
Transparency	• Fairness • Ethics	Everything that will be assessed is articulated and expectations of quality are communicated to students and teachers. Students do not have to guess what that teacher is looking for.
Clarity	• Fairness and inclusivity	Analytic rubrics break down the general skills and knowledge into observable parts. When used well, rubrics can help students to address all the skills that are required.
Feedback about learning in relation to specific criteria	• Informing about learning progress • Enabling goal setting	Analytic rubrics break down the skills and criteria that will be assessed. This can provide feedback about the student's strengths and challenges in the different skills that were assessed.
Self-assessment	• Self-regulation of learning	Students can use the rubrics to monitor their own learning by checking their progress against the criteria and comparing their self-assessment with the teacher's observations.

For teachers	Benefit	Explanation
Common tool for assessment	• Interrater reliability	When there is more than one assessor rubrics can provide a helpful tool to ensure that all assessors are marking in an equitable way.
Record keeping	• Monitoring learning • Reporting	They provide a way to quantify observations of quality in student work.
Justifying and defending assessment judgements	• Reporting learning progress to stakeholders	Rubrics can provide a way for teachers to justify and defend their decisions to stakeholders (such as students, parents, colleagues and school leadership) when assessing student learning, particularly for tasks that require teacher judgement to assess.
Assessment of student self-regulated learning	• Information about elements of self-regulated learning	It is important for students to learn to monitor their own learning progress. Teachers can use the students' self-assessments on rubrics to monitor aspects of self-regulation of learning

Learning activity 3. Think-pair-share: Reflecting on the purpose of rubrics

The purpose of this activity is to reflect on the uses of analytic rubrics in assessment, teaching and learning.

Think

Think about your experiences of assessment as a student. Have you ever experienced an assessment task where you felt you did not understand what was required? Or that you misinterpreted what you were required to do? What features made the assessment task unclear or confusing? If you were the teacher, what might you do to make the assessment task clearer for students?

Pair

Discuss your experiences and share your ideas with a person sitting next to you. How would analytic rubrics help you to understand what was expected in the assessment task?

Share

As a class, discuss ways in which teachers can use analytic rubrics to make assessment clearer for students in KG and Lower Primary school, so they can show what they know and can do.

Rubrics: Understanding underlying constructs

In Year 2, Lesson 8.1.4, you discussed three elements of an assessment rubric. These were: **criteria**, **standards**, and **descriptors**. These are important elements in any type of rubric, including analytic rubrics. However, to develop a clear set of criteria, standards and descriptors teachers need to first understand *what* they intend to assess (the **constructs**). They also need to know what observable evidence of learning they need to collect from students.

Unpacking constructs

Constructs are mental structures (or big ideas) that we build to make sense of the world around us.[134] However, individuals interpret and understand experiences and events differently. Our individual constructs determine how we behave and respond to our environment.[135] This has implications for assessment, because students will not always understand or interpret a task in the same way that the teacher intends. Therefore, it is important to develop strategies and tools to create a common understanding about what will be assessed.

Constructs are often abstract (such as the idea of beauty or love). We cannot always observe the construct itself, but we can observe evidence of it through the ways in which people respond to it. That is, what do they do, say, make and/or write.[136] To assess a construct, it needs to be broken down into smaller, observable parts. Take for example, the construct of *beauty*.

What is beauty? We know that beauty can mean many different things and it has many different qualities. So, how can we recognise if something or someone is beautiful? We need to go through a process of breaking the construct down into smaller parts that we can observe.

For example, we can break beauty down into different types of beauty, such as *aesthetics* and *internal character*. Then, we can break these types of beauty down further until there are elements that we can observe. Figure 8.7 demonstrates how we can do this.

134 Cohen, L., Manion, L., & Morrison, K. (2007); Griffin, P. (2018).
135 Cohen, L., Manion, L., & Morrison, K. (2007).
136 Griffin, P. (2018).

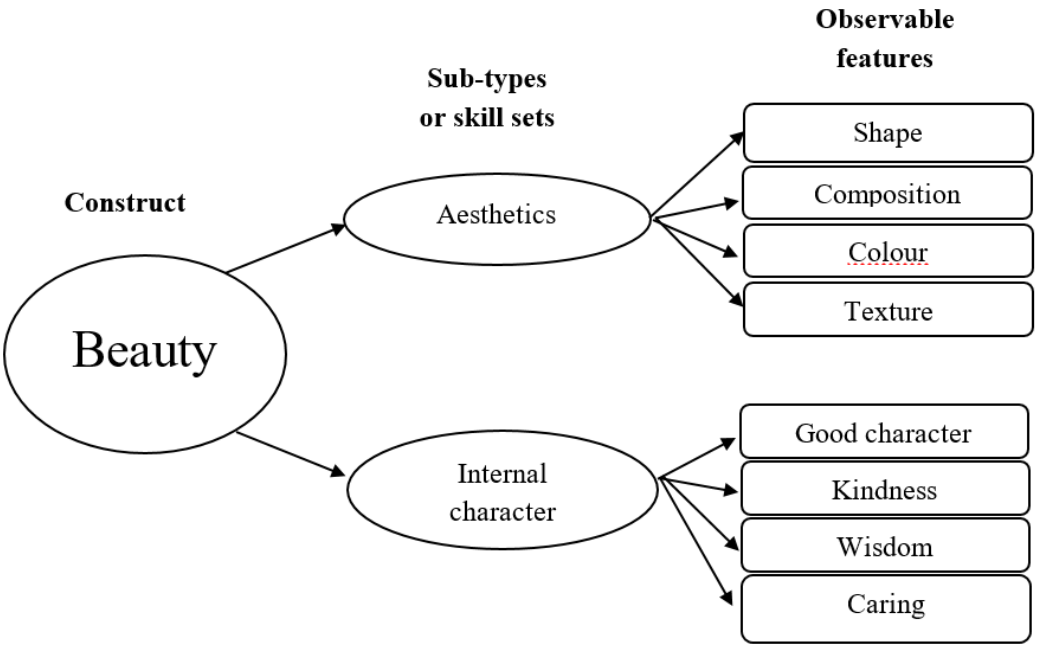


Figure 8.7. Breaking the construct of beauty down into observable parts[137]

Sometimes, elements need to be broken down even further to be able to observe them. For example, what evidence indicates that someone is *kind*? We could look at what they say (i.e., they say positive and thoughtful things to other people) and what they do (i.e., they help others).

Once we know what elements can be observed, we can break each element into levels of quality. For example, if we study a painting and focus on aesthetics, texture may be one observable element that we could analyse. A rubric could articulate different levels of quality in the texture that a student could used in their artwork:

137 Image by author, used with permission.

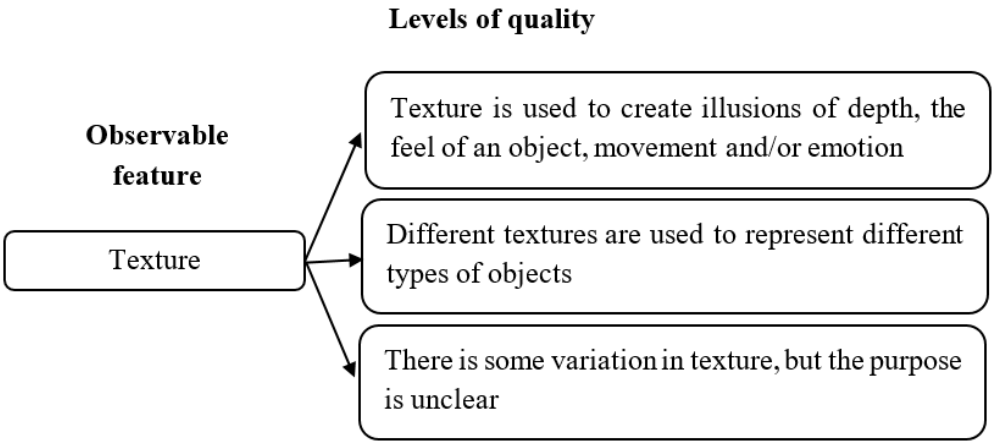


Figure 8.8. Different levels of quality in the use of texture that can be observed in a painting[138]

Learning activity 4. Group activity: Breaking down constructs

The purpose of this activity is to work in groups to break down constructs and develop a shared understanding of the evidence of the construct that can be observed.

You will be working in groups of three or four people. Your teacher educator will give each group a *construct* to unpack. All constructs will be related to 21st century skills. As a team, work through the following process, recording your ideas in the form of a flow chart.

Step 1: Write the construct on the left-hand side of your paper.

Step 2: Break the construct down into the subtypes or skill sets that you will need to observe.

Step 3: Break each sub-type or skill set into individual observable features (what will students produce? What will they do, say, make or write?).

Step 4: Break each feature down into levels of quality that you might observe in your students' work.

138 Image by author, used with permission.

Each team's flowchart will be pinned up around the room. You will walk around the room and observe how each team has broken down their construct into observable parts. As you look at the work of other teams, think about how your team might improve your own flowchart.

Period 3

Designing analytic rubrics

The process of breaking down constructs is a vital part of designing rubrics that will increase the validity and reliability of an assessment task. In this period, you will work through the first three steps in the process of designing analytic rubrics:

1. Identifying constructs;
2. Identifying main skills and knowledge to be assessed; and
3. Identifying observable features of the skills and knowledge (criteria).

You will create the level descriptors in Period 4.

Learning activity 5. Collaborative activity: Creating rubrics for an assessment task

The purpose of this learning activity is to begin developing marking rubrics by identifying the constructs that will be assessed in an assessment task.

You will work in groups of 3 or 4 people. Your teacher educator will give each group an assessment task description for a Grade 2 assignment in a particular learning area and a large sheet of paper on which you will record your ideas. Over the next three periods, your group will develop the marking rubrics for the assessment task.

Suggestion: brainstorm each step before completing the table. Structure your brainstorm in a similar way to the examples in Period 2 (see Figure 8.7 and 8.8).

Example:

This example of a task description will be used to guide you through the process of developing rubrics. Your group will have a different task to work with. The following task is from the Grade 2 Science curriculum in the Earth and Space strand.

The learning objective is:

- *To learn and apply steps in problem solving.*

The learning outcome is:

- *The students will learn and be able to apply the steps in problem solving.*

The achievement indicators are:

- *Asking questions*
- *Evaluating group work.*

In class, Grade 2 has been discussing the way that water flows from a high place to a lower place, but when the area is flat, the water stays still. Their task is to complete a problem-based learning task.

Example assessment task:

Flowing water

Ma Cho Cho Win has a beautiful garden. It is full of flowers. One very hot day, Ma Cho Cho Win sees that her flowers are dying. They need water. She needs to bring them water from the pond. The pond is up the hill. Help Ma Cho Cho Win solve the problem.

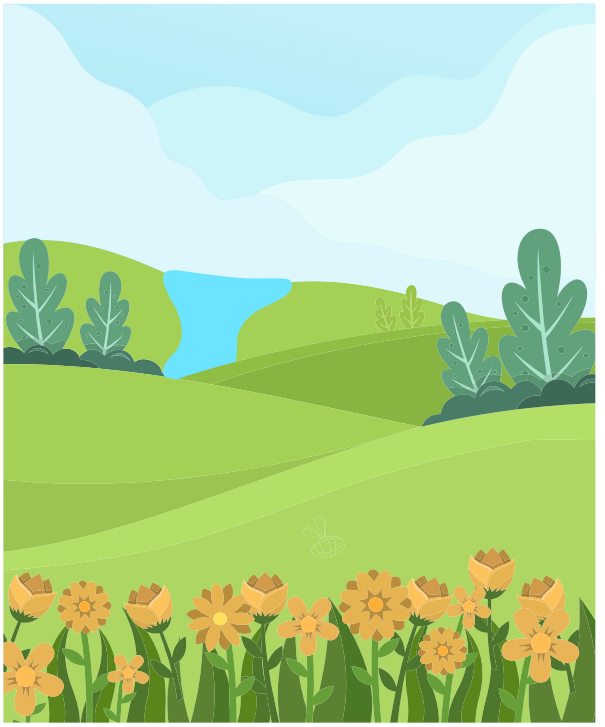


Figure 8.9. Task description for Flowing Water

Step 1: What constructs will you assess?

As a group, read the task description carefully. What construct(s) will be assessed through this task? On your large sheet of paper, record the main construct(s) that will be assessed. Make sure that there is a large amount of space between the constructs.

Hint: Even though the constructs will be tightly linked with the learning areas and topics, it is also important to consider the other skills that the students will develop

as they complete the assessment task, such as:

- 21st century skills, including:
  - Collaboration
  - Communication
  - Critical thinking and problem solving
  - Creativity and innovation
  - Citizenship
  - Leadership
  - Language proficiency
  - ICT skills
  - Research skills
- self-regulated learning behaviours
  - Metacognition
  - Help-seeking
  - Planning and goal-setting
  - Self-monitoring learning progress
  - Using feedback, etc.

Example:

Constructs to be assessed for the task – Flowing water

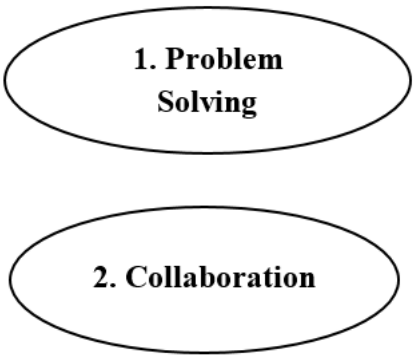


Figure 8.10. Identifying constructs in Flowing Water[139]

139 Image by author, used with permission.

Step 2: Break down the constructs into the broad types of knowledge and skills that will be assessed. As a team, discuss the broad areas of knowledge and skill that need to be assessed for each construct. Record these on your brainstorm.

Example:

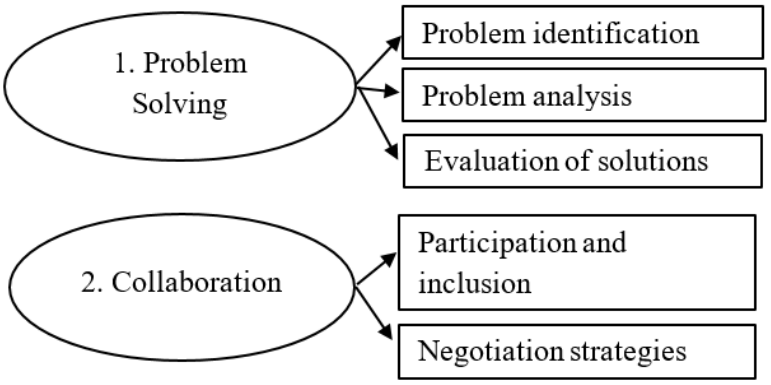


Figure 8.11. Example of breaking down the constructs to identify knowledge and skills for the task – Flowing Water[140]

Step 3: Break each sub-skill or knowledge into observable features (or criteria). Discuss the observable features that articulate the type of evidence the students will need to produce. Observable features will describe what the students will need to do, say, make or write to create evidence of their learning. These will become the criteria in the rubrics.

140 Image by author, used with permission.

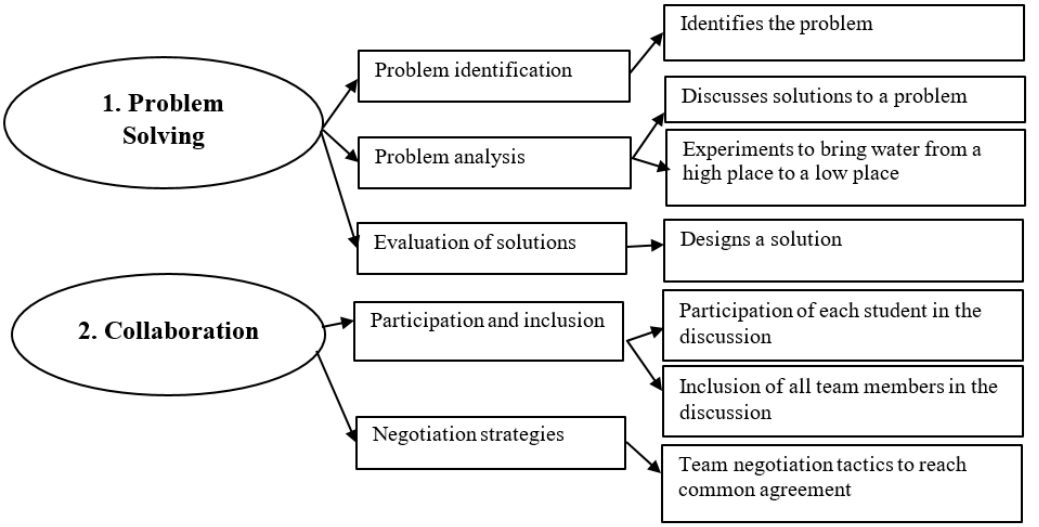


Figure 8.12. Example of breaking down the knowledge and skills to identify observable features (criteria) – Flowing Water[141]

Step 4:

When you have completed the brainstorm, transfer your ideas into a table like Table 8.12. You can also use computer spreadsheets to design the rubrics. You will complete the Table in Period 4. See Annex 4 for a completed example of Table 8.12.

Table 8.12. Example of page set up to design rubrics*

Framework							
	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7
	Sub-skill/knowledge 1		Sub-skill/knowledge 2		Sub-skill/knowledge 3		
	Construct 1				Construct 2		

*Note that the number of constructs, sub-skills/knowledge and criteria will vary, depending on the assessment task and the areas that are the focus of the assessment.

141 Image by author, used with permission.

Period 4

Building analytic rubrics: Identifying levels of quality

In Period 3, you worked with your group to begin writing rubrics for an assessment task. In this period, you will continue to work with your group to develop the descriptors or levels of quality that you would expect to observe in the students' work. It is helpful to use learning taxonomies to guide the development of the level descriptors (see Annex 3 for examples of the learning taxonomies).

Learning taxonomies provide a framework to support your observations for each level of quality. However, it is important to choose a taxonomy that suits the type of learning progress that you will observe. For example, if you want to observe the development of higher order thinking, you might choose Bloom's Revised Taxonomy. If you are observing skill development, you could use Dreyfus' Model of Skill Acquisition. For increasing complexity, you might select the SOLO taxonomy.

In the example of *Flowing water*, the teacher observes how students solve problems and how well they collaborate. The teacher decides to use Dreyfus' Model of Skills Acquisition[142] to frame the levels of quality, because there is a focus on skill development.

The next step is to write the descriptors, which articulate the quality that you would expect to see at each level in the rubric. There are ten rules for developing level descriptors that help to increase the validity and reliability of your rubrics.

Rules for writing levels of quality

The following rules will help you to increase the validity and reliability of your rubrics.[143]

1. Use descriptions of quality, not quantity – (e.g., do ***not*** use descriptors such as "makes 3 spelling mistakes" or "uses 5 adjectives"). Remember that you want to observe quality not quantity. The reason is because one student may

142 Dreyfus, S. E., & Dreyfus, H. L. (1980); Dreyfus, S. E. (2004).
143 These rules have been adapted from Griffin, P., & Francis, M. (2018, pp. 124 – 131).

try to use very complex and sophisticated vocabulary, and make many spelling mistakes, while another student may use very simple language, and make few spelling mistakes). In this case, the number of spelling mistakes does not represent the students' ability to spell and students are disadvantaged for trying to use more complex language.

2. Use wording that is objective, not subjective (e.g., descriptive words, such as "good" "adequate", "neat" can be confusing). Students may interpret descriptive words differently from the teachers, and different teachers may also interpret these terms in different ways. Instead, use specific language (particularly verbs) which provide a clear indication of the quality that should be observed.
3. The levels of quality should not describe a procedure or sequence of tasks. Rather, they need to describe the quality of a skill or sophistication of knowledge.
4. Level descriptors must demonstrate progressive improvement in quality of performance. (i.e., the lower levels indicate lower quality and the quality improves as the levels increase).
5. Each descriptor must focus on one main idea and centre around the evidence that will be observed (i.e., what students do, say, make or write). More than one main idea can make it more difficult to judge a student's level of achievement accurately if they achieve one part, but not the other part of the descriptor. This introduces **error** into the assessment and can make it less reliable.
6. Use positive language that describes the evidence that needs to be observed (what students do, say, make or write)
7. Make sure that the levels enable all students to show what they know and can do. This means that rubrics need to cater for the students who are less capable and stretch the students who are the most capable.
8. Each level of descriptor should be worth 1 point, and should NOT be weighted. This allows for analysis of the data (we will look at this in Period 5).
9. Only have a maximum of 4 levels of descriptors for any criterion (although, you can have fewer). The more levels there are, the more difficult it is to distinguish the level of quality between them when marking a student's work.
10. Make sure that the language is clear and that the students can understand what is expected at each level. This allows students to self-assess and to demonstrate their level of ability.

One of the difficulties with using rubrics in KG and Lower Primary school is the student's level of literacy. In the upper years of primary school, once students have a good foundation in reading and comprehension, teachers may use rubrics that contain age-appropriate language. In KG and Lower Primary school, teachers need to construct rubrics for students to engage with in a range of different ways, using visual cues and simple, familiar written language. There may be times when the teacher needs to examine student capabilities very closely. In which case, they may design more complex rubrics that are not intended to be used by the students. The teacher may also wish to provide a second rubric for students that is simpler and more accessible.

Learning activity 6. Collaborative activity: Using learning taxonomies as a framework for developing levels of quality

The purpose of this learning activity is to develop level descriptors for criteria in a rubric.

In this learning activity, you and your group will complete the rubrics you began to write in Period 3.

Step 1: Decide which learning taxonomy you will use as a framework to guide the development of the level descriptors. Discuss whether the task assesses skills, complexity, or higher order thinking. For example, Dreyfus' Model of Skills Acquisition may be appropriate to frame the rubrics for Flowing Water because it focuses on problem solving skills and collaboration.

Step 2: Looking at the learning taxonomy your team has chosen, consider how you will allocate the levels of the taxonomy. Remember that there should only be a maximum of 4 levels of quality. For example, the teachers who are developing the rubrics for Flowing Water decided to combine the top and bottom levels of Dreyfus' Model of Skills Acquisition because most students in the class have not yet developed high-level problem-solving skills. So, the focus will be on the lower levels, while providing some opportunity for the most proficient students to stretch their skills.

Level 3: Proficient and Expert
Level 2: Competent
Level 1: Novice and Advanced beginner
Level 0: Not demonstrated

Figure 8.13. Setting up the learning taxonomy to frame the level descriptors

Step 3: Divide the criteria among each member of the team. Each member will write the quality descriptors for their criteria. Apply the rules for writing levels of quality. You may find lists of useful verbs in Annex 3. Remember that you do not need to fill every gap if it does not make sense to do so, or if you wish to weight a particular criterion less heavily than other criteria.

You can look at Annex 4 for an example of level descriptors. Notice that there are gaps in the matrix, where some levels have not been filled. This can introduce weighting into the matrix (i.e., some criteria are worth more than others). It can also help to avoid reliability issues due to level descriptors being too similar (making it difficult for the assessor to decide which level to allocate when marking).

Step 4: Share your criteria and level descriptors with other members of your group. Use the rules for writing levels of quality to improve each level descriptor. Write the level descriptors onto the table that you drew in the last period.

Period 5

Analysing and interpreting analytic rubrics

In Year 2 (Lesson 8.2.4), you analysed test data using charts of student responses. Each response was marked as 1 (correct) or 0 (incorrect). The questions were sorted from the easiest to the hardest. The students were sorted from the highest score to the lowest score. This method can also be used to analyse rubric data. To demonstrate the process, we will base the students' scores on the rubrics in Annex 4.

Scoring

To analyse analytic rubrics using the chart method, each level descriptor should be equal to one mark. You will notice that some criteria in the example have three levels, while others have two levels. In this way, there is no weighting in terms of scoring, but weighting occurs as part of the design, through the number of level descriptors for each criterion. Those criteria with three levels, attract a total of three marks, while the criteria with two levels attract a total of two marks. In this example, there is a total of 18 marks altogether.

To illustrate scoring, if a student's work reaches Level 2 for Criterion 1, they would only receive two marks out of a possible three marks (see Table 8.13). However, if the student achieved level 2 for the third criterion, they would only achieve one mark, because Level 1 is blank.

Table 8.13. Scoring system for analytic rubrics

Framework–Dreyfus' Model of Skills Acquisition							
Level 3: Proficient and Expert	Interprets the text to infer the problem 1	Creative solution an proposed 1	Strengths and weaknesses are explained 1	Chooses solution based on evaluation of strengths and weaknesses 1		Ideas from all students were 1 valued	Students used logic and real reasoning to each a common agreement 1
Level 2: Competent	Identifies the main problem 1	Plausible solutions are presented 1	Strengths and or weakness are listed 1	Explains choice for solution to the problem 1	All students participated equally 1	Students encouraged each other to share ideas	
Level 1: Novice and Advanced beginner	Recites a relevant part of the text 1	Solution are listed 1		Selects one solution to the problem 1	All students participated 1	Each student had a turn to present an idea 1	Students developed rules to guide decision making 1
Level 0 Not demonstrated	The problem is not identified	No solutions are proposed; solutions are inappropriate	Strengths and weakness are not discussed	No preferred solution is selected	Some students did not participate	Not all students' ideas were valued	Disagreements were not resolved
Criteria	Identifies a problem that is inferred in a text	Proposes solutions to a problem	Examines solutions to find strengths and weaknesses	Evaluates strengths and weaknesses to identify the best solution	Participation of each student in the discussion	Inclusion of all team members in the discussions	Team negotiations to reach common agreement
Sub-skills/ knowledge	Problem identification	Problem analysis		Evaluation of solutions	Participation and inclusion		Negotiation strategies
Constructs	Problem solving				Collaboration		

Although the total score may seem arbitrary, this system of scoring enables relatively straightforward analysis of the data. Student results can be easily converted into percentages for reporting purposes.

Learning activity 7. Collaborative scoring and critique: Determining rubric scoring

The purpose of this activity is to calculate the total score for the rubrics you designed in the previous period.

You will work with the team members, with whom you developed the rubrics. Calculate the total score for the rubrics you designed.

Critically review your rubrics. Do they allow for the least proficient students to demonstrate what they know and can do? Will the most proficient students be stretched? Are all elements that will be assessed represented on the rubrics?

Recording results for analysis

Rubric data can be analysed in a similar way to other partial credit data (See Year 2, Lesson 8.2.4). Here are the steps to analyse the rubric data using a similar method.

Step 1: Record the total number of marks that each student has achieved for each criterion.

Consider a group of eight students, who completed this assessment task. Their results are as follows (each criterion is marked as C1, C2, C3, etc):

Table 8.14. Student results for each criterion on a rubric

	C1	C2	C3	C4	C5	C6	C7
Student 1	3	3	2	2	2	2	2
Student 2	2	2	2	2	2	2	2
Student 3	1	1	1	1	0	0	1
Student 4	3	2	2	3	2	3	2
Student 5	3	3	2	3	2	3	2
Student 6	2	2	2	3	2	3	2
Student 7	3	2	2	2	1	2	1
Student 8	2	2	1	1	1	1	1

Step 2: Break each criterion down into the number of levels they test. For each level, allocate 1s and 0s for each student according to their score. For example, Student 1 achieved three marks for Criterion 1, so their results would be represented as 1, 1, 1. On the other hand, Student 3 achieved one mark for Criterion 1, so their results would be represented as 1, 0, 0.

Table 8.15. Each criterion in the rubric broken down into 1s and 0s

	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3	C3.1	C3.2	C4.1	C4.2	C4.3	C5.1	C5.2	C6.1	C6.2	C6.3	C7.1	C7.2
Student 1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
Student 2	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1
Student 3	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0
Student 4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Student 6	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
Student 7	1	1	1	1	1	0	1	1	1	1	0	1	0	1	1	0	1	0
Student 8	1	1	0	1	1	0	1	0	1	0	0	1	0	1	0	0	1	0

Step 3: Calculate each students' total score and the total number of correct responses for each criterion level.

Table 8.16. Calculated total scores for each student and each criterion level

	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3	C3.1	C3.2	C4.1	C4.2	C4.3	C5.1	C5.2	C6.1	C6.2	C6.3	C7.1	C7.2	Total
Student 1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	**16**
Student 2	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1	**14**
Student 3	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	**5**
Student 4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**17**
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**18**
Student 6	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**16**
Student 7	1	1	1	1	1	0	1	1	1	1	0	1	0	1	1	0	1	0	**13**
Student 8	1	1	0	1	1	0	1	0	1	0	0	1	0	1	0	0	1	0	**9**
Total	**8**	**7**	**4**	**8**	**7**	**2**	**8**	**6**	**8**	**6**	**3**	**7**	**5**	**7**	**6**	**3**	**8**	**5**	

Step 4: Sort students from the highest score at the top to the lowest at the bottom.

Table 8.17. Data sorted by student scores

	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3	C3.1	C3.2	C4.1	C4.2	C4.3	C5.1	C5.2	C6.1	C6.2	C6.3	C7.1	C7.2	Total
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**18**
Student 4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**17**
Student 1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	**16**
Student 6	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**16**
Student 2	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1	**14**
Student 7	1	1	1	1	1	0	1	1	1	1	0	1	0	1	1	0	1	0	**13**
Student 8	1	1	0	1	1	0	1	0	1	0	0	1	0	1	0	0	1	0	**9**
Student 3	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	**5**
Total	**8**	**7**	**4**	**8**	**7**	**2**	**8**	**6**	**8**	**6**	**3**	**7**	**5**	**7**	**6**	**3**	**8**	**5**	

Step 5: Sort criteria from easiest on the left to hardest on the right.

Table 8.18. Data sorted by criterion difficulty

	C1.1	C2.1	C3.1	C4.1	C7.1	C1.2	C2.2	C5.1	C6.1	C3.2	C4.2	C6.2	C5.2	C7.2	C1.3	C4.3	C6.3	C2.3	Total
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**18**
Student 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	**17**
Student 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	**16**
Student 6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	**16**
Student 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	**14**
Student 7	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	**13**
Student 8	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	**9**
Student 3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**
Total	**8**	**8**	**8**	**8**	**8**	**7**	**7**	**7**	**7**	**6**	**6**	**6**	**5**	**5**	**4**	**3**	**3**	**2**	

Step 6: Colour the boxes with 1s to see the pattern and estimate the reliability. In this example, there appears to be a reasonable level of reliability, based on the small overlap between 1s and 0s.

Table 8.19. Checking the overlap between 1s and 0s.

	C1.1	C2.1	C3.1	C4.1	C7.1	C1.2	C2.2	C5.1	C6.1	C3.2	C4.2	C6.2	C5.2	C7.2	C1.3	C4.3	C6.3	C2.3	Total
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**18**
Student 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	**17**
Student 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	**16**
Student 6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	**16**
Student 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	**14**
Student 7	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	**13**
Student 8	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	**9**
Student 3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**
Total	8	8	8	8	8	7	7	7	7	6	6	6	5	5	4	3	3	2	

Although the process of analysing data like this is very time-consuming by hand, it is relatively fast when using a computer spreadsheet programme, such as Microsoft Excel. See the Further Reading section for a video that explains how to do this.

Calculating the Coefficient of Reproducibility

From this data, we can calculate the **Coefficient of Reproducibility (CR),**[144] which is one way to check the reliability of the data. The CR "…measures the extent to which an observed set of response patterns agrees with that expected from a perfect scale".[145] To calculate an estimate of the reliability of the rubric, we need to look at the amount of overlap between the 1s and 0s. We find the number of **errors** by finding the least number of positive responses that should be negative, or negative responses that should be positive in order to make a perfect scale[146] (that is, a scale where there is no overlap between the 1s and 0s).

Step 1: Find the cells where the distance between the 1s and 0s is inconsistent.

144 Jobling, D., & Snell, E. J. (1961).
145 Jobling, D., & Snell, E. J. (1961, p. 110).
146 McIver. J.P., & Carmines, E. G. (1981).

Table 8.20. Highlighted cells where the pattern of 0s and 1s are inconsistent.

	C1.1	C2.1	C3.1	C4.1	C7.1	C1.2	C2.2	C5.1	C6.1	C3.2	C4.2	C6.2	C5.2	C7.2	C1.3	C4.3	C6.3	C2.3	Total
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Student 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	17
Student 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	16
Student 6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	16
Student 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	14
Student 7	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	13
Student 8	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	9
Student 3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Total	8	8	8	8	8	7	7	7	7	6	6	6	5	5	4	3	3	2	

In this example, there are 144 observations (8 students multiplied by 18 level descriptors). Of these 144 cells, 6 cells show inconsistencies.

Step 2: Calculate **Guttman's Coefficient of Reproducibility** (CR)[147] using the following formula:

$$CR = 1 - \frac{(Number\ of\ errors)}{(Number\ of\ items \times number\ of\ students)}$$

In this example,

$$CR = 1 - \frac{6}{144}$$

$$CR = 0.958$$

As with many tests of reliability, the data is more robust, the closer the coefficient is to 1.

Learning activity 8. Group calculation and analysis: Analysing rubric data

The purpose of this learning activity is to analyse rubric data and calculate the Coefficient of Reproducibility.

147 Jobling, D., & Snell, E. J. (1961); McIver. J.P., & Carmines, E. G. (1981).

Scenario: Your Grade 2 students have just completed the assessment task Flowing Water. You have marked their work and created a chart to study the reliability of the scores and analyst student learning. The chart has been arranged for you.

In small groups consider the data in Table 8.21 (student scores for each criterion) and Table 8.22 (Chart of student scores that has been converted, sorted and organised).

1. Calculate the Coefficient of Reproducibility.
2. A coefficient of 0.9 or higher is desirable. What does the coefficient say about the reliability of the data?
3. What factors might have contributed to the level of reliability or the amount of error? Could these factors be changed to improve the reliability for next time?

Discuss your findings with the class.

Table 8.21. Raw scores for each criterion based on a rubric

	/3	/3	/2	/3	/2	/3	/2
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**
Student 1	3	3	2	2	2	2	2
Student 2	2	2	2	2	2	2	2
Student 3	1	1	1	1	0	0	1
Student 4	3	2	2	3	2	3	2
Student 5	3	3	2	3	2	3	2
Student 6	2	2	2	3	2	3	2
Student 7	3	2	2	2	1	2	1
Student 8	2	2	1	1	1	1	1
Student 9	0	1	1	1	0	0	0
Student 10	1	1	1	2	1	1	1
Student 11	2	2	1	1	2	1	1
Student 12	2	1	1	2	2	2	1
Student 13	2	2	2	2	2	2	2
Student 14	3	3	2	3	2	3	2

Student 15	3	3	2	2	2	3	2
Student 16	2	1	2	2	1	2	2
Student 17	3	2	2	3	2	2	2
Student 18	2	2	2	2	1	2	1
Student 19	3	3	2	3	2	3	2
Student 20	2	2	2	2	2	2	2

Table 8.22. Chart of student scores that has been converted to 1s and 0s and organised

	C2.1	C3.1	C4.1	C1.1	C7.1	C5.1	C6.1	C1.2	C4.2	C2.2	C6.2	C3.2	C5.2	C1.3	C7.2	C4.3	C6.3	C2.3	Total
Student 5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Student 14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Student 19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Student 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	17
Student 15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	17
Student 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	16
Student 6	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	16
Student 17	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	16
Student 2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	14
Student 13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	15
Student 20	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	14
Student 7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	13
Student 16	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0	12
Student 18	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	12
Student 12	1	1	1	1	1	1	1	1	1	0	1		0	0	0	0	0	0	11
Student 11	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	10
Student 8	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	9
Student 10	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	8
Student 3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Student 9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL	20	20	20	19	19	18	18	17	16	15	15	14	13	9	12	6	6	5	

8.3.2. Interpreting data using measures of centrality and measures of variability

Expected learning outcomes

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

- Calculate measures of central tendency;
- Explain the uses and limitations of using measures of central tendency to analyse assessment data;
- Explain the uses and limitations of measures of variability when analysing assessment data; and
- Compute the value measures of variability.

Period 1

Using measures of central tendency to understand assessment data

In Year 1, you learnt that a body of data can be called a data set. These data sets need to be manipulated in some way to result in meaningful insights. Teachers may generate their own data sets based on assessment evidence.

In Year 2, you learnt that appropriate analysis of quality assessment evidence can enable teachers to:

- evaluate student achievement in relation to the learning outcomes;
- gain in-depth understanding of student strengths and weaknesses; and
- evaluate the impact of their teaching.

As such, analysis and discussion of student assessment data can provide powerful insights to inform modification of your professional practice.

In Year 2, you also learnt to analyse assessment data to evaluate quality features of the assessment task, such as reliability and validity. You also discussed how teachers use assessment data to inform teaching, learning and reporting.

In Year 2, you learnt that data collected by teachers about student learning may be *qualitative* or *quantitative* in nature. Examples of qualitative data include observation records or student work samples. Examples of quantitative data include student marks or scores on an assessment task. Quantitative data can be analysed using statistical methods. This is the focus of this lesson.

In Year 1, Lesson 5.9.1, you encountered frequency tables and calculated the three **measures of central tendency**: the mean, median and mode. We will briefly revisit each central tendency measure. [148]

The mean

The **mean** is the average value of the dataset. It is calculated by summing up all individual values in the dataset, and dividing the sum by the total number of values. This is expressed using the following formula:

$$\text{mean} = \frac{\text{sum of individual values}}{\text{number of values}} \quad \text{or} \quad \bar{x} = \frac{\Sigma^{X}}{N}$$

The median

The **median** this is the middle value of the dataset when all values are ordered from low to high; half of the numbers in the dataset are above the median and half are below the median (also known as the 50th **percentile**). When the dataset consists of an even number of values, the median can be identified by calculating the average of the two middle values.

The mode

The **mode** is the most frequently appearing value within the data set. It is possible to have more than one mode; this is more likely to occur in larger datasets.

Each of these measures is an example of a **descriptive statistic**; it quantitatively describes a feature of the dataset.

148 Centre for Education Statistics and Evaluation, (n.d.). https://www.cese.nsw.gov.au/effective-practices/using-data-with-confidence-main/mean

Learning activity 1. Calculate and reflect: Measures of central tendency

The purpose of this learning activity is for you to calculate measures of central tendency using a sample data set and reflect on their meaning.

- Together with a peer, examine the Grade 2 Science student assessment scores in Table 8.23.
- Calculate the three measures of central tendency for this data set; the mean, median and mode. Record your responses in Table 8.23.
- Remember that it can be useful to rearrange the dataset to represent the values from low to high.
- Reflect on the meaning of the numbers you calculated with your peer. What do these numbers tell you?

Table 8.23. Grade 2 Science student assessment scores (/70 marks)

Student	Score /70	Student	Score /70	Student	Score /70	Student	Score /70
Student 1	45	Student 11	31	Student 21	65	Student 31	32
Student 2	70	Student 12	21	Student 22	65	Student 32	36
Student 3	70	Student 13	24	Student 23	65	Student 33	36
Student 4	34	Student 14	46	Student 24	44	Student 34	44
Student 5	64	Student 15	54	Student 25	47	Student 35	54
Student 6	54	Student 16	59	Student 26	70	Student 36	65
Student 7	65	Student 17	32	Student 27	65		
Student 8	34	Student 18	58	Student 28	42		
Student 9	55	Student 19	55	Student 29	60		
Student 10	57	Student 20	69	Student 30	62		
Measures of central tendency							
Mean:		Median:		Mode:			

Learning activity 2. Group discussion: Using measures of central tendency to understand student achievement

The purpose of this learning activity is for you to reflect on the benefits and limitations of measures of central tendency to understand student achievement.

- This activity builds on the previous activity. In the previous activity, you were asked to reflect on the meaning of the calculated measures of central tendency. In this activity, you will take this further by reflecting on the benefits and limitations of measures of central tendency to understand student achievement.
- Contribute to the whole class discussion. Your teacher educator will guide the discussion using following questions as a stimulus:
  - What do these numbers tell the teacher about learning and teaching in the class?
  - What do these numbers not tell the teacher about learning and teaching within the class?
  - Are there things you as a teacher would like to know that these numbers cannot tell you?
  - What types of data can be analysed using measures of central tendency?
  - What are some other benefits and limitations of the different measures of central tendency when analysing student assessment data?
- Summarise key points of the discussion in Table 8.24.

Table 8.24. Benefits and limitations of using measures of central tendency to understand student achievement

Benefits	Limitations

Period 2

Using measures of variability to understand assessment data: Range and box and whisker plots

Comparing the mean, median and mode of a set of data can give you some indication of the **variability** (also called **spread** or **distribution**) of the data. However, it cannot provide specific information about the spread of student achievement within your class.

Measures of variability can show how the individual values in the data are distributed relative to each other and the measures of central tendency. This is information is important, because data sets with the same measures of central tendency may look similar, but represent different distributions.[149]

Take a look at the data set in Table 8.25. The measures of central tendency for both data set are identical:

- *Mean* = 4
- *Median* = 4
- *Mode* = 4

Table 8.25. Two data sets with the same measures of central tendency but different variability

Data set 1	Data set 2
2	1
2	1
3	1
3	4
4	4
4	4
4	5
5	6

149 Australian Bureau of Statistics, (n.d.).

Data set 1	Data set 2
6	7
7	7

Yet, the values in Data set 2 are more spread out than those in Data set 1. Taking account of variability in the data is necessary for teachers to understand assessment data.

There are various measures of variability. In this period, you will look at the **range, quartiles** and **interquartile rang**e. You will examine box-and-whisker plots that represent these statistics. You will also learn how to create box and whisker plots.

The **range** of a dataset is the difference between the lowest and highest value. You can calculate the range by subtracting the smallest value from the largest value. For example, if your data sets consists of the values 8, 6, 9, 3, 7, 5, 4, the range is 9 – 3 = 6.

As illustrated in Figure 8.14, a **box and whisker plot** (also called **boxplot**) represents the variability of the data based on several values in the data set:

- Minimum; the lowest value in the data set
- Q1; the first **quartile**, representing the first 25% of values
- The Median (also known as the second quartile, Q2); representing the middle value (50%) of the dataset
- Q3; the third quartile, representing the first 75% of values
- Maximum; the highest value in the data set
- Mean: you may also display the mean in the box and whisker plot, using an ‘x’ or dot. The mean is not always included in box and whisker plots but can be helpful when analysing a data set.

The box of the box and whisker plot represents the **interquartile range**, or IQR, being the middle 50% of data values, which sit between the first and third quartiles. This box represents the middle 50% within the dataset. You can calculate the IQR value by subtracting Q1 from Q3.

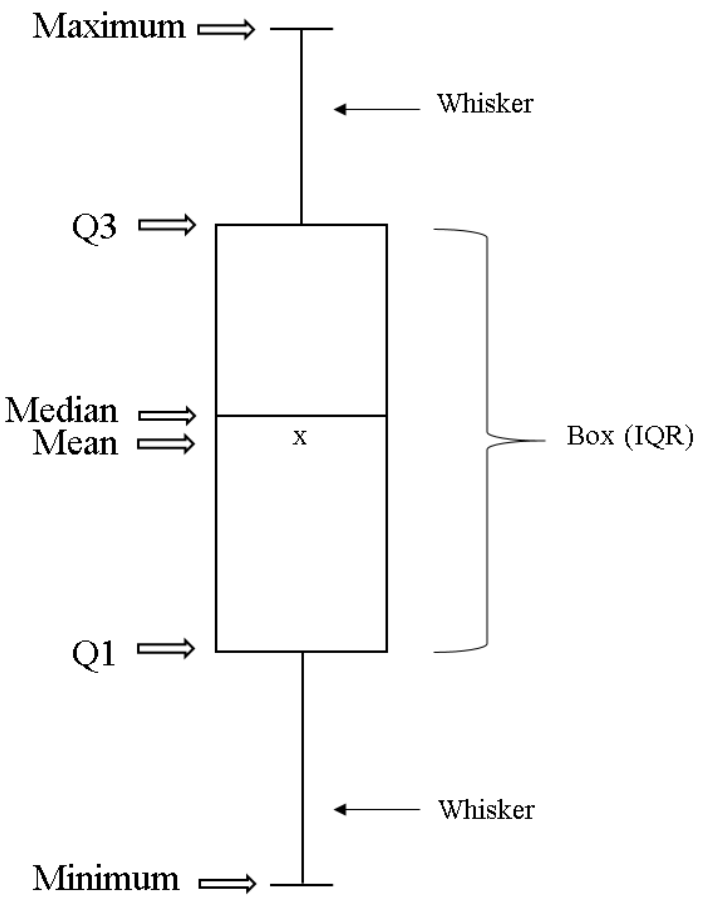


Figure 8.14. Key features of a box and whisker plot[150]

Box and whisker plots can be created using spreadsheet programmes like Excel. However, it is also possible to create them by hand. Figure 8.15 shows an example of a box and whisker plot which was created in Excel.

150 Image by author, used with permission.

Figure 8.15. Example of a box and whisker plot[151]

Learning activity 3. Representing data variability: Box and whisker plot

The purpose of this learning activity is for you to understand how to represent variability in the data using box and whisker plots.

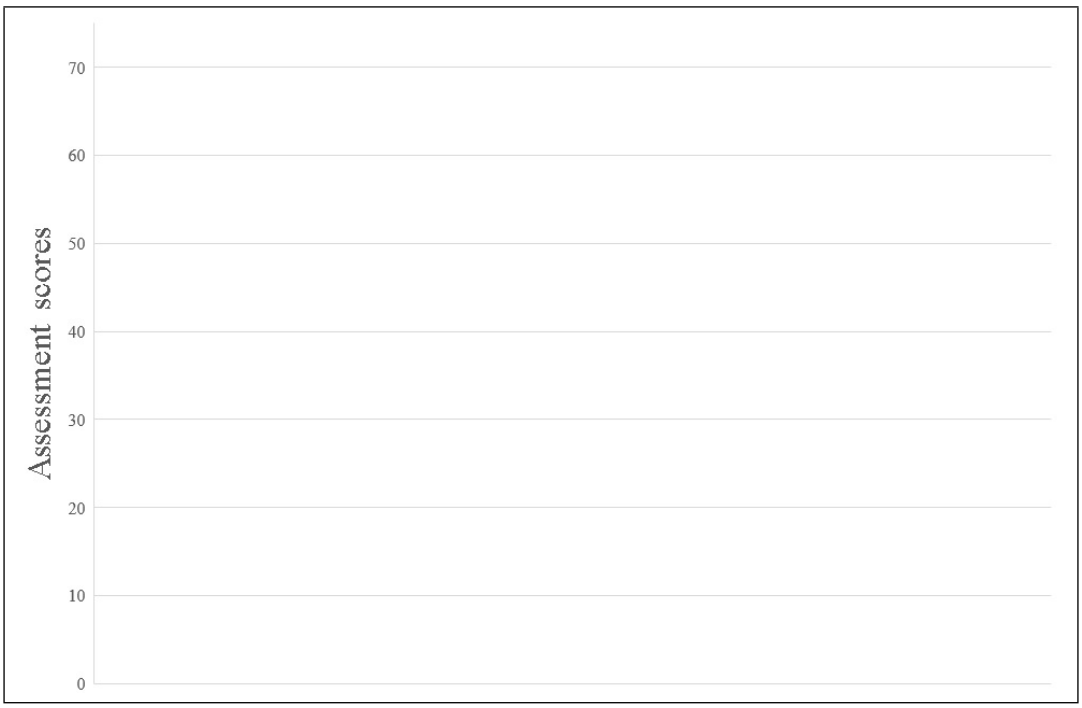
1. Complete this activity together with a peer.
2. First look at Figure 8.15 and identify the (approximate) represented descriptive statistics using the Y axis of the graph. Record your responses in Table 8.26 in the column, 'Approximate value in Figure 8.15'.
3. Go back to the Table 8.23, 'Grade 2 Science student assessment scores' (in Period 1).
   - First, identify the relevant descriptive statistics and record your responses in Table 8.26. Remember that just like the medium, Q1 and Q3 may represent the average of two values if the data set consists of even numbers.
   - Next, use these statistics to create a box and whisker plot in Box 8.6.

151 Image by author, used with permission.

Table 8.26. Values of descriptive statistics in Figure 8.15 and Table 8.23

Descriptive statistic	Approximate value in Figure 8.15	Value in the Grade 2 Science student assessment scores dataset
minimum		
Q1		
Median		
Q3		
maximum		
range		
interquartile range		
mean		

Box 8.6. Create a box and whisker plot based on the Grade 2 Science student assessment scores dataset[152]



152 Image by author, used with permission.

Learning activity 4. Group discussion: Interpreting variability using box and whisker plots

The purpose of this learning activity is for you to explore the benefits and limitations of using the range and interquartile range to interpret student assessment data.

- This activity builds on the previous activity. In the previous activity, you were asked to create a box and whisker plot based on a data set. In this activity, you will take this further by reflecting on the benefits and limitations of using box and whisker plots to understand student achievement.
- Contribute to the whole class discussion. Your teacher educator will the discussion using following questions as a stimulus:
  - What does the plot say about how students performed on the assessment task?
  - How might this inform planning for teaching and learning?
  - Are there things you as a teacher would like to know which the box and whisker plot cannot tell you?
  - When is it appropriate to examine the spread of data using the range and interquartile ranges?
- Summarise key points of the discussion in Table 8.27.

Table 8.27. Benefits and limitations of using box and whisker plots to understand student achievement

Benefits	Limitations

Period 3

Using measures of variability to understand assessment data – histograms and standard deviation

In the final period of this lesson, we will be looking at **variability** in a data set using **histograms** and the **standard deviation**.

Histograms

In Period 1 of this lesson, you learnt that measures of central tendency have limitations in sketching an accurate picture of student achievement. Histograms can help overcome some of these limitations. **Histograms** are a type of graph, which provide a useful way to visually display the variability of **continuous data**.[153] Any data that can be measured along a continuum or scale is continuous. Examples are length, temperature or student achievement scores.

A histogram includes bars which represent the count or percentage of observations within a certain range of values. These ranges of values are called *bins*.

Examining histograms can give you an idea of the variability and distribution of the data. The distribution of data may be symmetrical or asymmetrical in shape. Take a look at the examples of a symmetrical (Figure 8.16), asymmetrical left skewed (Figure 8.17), and asymmetrical right skewed (Figure 8.18) distribution.

153 Frost, J. (n.d.).

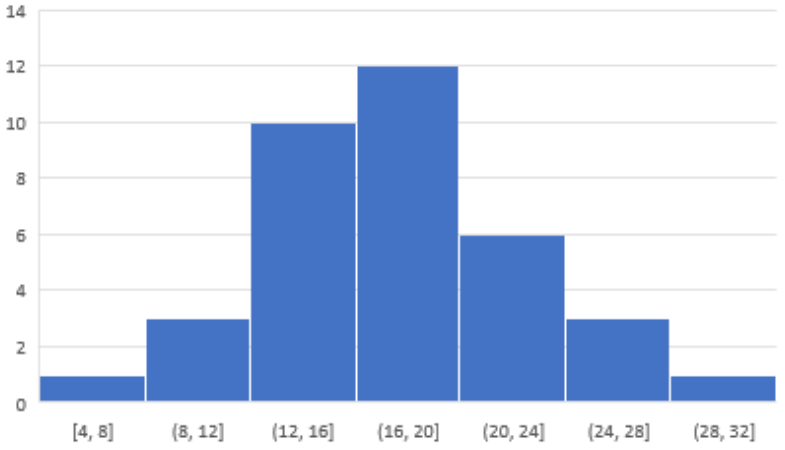


Figure 8.16. Histogram with a (almost) symmetrical distribution[154]

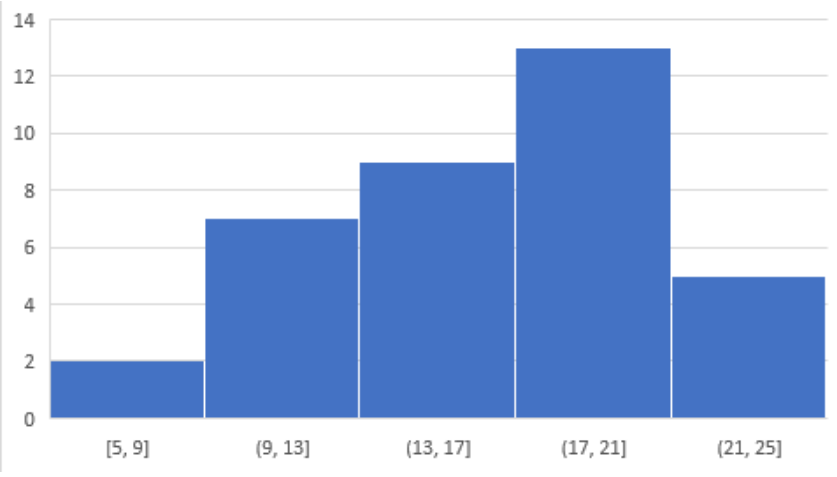


Figure 8.17. Histogram with an asymmetrical left skewed distribution[155]

154 Image by author, used with permission.
155 Image by author, used with permission.

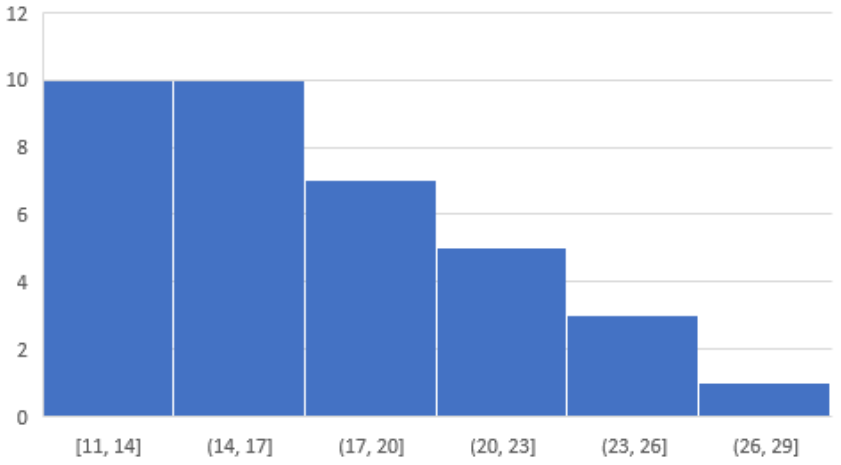


Figure 8.18. Histogram with an asymmetrical right skewed distribution[156]

The shape of the distribution is related to the position of measures of centrality, as shown in Figure 8.19.

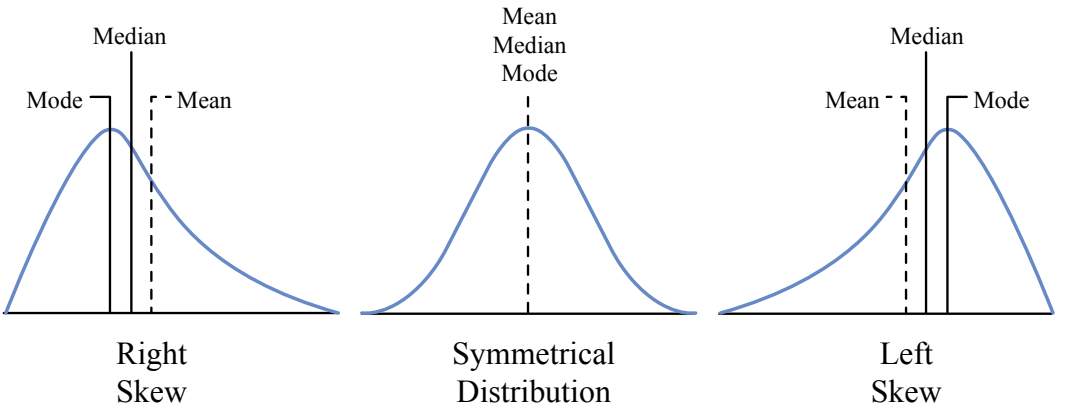


Figure 8.19. Shape of distributions and their relation to measures of centrality

156 Image by author, used with permission.

Learning activity 5. Data interpretation: Histograms

The purpose of this learning activity is for you to examine histograms to understand assessment data.

- Your teacher educator will assign you to a group of 3 or 4.
- With your group, examine the mathematics assessment scores of Class A and Class B (displayed in histograms in Figures 8.20). The mean assessment score in each class is 50. Students needed to score at least 50 marks to pass the assessment.
- Interpret the data using the following questions as a guide:
  - What do these histograms tell you about student mathematics achievement in Class A and Class B?
  - What can you say about how the assessment scores are distributed in each class?
  - What can you say about the differences in student mathematics achievement in the two classes?
  - How could this information inform your teaching?
  - Are there things you as a teacher would like to know which the histogram cannot tell you?
- Record your group's interpretations of the two histograms in Box 8.7.

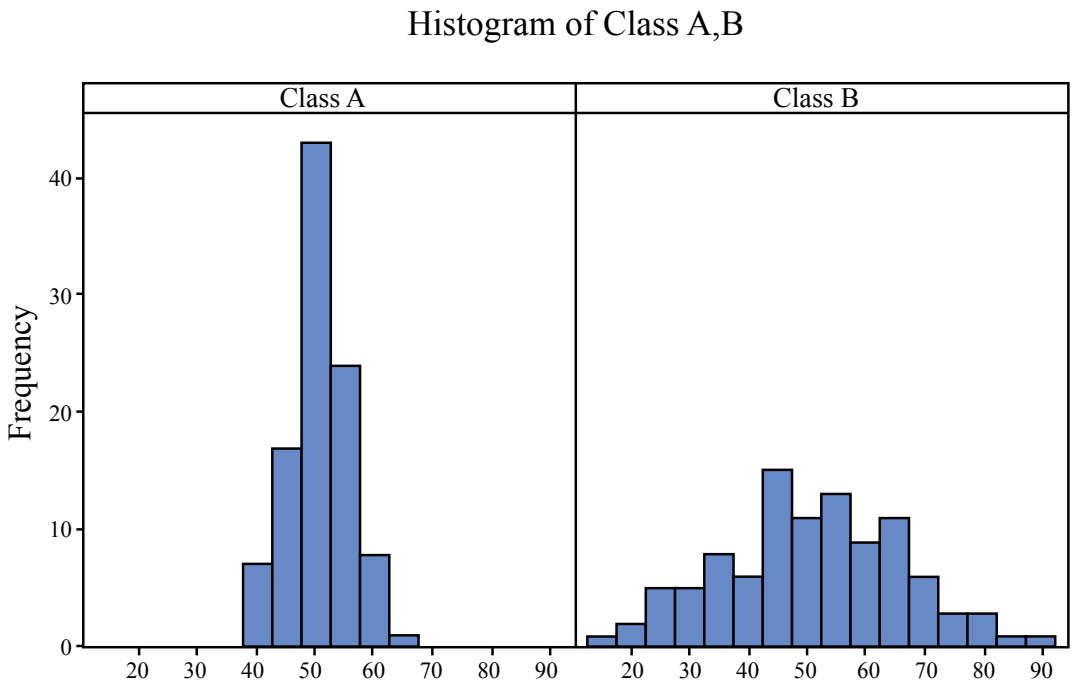


Figure 8.20. Histogram with an asymmetrical right skewed distribution

Box 8.7. Your group's interpretations of the two histograms in Figure 8.20

Standard deviation

The standard deviation is the most frequently used measure of variability.[157] The standard deviation shows how much the individual values in a data set deviate from the mean. A small standard deviation means the individual values are close to the mean; a large standard deviation means the individual values are not close to the mean or they are more dispersed.

The standard deviation in a population is represented using a sigma symbol; σ. The standard deviation of a sample from the population is represented using the letter *s*.

The formula to find the value for the standard deviation is:

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - x)^2}{n-1}}$$

Where: s = the sample standard deviation

n = the number of values in the data set

x_i = each value from the data set

$\overline{x}$ = the mean value of the data set

157 Frost, J. (n.d.).

Complete the following steps to calculate the sample standard deviation (s):

1. Calculate the sample mean.
2. Subtract the mean from all individual values in the data set and write down the values; these numbers show the distance of the individual value in relation to the mean.
3. Calculate the square of the distance to the mean for each individual value
4. Sum up all values from Step 3.
5. Divide the sum calculated in Step 4 by the number of values in the data set minus 1 ($n - 1$).
6. Calculate the square root of the number calculated in Step 5.

As you can see, there are multiple steps involved in calculating the standard deviation. If you have access to a computer, you can use spreadsheet programmes such as Excel to calculate the standard deviation. However, knowing how the standard deviation is calculated will help you better understand this measure. It will also help you identify when something does not seem right with a calculation.

It is useful to have knowledge of some basic statistical concepts when interpreting the standard deviation. We will therefore briefly revisit symmetrical distributions. The most common example of a symmetrical distribution is the **normal distribution** (also known as the **normal curve** or **bell curve**). Figure 8.21 shows the key features of a normal distribution.

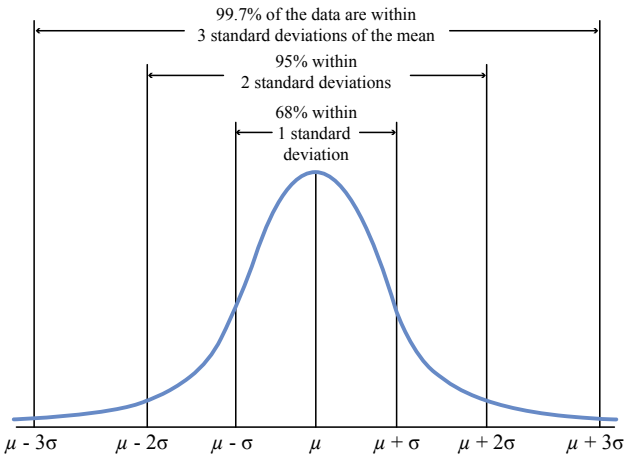


Figure 8.21. Normal distribution[158]

In a normal distribution, the mean, mode and median have the same value and are positioned in the middle of the distribution. In Figure 8.21, the population mean is represented using the symbol "μ". The standard deviation (represented using a sigma symbol; σ) is the distance between the mean and the point where the curve changes shape.[159]

As shown in Figure 8.21, the empirical rule states that 68%, 95% and 99.7% of data values lie within one, two and three standard deviations of the mean. This means that if you know the value of the mean and the standard deviation (and your data set is normally distributed), you can use these values to estimate where the individual values within the data set are located.

The value of the standard deviation is always positive. In theory, it can be 0; this would mean that all values in the data set have the same value, and thus do not deviate from the mean. In practice, this is unlikely to occur in case of student assessment data.

158 https://commons.wikimedia.org/wiki/File:Empirical_Rule.PNG
159 https://analystprep.com/cfa-level-1-exam/quantitative-methods/key-properties-normal-distribution/

Learning activity 6. Calculating and interpreting: Standard deviation

The purpose of this learning activity is for you to calculate and interpret the standard deviation of a data set. This will help you identify the variability in a data set using the standard deviation.

1. Complete this activity together with a peer.
2. For this activity, you will need the student assessment scores displayed in Table 8.28.
3. Calculate the standard deviation of the Grade 2 Science student assessment scores data set. Remember to consult the step-by-step explanation of how to calculate the standard deviation if needed. Record your responses to each step so you can go back and make any corrections if needed.
4. Discuss the meaning of the standard deviation. What does this say about student achievement within each class? Assume that the assessment scores are normally distributed.

Table 8.28. Grade 2 Science student assessment scores (/30 marks)

Student	Score /30	Student	Score /30	Student	Score /30	Student	Score /30
Student 1	15	Student 11	16	Student 21	11	Student 31	19
Student 2	23	Student 12	17	Student 22	12	Student 32	16
Student 3	8	Student 13	11	Student 23	14	Student 33	21
Student 4	13	Student 14	17	Student 24	22	Student 34	16
Student 5	20	Student 15	14	Student 25	19	Student 35	21
Student 6	21	Student 16	11	Student 26	16	Student 36	18
Student 7	17	Student 17	20	Student 27	18		
Student 8	18	Student 18	20	Student 28	16		
Student 9	26	Student 19	23	Student 29	13		
Student 10	13	Student 20	19	Student 30	22		

Table 8.29. Calculate and interpret the standard deviation of Grade 2 Science student assessment scores

Student	Assessment score	Distance to the mean (Step 2)	Square of distance to the mean (Step 3)
Student 1			
Student 2			
Student 3			
Student 4			
Student 5			
Student 6			
Student 7			
Student 8			
Student 9			
Student 10			
Student 11			
Student 12			
Student 13			
Student 14			
Student 15			
Student 16			
Student 17			
Student 18			
Student 19			
Student 20			
Student 21			
Student 22			
Student 23			
Student 24			
Student 25			
Student 26			
Student 27			
Student 28			

Student	Assessment score	Distance to the mean (Step 2)	Square of distance to the mean (Step 3)
Student 29			
Student 30			
Student 31			
Student 32			
Student 33			
Student 34			
Student 35			
Student 36			

Box 8.8. Calculate and interpret the standard deviation of Grade 2 Science student assessment scores

Step 4:

Step 5:

Step 6:

Interpretation:

8.3.3. Percentile and percentile rank

Expected learning outcomes

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

- Examine the benefits and limitations of using percentiles and percentile ranks to describe learning progress; and
- Calculate the values of percentile and percentile rank.

Period 1

Defining percentiles and percentile ranks

While measures of centrality and variability can be used to observe and interpret the mid-point and spread of achievement within a class or group of students. **Percentiles** and **percentile ranks** enable us to analyse aspects of group performance and compare individual students with the larger group. In this lesson, you will calculate percentiles and percentile ranks. You will also examine and evaluate their use in relation to teaching and learning.

Percentiles

A percentile is a measure that indicates the percentage of a group that is below a particular score.[160] We can use percentiles to understand the achievement of groups of students by determining a score below which a certain percentage of the students' results fall. For example, we could ask the question: *What score do three quarters of the students in my class fall below?* If you find the score that sits on the 75th percentile, three quarters of the students' scores will fall below that score. This will often be referred to as the n^{th} percentile, where n is a number between 0 and 99 (e.g., 57th percentile, 86th percentile, etc).

160 Note – this is using a linear model. More advanced models may use a normal distribution via z-scores.

The formula to find the value for a particular percentile is:

$$R = \left[\frac{100-n}{100} \times N\right]$$

Where: R = the rank of the score that sits above the n^{th} percentile

N = the number of values in the data set

n = the percentile

Note that the result of this calculation should be *rounded down* to the nearest whole number. This is why it is enclosed in the floor function brackets ⌊⌋. If you have access to a computer, you can use spreadsheet programmes such as Excel to calculate and sort the data.

Here is an example to illustrate the process:

You have 30 students in your Grade 2 Mathematics class. They have just completed the final test in their algebra unit. The test has a possible 70 marks. You want to know the score below which 75% of the students scored. The students' scores are as follows:

Table 8.30. Grade 2 Mathematics student test scores (/70 marks)

Student	Score /70	Student	Score /70	Student	Score /70
Student 1	35	Student 11	31	Student 21	33
Student 2	35	Student 12	24	Student 22	50
Student 3	36	Student 13	46	Student 23	21
Student 4	36	Student 14	54	Student 24	57
Student 5	44	Student 15	44	Student 25	49
Student 6	33	Student 16	47	Student 26	34
Student 7	68	Student 17	70	Student 27	49
Student 8	34	Student 18	38	Student 28	35
Student 9	49	Student 19	42	Student 29	38
Student 10	57	Student 20	30	Student 30	44

To calculate the percentiles:

Step 1: Rank students' scores from highest to lowest.

Table 8.31. Example of scores ranked from highest to lowest

Student	Score/70	Rank	Student	Score/70	Rank	Student	Score/70	Rank
Student 17	70	1	Student 13	46	11	Student 2	35	20
Student 7	68	2	Student 5	44	12	Student 28	35	20
Student 10	57	3	Student 15	44	12	Student 8	34	23
Student 24	57	3	Student 30	44	12	Student 26	34	23
Student 14	54	5	Student 19	42	15	Student 6	33	25
Student 22	50	6	Student 18	38	16	Student 21	33	25
Student 9	49	7	Student 29	38	16	Student 11	31	27
Student 25	49	7	Student 3	36	18	Student 20	30	28
Student 27	49	7	Student 4	36	18	Student 12	24	29
Student 16	47	10	Student 1	35	20	Student 23	21	30

Step 2: Calculate the rank of the score that is at the 75th percentile:

$$R = [\frac{100-75}{100} \times 30]$$

$$= [7.5]$$

$$R = 7$$

Step 3: Consult the ranked list of scores in Step 1 to determine the score which has a percentile of 75% (in this case it is the score with a rank of 7).

Table 8.32. Table of scores ranked from highest to lowest showing the score on the 75th percentile

Student	Score/70	Rank	Student	Score/70	Rank	Student	Score/70	Rank
Student 17	70	1	Student 13	46	11	Student 2	35	20
Student 7	68	2	Student 5	44	12	Student 28	35	20
Student 10	57	3	Student 15	44	12	Student 8	34	23

Student	Score/70	Rank	Student	Score/70	Rank	Student	Score/70	Rank
Student 24	57	3	Student 30	44	12	Student 26	34	23
Student 14	54	5	Student 19	42	15	Student 6	33	25
Student 22	50	6	Student 18	38	16	Student 21	33	25
Student 9	**49**	**7**	Student 29	38	16	Student 11	31	27
Student 25	**49**	**7**	Student 3	36	18	Student 20	30	28
Student 27	**49**	**7**	Student 4	36	18	Student 12	24	29
Student 16	47	10	Student 1	35	20	Student 23	21	30

This means that a score of 49/70 (70%) is on the 75th percentile. Note that the percentage score is *different* from the percentile.

Learning activity 1. Calculation: Calculating Percentiles

The purpose of this learning activity is to calculate percentiles for a group of students.

Another group of Grade 2 students sat the same Mathematics test for algebra. Again, the test has a possible 70 marks. These are the scores and ranks for each student. (Note - the group has been ranked for you):

Table 8.33. Table of scores (out of 70 marks) ranked from highest to lowest score

Student	Score /70	Rank	Student	Score /70	Rank	Student	Score /70	Rank
Student 9	54	1	Student 14	42	10	Student 18	31	21
Student 10	53	2	Student 2	41	12	Student 26	31	21
Student 23	49	3	Student 8	41	12	Student 16	29	23
Student 25	48	4	Student 22	41	12	Student 19	24	24
Student 29	48	4	Student 20	40	15	Student 11	23	25
Student 17	45	6	Student 21	40	15	Student 4	21	26
Student 24	45	6	Student 27	40	15	Student 3	20	27
Student 28	44	8	Student 12	38	18	Student 6	20	27
Student 1	43	9	Student 30	36	19	Student 7	20	27
Student 13	42	10	Student 5	33	20	Student 15	19	30

You will be working in a group of two or three people to complete this activity.

Step 1: Each person in the group will calculate ONE of the following percentiles:

Person 1: Calculate the score under which 90% of scores fall (90th percentile).

Person 2: Calculate the score under which 50% of scores fall (50th percentile).

Person 3: Calculate the score under which 10% of scores fall (10th percentile).

You may also like to calculate the percentage scores for your percentile.

Step 2: Each person should report their findings back to the group.

Step 3: Analyse the results in relation to the achievement of the class as a whole and groups within the class.

- How did the class achieve in general?
- What do you notice about the achievement of the majority of the class (refer to the 90th percentile)?
- What do you notice about the achievement of the lower half of the class (refer to the 50th percentile)?
- What do you notice about the lowest levels of achievement?

Step 4: Discuss the following as a class:

What factors might influence this result? If you were the teacher, what questions might you ask in order to understand the implications of these results for learning and teaching?

Period 2

Percentile ranks

A percentile rank is different from a percentile. *Percentile ranks* provide a way to compare the achievement of individual students against the rest of a group. These

measures are sometimes used to report to students and other stakeholders about their achievements relative to the rest of their class or grade level.

The formula to find the percentile rank of a student's score is:

$$PR = \frac{CC + \frac{RC}{2}}{N} \times 100$$

Where: *PR* = Percentile Rank

CC = the cumulative count of values *below* the value that is being analysed

RC = the number of people or scores that have the same rank

N = total number of values

Here is an example to illustrate the process.

Your Grade 2 students have just completed their final test for Science for the year. There are 30 students in your class. You have decided to provide the students with their percentile ranks when you give them feedback on their achievement. The test had a total of 120 marks.

Here is a table of their scores:

Table 8.34. Grade 7 Science test scores (/120 marks)

Student	Score/120	Student	Score/120	Student	Score/120
Student 1	73	Student 11	49	Student 21	69
Student 2	79	Student 12	64	Student 22	96
Student 3	63	Student 13	73	Student 23	87
Student 4	46	Student 14	86	Student 24	80
Student 5	89	Student 15	92	Student 25	88
Student 6	82	Student 16	68	Student 26	44
Student 7	68	Student 17	85	Student 27	107
Student 8	74	Student 18	39	Student 28	80

Student	Score/120	Student	Score/120	Student	Score/120
Student 9	66	Student 19	67	Student 29	53
Student 10	75	Student 20	80	Student 30	72

To calculate a percentile rank:

1. Rank students' scores in order, from the lowest to the highest.

Table 8.35. Ranked student scores

Student	Score /120	Rank	Student	Score /120	Rank	Student	Score /120	Rank
Student 27	107	1	Student 24	80	10	Student 16	68	20
Student 22	96	2	Student 28	80	10	Student 19	67	22
Student 15	92	3	Student 2	79	13	Student 9	66	23
Student 5	89	4	Student 10	75	14	Student 12	64	24
Student 25	88	5	Student 8	74	15	Student 3	63	25
Student 23	87	6	Student 1	73	16	Student 29	53	26
Student 14	86	7	Student 13	73	16	Student 11	49	27
Student 17	85	8	Student 30	72	18	Student 4	46	28
Student 6	82	9	Student 21	69	19	Student 26	44	29
Student 20	80	10	Student 7	68	20	Student 18	39	30

2. For each student's score, determine how many students have scored less than them. This is labelled the "Cumulative Count" or **CC.**

Table 8.36. Cumulative count for each students' score

Student	Score /120	Rank	CC	Student	Score /120	Rank	CC
Student 27	107	1	29	Student 1	73	16	13
Student 22	96	2	28	Student 13	73	16	13
Student 15	92	3	27	Student 30	72	18	12
Student 5	89	4	26	Student 21	69	19	11
Student 25	88	5	25	Student 7	68	20	9

Student	Score /120	Rank	CC	Student	Score /120	Rank	CC
Student 23	87	6	24	Student 16	68	20	9
Student 14	86	7	23	Student 19	67	22	8
Student 17	85	8	22	Student 9	66	23	7
Student 6	82	9	21	Student 12	64	24	6
Student 20	80	10	18	Student 3	63	25	5
Student 24	80	10	18	Student 29	53	26	4
Student 28	80	10	18	Student 11	49	27	3
Student 2	79	13	17	Student 4	46	28	2
Student 10	75	14	16	Student 26	44	29	1
Student 8	74	15	15	Student 18	39	30	0

3. Then, for each student's score, determine how many students have the SAME score as them (including their own). This is labelled the "Rank Count" or **RC.**

Table 8.37. Rank count for each score

Student	Score /120	Rank	CC	RC	Student	Score /120	Rank	CC	RC
Student 27	107	1	29	1	Student 1	73	16	13	2
Student 22	96	2	28	1	Student 13	73	16	13	2
Student 15	92	3	27	1	Student 30	72	18	12	1
Student 5	89	4	26	1	Student 21	69	19	11	1
Student 25	88	5	25	1	Student 7	68	20	9	2
Student 23	87	6	24	1	Student 16	68	20	9	2
Student 14	86	7	23	1	Student 19	67	22	8	1
Student 17	85	8	22	1	Student 9	66	23	7	1
Student 6	82	9	21	1	Student 12	64	24	6	1
Student 20	80	10	18	3	Student 3	63	25	5	1
Student 24	80	10	18	3	Student 29	53	26	4	1

Student	Score /120	Rank	CC	RC	Student	Score /120	Rank	CC	RC
Student 28	80	10	18	3	Student 11	49	27	3	1
Student 2	79	13	17	1	Student 4	46	28	2	1
Student 10	75	14	16	1	Student 26	44	29	1	1
Student 8	74	15	15	1	Student 18	39	30	0	1

4. For each student, divide **RC** in half. Add the result of step 2 to the halved RC. Divide this number by the total number of students. Multiply by 100. The result is the percentile rank (PR).

Table 8.38. Calculated percentile ranks

Student	Score	Rank	CC	RC	PR	Student	Score	Rank	CC	RC	PR
Student 27	107	1	29	1	98	Student 1	73	16	13	2	47
Student 22	96	2	28	1	95	Student 13	73	16	13	2	47
Student 15	92	3	27	1	92	Student 30	72	18	12	1	42
Student 5	89	4	26	1	88	Student 21	69	19	11	1	38
Student 25	88	5	25	1	85	Student 7	68	20	9	2	33
Student 23	87	6	24	1	82	Student 16	68	20	9	2	33
Student 14	86	7	23	1	78	Student 19	67	22	8	1	28
Student 17	85	8	22	1	75	Student 9	66	23	7	1	25
Student 6	82	9	21	1	72	Student 12	64	24	6	1	22
Student 20	80	10	18	3	65	Student 3	63	25	5	1	18
Student 24	80	10	18	3	65	Student 29	53	26	4	1	15
Student 28	80	10	18	3	65	Student 11	49	27	3	1	12
Student 2	79	13	17	1	58	Student 4	46	28	2	1	8
Student 10	75	14	16	1	55	Student 26	44	29	1	1	5
Student 8	74	15	15	1	52	Student 18	39	30	0	1	2

Learning activity 2. Calculation: Calculating Percentile Rank

The purpose of this learning activity is to calculate percentiles for a group of students.

Scenario: Another group of students sat the same Science test. Again, the test has a possible 120 marks. These are the scores and ranks for each student. (Note - the group has been ranked for you and the CC and RC have been added for you):

Table 8.39. Scores for Planet Earth Science test

Student	Score /120	Rank	CC	RC	PR	Student	Score /120	Rank	CC	RC	PR
Student 22	120	1	29	1		Student 4	78	16	14	1	
Student 14	101	2	27	2		Student 16	75	17	13	1	
Student 21	101	2	27	2		Student 3	71	18	11	2	
Student 18	95	4	26	1		Student 27	71	18	11	2	
Student 28	94	5	25	1		Student 17	70	20	10	1	
Student 7	91	6	24	1		Student 6	69	21	9	1	
Student 19	87	7	22	2		Student 1	66	22	7	2	
Student 30	87	7	22	2		Student 11	66	22	7	2	
Student 12	86	9	20	2		Student 8	65	24	5	2	
Student 26	86	9	20	2		Student 9	65	24	5	2	
Student 10	85	11	18	2		Student 23	60	26	4	1	
Student 24	85	11	18	2		Student 15	55	27	3	1	
Student 25	82	13	17	1		Student 20	48	28	2	1	
Student 2	81	14	15	2		Student 5	47	29	1	1	
Student 13	81	14	15	2		Student 29	43	30	0	1	

Your task is to calculate the percentile rank (PR) for each student (Step 4). Write each PR in the table above.

Learning activity 3. Group discussion: Critiquing the use of percentile rank to report achievement

The purpose of this learning activity is to discuss the strengths, limitations and issues in using percentile ranks to compare student achievement.

In groups of three or four people, critically evaluate the usefulness of percentile ranks by weighing up the strengths, limitations and issues. Use the PMI chart (Table 8.40) to record the ideas raised in your group's discussion.

Consider issues such as self-efficacy, collaboration, student motivation, monitoring learning growth and reporting. Discuss these and any other factors that may impact on the usefulness of percentile rankings.

Draw a conclusion about the ways in which percentile ranks should be used and when they may be disadvantageous for different groups of students.

Report your recommendations to the class.

Table 8.40. Critical evaluation of percentile rank using a plus, minus and interesting chart

Plus What are the positive outcomes and consequences of using percentile ranks?	Minus What are the negative outcomes and consequences of using percentile ranks?	Interesting What is unknown? What questions need to be asked? What outcomes or consequences are neither positive nor negative, but may lead to different outcomes?

8.3.4. Correlation

Expected learning outcomes

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

- Explain how correlations can be used to analyse assessment data;
- Compute the value of Q-correlation coefficient; and
- Compute the value of Pearson's r correlation coefficient.

Period 1

Using correlations to analyse assessment data

Correlations provide a way to analyse the relationship between two or more **variables**. In order to find meaning in correlations, you need to have reason to expect that the variables are directly connected. For example, you might expect the results of a pre-test and post-test for a unit of work to be related in some way (hopefully the post-test will show improvement in the students' understanding of the content).

Correlation versus causation

Sometimes, two things may seem to be related, but there may be other factors that impact on the relationship. For example, we may observe that age and academic achievement in students are connected. As students move through school, they become better at mathematics, reading and writing, etc. This means that there is likely to be some sort of relationship between age and academic ability.

However, consider the following situations: There are two 7-year-old students. Student 1 has attended school regularly since Kindergarten, while Student 2 rarely attends school.

Question: Which student is likely to be more proficient at their studies? Why?

You may observe that age and academic achievement are related, but age *does not cause* an increase in academic ability. When we interpret correlations, we may see a

relationship, but we need to be very careful not to assume that one factor *causes* the other.

Estimating the strength of a relationship using the Q-Correlation coefficient[161]

The **Q-correlation** coefficient can be used as a simple way to estimate the strength of the relationship between two variables. It is particularly useful if you only have access to a scatterplot but not the raw data. It is also a simple and fast way to estimate the relationship between two variables. However, Q-correlation coefficient is less accurate than more rigorous models (such as **Pearson's r** and Spearman rho) and cannot be used as a predictive model. It also assumes a linear relationship between the variables.

Q-correlation coefficient is represented as a number between -1 and +1. If the number is negative, it indicates a negative relationship between the two variables. If the number is positive, it indicates a positive relationship. The closer to zero (0) the number is, the weaker the relationship between the two variables.

To ensure that the Q-correlation coefficient is meaningful, it is important to begin with variables that are likely to be related or comparable. For example, if a teacher calculates the correlation coefficient between Mathematics results and their students' English results the test scores may appear to correlate. However, because they are not related skill sets, the results are **spurious**. That is, the results are false or meaningless because the Mathematics assessments and English assessments are not related (i.e., they test very different skills and knowledge).

Here is an example to illustrate the process of calculating the Q-correlation coefficient

A class of 30 Grade 2 students have just completed their final narrative writing task for their Myanmar subject. Before they began the narrative writing unit, the students were asked to write a short story. The teacher used the students' submissions of the first task as a diagnostic tool to inform teaching and learning over the course of the unit. The same rubrics were used to mark the diagnostic and final (summative) writing tasks, because the same skills and knowledge were being assessed. When

161 Jones et al. (2012).

analysing the results, the teacher wanted to estimate the strength of the relationship between the scores for the diagnostic writing task and the summative task.

Step 1: Begin with the scores from the two assessment tasks:

Table 8.41. Class scores for diagnostic versus summative tasks

Student ID	Diagnostic task /45	Summative task /45	Student ID	Diagnostic task /45	Summative task /45
Student 1	29	36	Student 16	24	31
Student 2	34	40	Student 17	45	41
Student 3	31	31	Student 18	23	24
Student 4	34	37	Student 19	26	24
Student 5	32	42	Student 20	34	42
Student 6	36	45	Student 21	24	29
Student 7	29	32	Student 22	26	33
Student 8	39	32	Student 23	30	29
Student 9	37	45	Student 24	22	21
Student 10	31	29	Student 25	29	25
Student 11	29	28	Student 26	22	23
Student 12	29	38	Student 27	25	24
Student 13	28	29	Student 28	18	23
Student 14	33	41	Student 29	45	44
Student 15	34	39	Student 30	31	37

Step 2: Create a scatter plot using the scores from the two tasks. In this example, all students scored above 15 marks, so both the X-axis and Y-axis begin at 15. Remember to label your axes clearly. In this example, each dot represents one student. The student's number is marked on the graph.

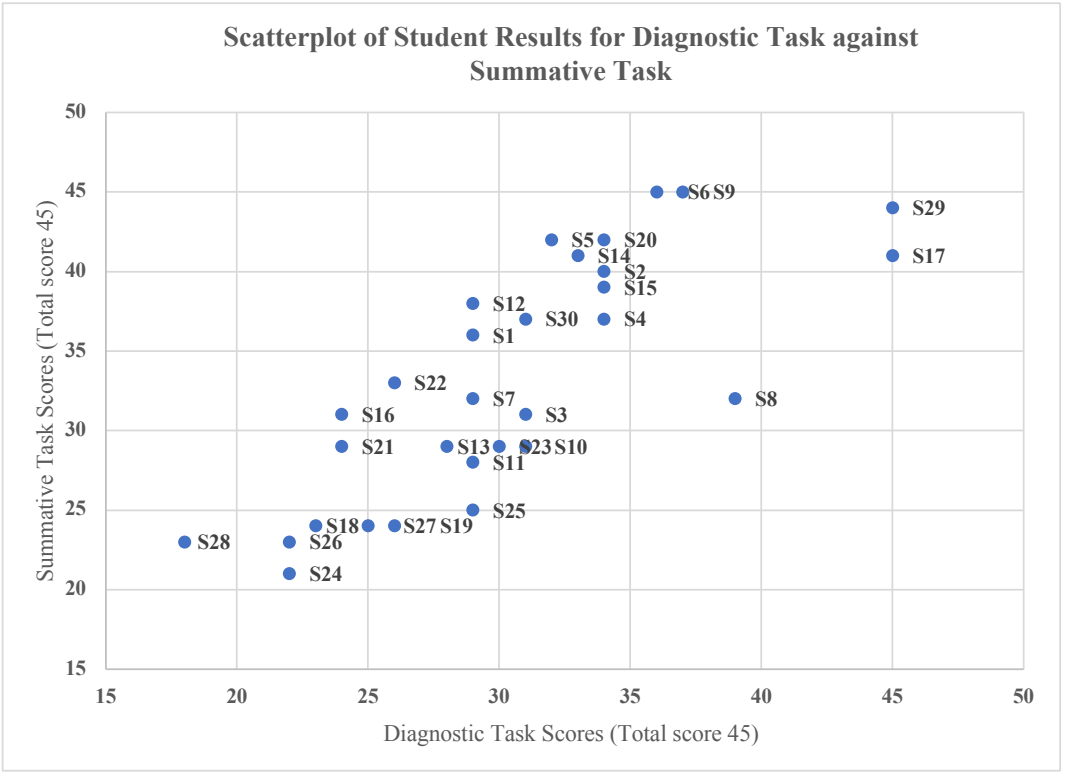


Figure 8.22. Scatter plot of student results for diagnostic task against summative task[162]

Step 3: Count the number of dots on the graph. In this case, it is 30, because there are 30 students.

Step 4: Find the median. Here is the equation:

$$m = \frac{n + 1}{2}$$

Where m = the median

n = the number of dots

162 Image by author, used with permission.

In this example, the median is between 15 and 16:

$$m = \frac{30 + 1}{2}$$

$$m = \frac{31}{2}$$

m = 15.5 (or halfway between 15 and 16)

Step 5: Count the dots from left to right until you reach the midpoint (in this example, it is between 15 and16). Draw a vertical line from the top of the graph to the bottom of the graph at the midpoint. Note that if the median is a whole number, the line will go through a dot. If the midpoint is not a whole number, the line will be drawn between the dots (as shown in Figure 8.23).

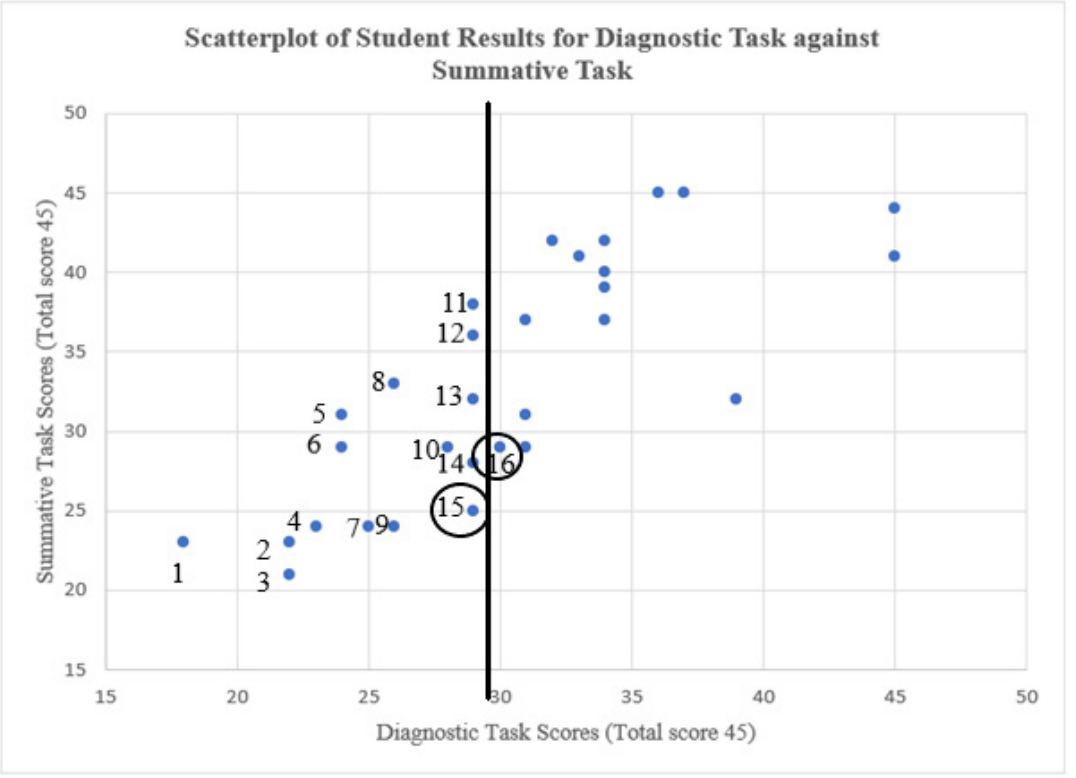


Figure 8.23. Bisecting the scatterplot vertically using the median[163]

163 Image by author, used with permission.

Step 6: Count the dots from the bottom of the graph to the median. In this example the median is between dot 15 and dot 16. Note that both dots are in line with each other. In these cases, draw the line through both dots. Draw a horizontal line across the midpoint of the data.

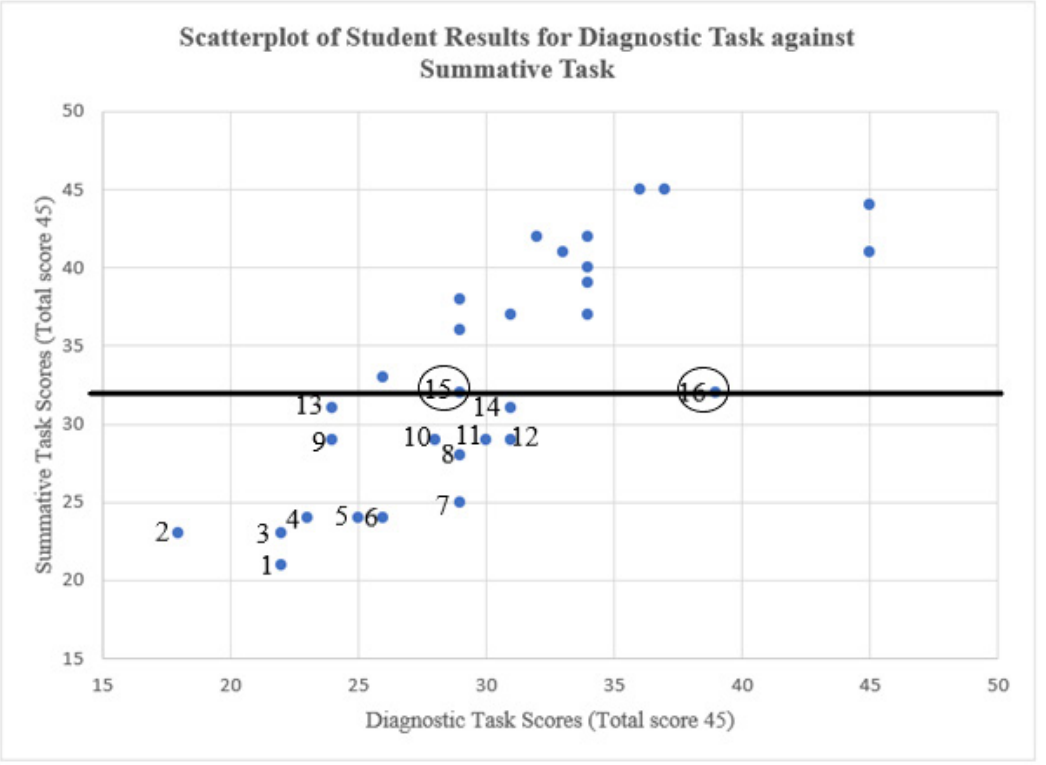


Figure 8.24. Bisecting the scatter plot horizontally, using the median[164]

Now you should have two lines on the graph, splitting the data into four sections or quadrants.

164 Image by author, used with permission.

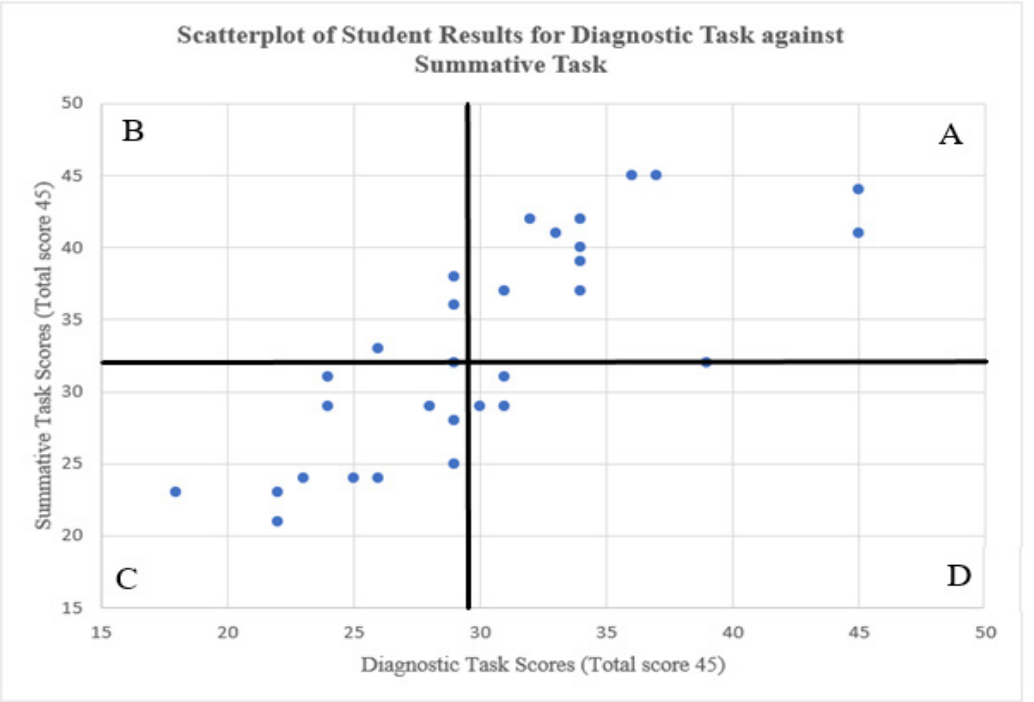


Figure 8.25. Scatterplot divided into quadrants (each quadrant has been labelled with a letter) [165]

Step 7: Count the number of dots within each quadrant. Do not include the dots that have a line drawn through them.

165 Image by author, used with permission.

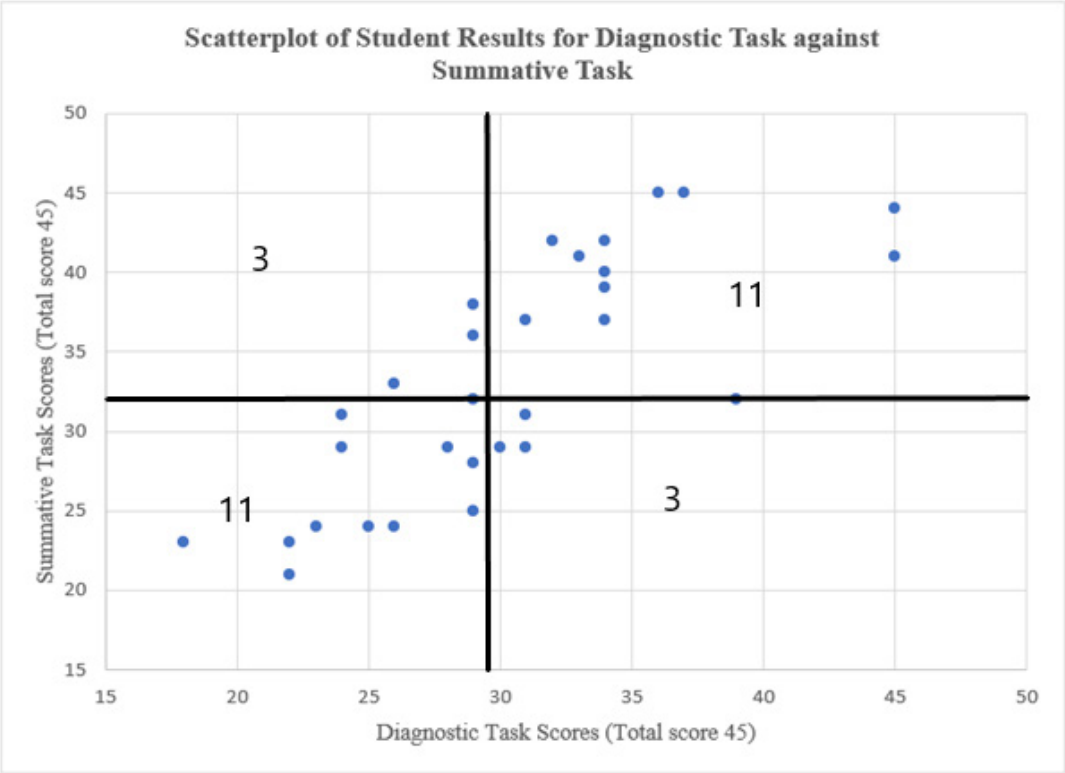


Figure 8.26. Count the number of dots in each quadrant[166]

Step 8: Calculate the Q-correlation coefficient. The formula is:[167]

$$Q = \frac{(A + C) - (B + D)}{A + B + C + D}$$

Where: Q = Q-correlation coefficient
A = Quadrant A
B = Quadrant B
C = Quadrant C
D = Quadrant D

166 Image by author, used with permission.
167 Jones et al. (2012, p. 150).

For this example, the equation would be:

$$Q = \frac{(11+11) - (3+3)}{11+3+11+3}$$

$$Q = \frac{22 - 6}{28}$$

$$Q = \frac{16}{28}$$

$$Q = 0.57$$

Learning activity 1. Calculation: Calculating the Q-correlation coefficient for assessment data

The purpose of this learning activity is for you to practise calculating the Q-correlation coefficient and interpret what it means.

Your colleague's Year 2 students have completed the same diagnostic task and summative task for the narrative writing unit. Your colleague presents you with the scatterplot of the students' scores. They ask you whether you think there is a strong relationship between both tasks.

Calculate the Q-correlation for the following data and provide an estimate of the strength of the relationship between the results for the diagnostic and summative tasks.

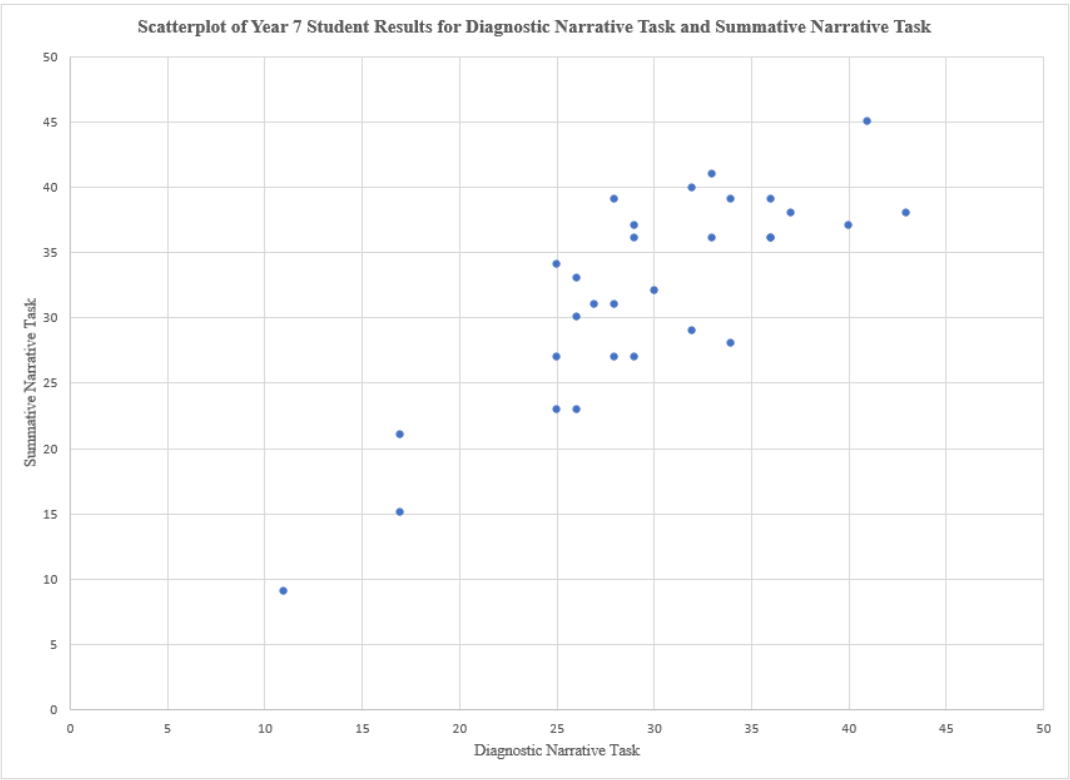


Figure 8.27. Scatterplot of Year 2 results for two narrative assessment tasks[168]

Discuss the scatterplot and correlation coefficient with the person sitting next to you. What does this graph and the correlation coefficient tell you about the achievement of this group of students?

Period 2

Pearson's r Correlation Coefficient

While Q-correlations provide a simple, but less accurate estimate of the relationship between two variables, Pearsons' r provides a more accurate and predictive measure. Like Q-correlations, Pearsons' r requires there to be a linear relationship between the variables. For the purpose of this lesson, we will discuss Pearson's r using the two variables you analysed for the Q-correlation coefficient.

168 Image by author, used with permission.

We would use Pearson's r to quantify the strength of the relationship between two variables. Both the diagnostic task and summative task were given to all students within the class. We might apply Pearson's r to see whether all students in the class improved in their learning to a similar degree. If the correlation is weak (close to 0), it could indicate that some groups of students benefited more than others from teaching and learning opportunities in this unit of work. However, if the correlation is positive and strong (close to 1) it could mean that most of the students benefited to a similar degree. In this scenario, a negative correlation would be unlikely.

Calculating Pearson's r

There are four calculations that need to be performed before beginning to calculate Pearson's r.

Step 1:

1. Calculate the *mean* of the first variable (e.g., the diagnostic test: mean =30.3)
2. Calculate the *standard deviation (SD)* of the first variable (SD = 6.304)
3. Calculate the *mean* of the second variable (e.g., the summative test: mean = 33.133)
4. Calculate the SD of the second variable (SD = 7.427).

Step 2: Create a table with 8 columns (see Table 8.42). Note all means and standard deviations have been calculated from the full class of 30 students. However, for the purpose of illustration, Table 8.42 only provides the scores for first 10 students in the class. See Annex 5 for the full table of results.

Table 8.42. Example of table to calculate Pearson's r correlation coefficient

Student ID	Diagnostic task/45 Variable 1	Mean distance Variable 1	Standardised mean distance Variable 1	Summative task/45 Variable 2	Mean distance Variable 2	Standardised mean distance variable 2	Product of Standardised mean distances
Student 1	29			36			
Student 2	34			40			
Student 3	31			31			
Student 4	34			37			

Student ID	Diagnostic task/45 Variable 1	Mean distance Variable 1	Standardised mean distance Variable 1	Summative task/45 Variable 2	Mean distance Variable 2	Standardised mean distance variable 2	Product of Standardised mean distances
Student 5	32			42			
Student 6	36			45			
Student 7	29			32			
Student 8	39			32			
Student 9	37			45			
Student 10	31			29			

a. The **mean distance** is the difference between the mean of the variable and each value. For example, find the mean of all scores for the *diagnostic test* (Variable 1) first.
   To calculate the mean distance, subtract the **mean of variable 1** from each students' variable 1 score.
b. The standardised mean distance is calculated for each value. The standardised mean distance for each value is the **mean distance** divided by **the standard deviation** for that variable.
c. The product of the standardised mean distances is calculated for each student by multiplying the standardised mean distances for variable 1 (diagnostic task) and variable 2 (summative task).

Step 3: To calculate Pearson's r, sum all values for the **product of standardised mean distances** and divide by *n*-1 (where *n* is the number of students). The result is the Pearson's correlation coefficient (r) or Pearson's r. Here is the formula:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \overline{y})^2}}$$

Where: r = correlation coefficient
Σ sum of values based on:
n = the number cases
i = case number
x = explanatory variable (EV)
$\underline{x}$ = the mean of EV

y = response variable (RV)
$\underline{y}$ = the mean of RV

An alternative formula that achieves the same result is this:

$$r = \frac{1}{n-1}\sum \frac{V_1 - \overline{v}_1}{Sv_1} \times \frac{V_2 - \overline{v}_2}{Sv_2}$$

Where: n = the number of students (or cases)
Σ = sum of values for all students (or cases)
V_1 = Variable 1 (value for each student)
V_2 = Variable 2 (value for each student)
$\underline{V}_1$ = mean of variable 1
$\underline{V}_2$ = mean of variable 2
S_{v_1} = standard deviation of variable 1
S_{v_2} = standard deviation of variable 2

This alternative formula enables us to work through a relatively simple process to understand how Pearson's r is generated.

Interpreting Pearson's r

Pearson's r will always result in a number between -1 and 1. A result below 0 indicates an inverse relationship. A result above 0 indicates a direct relationship. If the score is 0, it means that there is no linear relationship between the two variables. The further away from 0 (either positive or negative), the more linear the relationship.

A perfect correlation (either -1 or 1) is very unlikely in practice, particularly in classes with more than 5 or 6 students. Because it is so unlikely, if a correlation between two tests was perfect, it would be cause for concern and further investigation. Similarly, if there is a weak relationship between two variables that you might expect to be related, it would require further investigation.

The strength (linearity) of the relationship is often described in the following way:

Table 8.43. Strength of linear relationships for Pearson's r

Absolute Value of r	Strength of Relationship
$\|r\| < 0.3$	None to very weak
$0.3 < \|r\| < 0.5$	Weak
$0.5 < \|r\| < 0.7$	Moderate
$\|r\| > 0.7$	Strong

Learning activity 2. Calculation: Calculating Pearson's r

The purpose of this learning activity is to calculate Pearson's r to analyse the relationship between a diagnostic test and a summative test.

You will work in small groups of three to four people.

When calculating scores for each student, divide the data between the members of your group. Record your results on a large sheet of paper.

Part 1: Work through the steps to calculate Pearson's r for the class of students. See Annex 6 for the table to fill in.

Part 2: Interpret Pearson's r in relation to the data.

- What does the result indicate about the strength of the correlation?
- What does this mean about the achievement of students on the summative assessment in comparison with the diagnostic test?
- As a teacher, when and how might you use this information?

Part 3: Compare the correlation coefficients for your calculations of the Q-correlation and Pearson's r. Remember that Q-correlations are an estimate, while Pearson's r is a more accurate measure.

- When would Q-correlations be a useful method to use to analyse student data?
- When would Pearson's r be a more appropriate method?
- Discuss the benefits and limitations of both methods of calculating a correlation coefficient.

Review questions

1. What is the role of judgement-based assessment in education? What are the benefits and limitations? How can teachers minimise the limitations and maximise the benefits?
2. What is the purpose of rubrics in assessment? How can rubrics be used to make assessment more objective, valid and reliable?
3. Which measures of central tendency may teachers use to understand assessment data in their classrooms?
4. Why is it important for teachers to look at measures of variability in addition to measures of central tendency when trying to understand assessment data in their classrooms?
5. What are the pros and cons of using percentiles and percentile rank to analyse and report student achievement?
6. Evaluate the use of correlations in analysing student assessment data.

Unit Summary

Key messages

- The four pillars of assessment in the National Assessment Policy outline the different roles of assessment plays at different levels and for different stakeholders in education.
- The National Assessment Policy provides objectives that outline what assessment is expected to support or achieve in education.
- Assessment is a core component of the learning and teaching cycle. It needs to be valid, reliable, objective and fair so that it can be used to inform effective planning for teaching and learning.
- Learning taxonomies can be used as a framework to observe student learning as it progresses and to map the steps students are likely to take as they progress towards their learning goals.
- Peer and self-assessment can be beneficial tools to support learning and student self-regulation of learning. However, teachers also need to be aware of the limitations and minimise the risks of peer and self-assessment.
- Teachers should develop strategies to make feedback effective for supporting student learning. Feedback should also be given in a way that is sustainable for teachers.
- Judgement-based assessment is essential for assessing a range of different skills, however, it is subjective in nature. Teachers need to build tools to minimise subjectivity and maximise objectivity, reliability and validity in assessment.
- Rubric data can be analysed and used to inform teaching and learning. It can also be analysed to determine the reliability and validity of the tool.
- Measures of central tendency can help teachers to analyse the general progress of groups of students.
- Measures of variability enable teachers to analyse the range of proficiency levels within a class. They can also be used to analyse the shape of the data to see different trends in achievement of groups of students.
- Percentiles enable teachers to compare individual student achievement with a larger group. However, percentiles do not provide specific information about how teachers should plan for teaching and learning.

- Percentile rank enables teachers to rank students according to their level of achievement. Percentile rank has a range of limitations which need to be weighed against the benefits.
- Q-Correlations provide a relatively fast and effective way to analyse two sets of data. However, it provides an estimate and is less accurate than Pearson's r.
- Pearson's r provides an accurate way to analyse linear relationships between two variables.

Unit reflection

In this unit, you deepened your knowledge about assessment and how it can be used effectively to enhance teaching and learning.

What did you learn well in this unit?

What do you think you need to work on to improve your learning?

How will you put what you have learnt about feedback, self-assessment and peer assessment into practice in your own learning and in your teaching?

What are the benefits, limitations and challenges in using statistics to inform teaching and learning?

Further reading

8.1. Four Pillars of Assessment and the Teacher's Role

Masters, G. (2013). *Reforming educational assessment: Imperatives, principles and challenges*. Australian Council for Educational Research. https://research.acer.edu.au/aer/12/

8.2. Classroom Level Assessment in the KG and Lower Primary School

Andrade, H., & Brookhart, S. M. (2016). The role of classroom assessment in supporting self-regulated learning. In D. Laveault, & L. Allal (Eds.). *Assessment for learning: Meeting the challenge of implementations* (pp. 293–309). Springer.

Australian Institute for Teaching and School Leadership. (2017). *Spotlight: Reframing feedback to improve teaching and learning.* https://www.aitsl.edu.au/docs/default-source/research-evidence/spotlight/spotlight-feedback.pdf

Reynolds, L. (n.d.). *20 ways to provide effective feedback for learning.* Teach Thought https://www.teachthought.com/pedagogy/20-ways-to-provide-effective-feedback-for-learning/

8.3. School-based Assessment: Designing Tools and Analysing Achievement

Griffin, P., & Robertson, P. (2018). Writing assessment rubrics. In P. Griffin (Ed.). *Assessment for Teaching* (2nd ed., pp. 125-155). Cambridge University Press.

Richardson Grichting, K. (2021, July 24). *Creating a Guttman chart with partial credit (e.g., rubric data).* [Video]. YouTube. https://youtu.be/fGhHz9rUvUk

Soh, K. (2016). On Correlation: What is between them? *Understanding and exam results statistically: An essential guide for teachers and school leaders* (pp. 35–45). Springer

Unit 9

Supportive and Safe Learning Environment

In this unit, you will consolidate your understanding of building a supportive, safe, and stimulating learning environment for KG/Lower Primary students. You will explore aspects of inclusive education, teacher beliefs about students and learning, teacher–student and student–student relationship building, the physical learning environment, the role of technology in enhancing inclusion, innovation and citizenship, and classroom procedures, rules, and proactive management techniques.

Expected learning outcomes

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

- Outline characteristics of an educational system that is becoming inclusive;
- Reflect on characteristics of a classroom that is becoming inclusive to identify supporting strategies in KG/Lower Primary settings;
- Outline strategies that foster highly productive and positive teacher–student and student–student relationships in KG/Lower Primary classrooms;
- Design the physical learning environment to maximise KG/Lower Primary student engagement, learning, and inclusion;
- Reflect on how technologies can support inclusion in Myanmar KG/Lower Primary classrooms;
- Reflect on personal use of technologies to support creativity and innovation;
- Review literature-informed characteristics of global citizenship to scope aligned KG/Lower Primary teaching and learning activities and supporting technologies;
- Generate appropriate procedures for different areas of KG/Lower Primary classroom activity;

- Compile a checklist to ensure a safe KG/Lower Primary classroom learning environment;
- Outline elements of an evidence-informed framework of effective and inclusive classroom management; and
- Consider how a teacher in a large KG/Lower Primary classroom may use proactive classroom management techniques.

Competencies gained

A2.2 Demonstrate understanding of appropriate use of Information and Communication Technology (ICT) in teaching and learning

A3.2 Demonstrate respect for the social, linguistic, and cultural diversity of the students and their communities

B3.1 Demonstrate capacity to create a safe and effective learning environment for all students

B3.2 Demonstrate strategies for managing student behaviour

C1.1 Demonstrate values and attitudes consistent with Myanmar's tradition of perceiving teachers as role models

C1.3 Demonstrate understanding of the possible effect of local culture and context on student participation in school

C2.1 Demonstrate commitment to serving the school and community as a professional member of the teaching profession

C3.1 Demonstrate a high regard for each student's right to education and treat all students equitably

C3.2 Demonstrate respect for diversity of students and the belief that all students can learn according to their capacities

Key terms

Augmentative and Alternative Communication (AAC), coding, global citizenship, habits of mind, immersive simulation, Individualised Education Plans (IEP), integration, segregation

9.1. Social and Physical Environment

In this sub-unit, you will explore how to create a more inclusive social and physical learning environment for KG/Lower Primary students.

9.1.1. Creating an inclusive learning environment

Expected learning outcomes

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

- Outline characteristics of an educational system that is becoming inclusive;
- Reflect on characteristics of a classroom that is becoming inclusive to identify supporting strategies in KG/Lower Primary settings;
- Outline strategies that foster highly productive and positive teacher–student and student–student relationships in KG/Lower Primary classrooms; and
- Design the physical learning environment to maximise KG/Lower Primary student engagement, learning, and inclusion.

Period 1

Linking to prior learning: Inclusive school and classroom

In Year 2 Educational Studies, you explored three approaches to providing education for students with disabilities and additional needs – **segregation, integration,** and inclusion (see glossary if you wish to revisit concepts). With respect to inclusion, you reviewed characteristics, as outlined by UNESCO's International Bureau of Education, of:

- A classroom that is becoming inclusive (in Unit 3. Strategies for Effective Learning)
- A school that is becoming inclusive (in Unit 9. Supportive and Safe Learning Environment) (Box 9.1).[169]

Box 9.1. Characteristics of a classroom and school that are becoming inclusive

In a classroom that is *becoming* inclusive:

1. Teaching is planned with all students in mind.
2. Lessons encourage the participation of all students.
3. Students are actively involved in their own learning.
4. Students are encouraged to support one another's learning.
5. Support is provided when students experience difficulties.
6. Classroom discipline is based on mutual respect and healthy living.
7. Students feel that they can speak to somebody when they are worried or upset.
8. Assessment contributes to the achievement of all students.

In a school that is *becoming* inclusive:

1. Everyone feels welcome.
2. Students are equally valued.
3. There are high expectations for all students.
4. Staff and students treat one another with respect.
5. There is a partnership between staff and families.
6. The building is accessible to all students.
7. Senior staff support teachers in ensuring that all students participate and learn.
8. The school monitors the presence, participation, and achievement of all students.

169 International Bureau of Education, (2016, p. 14).

Inclusive educational system

In Year 3 of Educational Studies, the focus on inclusive educations extends to include educational system level reforms. You have already reflected on how:

- Myanmar's educational system can become more resilient and inclusive (Sub-unit 1.1. Education in the 21st century)
- Recent educational reforms aligned with:
  - Myanmar's National Education Strategic Plan, with the focus of Basic Education on access, quality, and inclusion (Sub-unit 6.1. Myanmar educational reforms); and
  - UN Sustainable Development Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

In addition to a classroom and school, UNESCO's International Bureau of Education also identified characteristics of an *educational system* that is becoming inclusive.[170] These characteristics (Box 9.2) are organised according to four dimensions (Figure 9.1). Note that the reference to 'becoming inclusive' points to inclusion as an ongoing process of learning – at no point is a classroom, school, or educational system ever entirely inclusive.

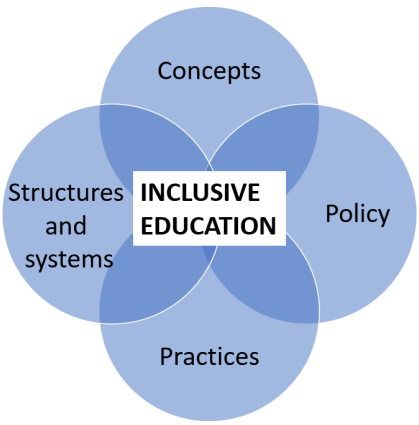


Figure 9.1. Dimensions of an educational system that is becoming inclusive[171]

170 International Bureau of Education. (2016, p. 14).
171 Author's own work, used with permission.

Box 9.2. Characteristics of an educational system that is becoming inclusive

Concepts

- Inclusion is seen as an overall principle that guides all educational policies and practices.
- National curriculum and assessment systems are designed to take account of all learners.
- All agencies that work with children and their families understand and support national policy aspirations for promoting inclusive education.
- Systems are in place to monitor the presence, participation, and achievement of all students within the education system.

Policy

- Inclusive education is strongly featured in important national education policy documents.
- Senior staff at national, state/regional, and district levels provide clear leadership on inclusive education.
- Leaders at all levels, including civil society and other social sectors:
  - articulate consistent policy aspirations for the development of inclusive practices in schools; and
  - challenge non-inclusive practices in schools.

Structures and systems

- There is high-quality support for vulnerable groups of learners.
- All services and institutions involved with children and families work together in coordinating inclusive policies and practices.
- Resources, both human and financial, are distributed in ways that benefit vulnerable groups of children.
- There is a clear role for specialist services in promoting inclusive education within the understanding of education as a right.

Practices

- Schools have strategies for encouraging the presence, participation, and achievement of all learners from their local communities.
- Schools provide support for children who are vulnerable to marginalisation, exclusion, and underachievement.
- Pre-service teachers are prepared for dealing with learner diversity.
- Teachers have opportunities to take part in continuing professional development regarding inclusive practices.

Learning activity 1. Evaluation: Myanmar's education system

The purpose of this learning activity is to discuss indicators of an educational system that is becoming inclusive and arrive at a broad assessment of Myanmar's progress with respect to the indicators.

Background information:

The characteristics outlined in Box 9.2 inform a National Review Framework, which can be used to determine the stage of development of inclusive education within a national education system. UNESCO's International Bureau of Education highlights that such a review:

> …requires engagement with statistical and qualitative data, ensuring inclusion of the views of students and their families. As such, evidence can be used to formulate plans for moving policy and practice forward.[172]

Ordinarily, a national strategy group, comprising representatives of stakeholders from different levels of the education system and different parts of the country, would be convened to undertake the review. The International Bureau of Education recommends the rating system for each indicator, based on the collated evidence, which is outlined in Table 9.1.

172 International Bureau of Education, (2016, p. 18).

Discuss the indicators in Box 9.2. Identify those that you believe are Myanmar's:

- [S] Strengths
- [W] Weaknesses.

Refer to the rating system in Table 9.1 to make a broad assessment of Myanmar's progress towards an educational system that is becoming inclusive.

Table 9.1. Rating system

Rating	Descriptor	Explanation
1	The system is performing well.	There are several significant strengths and no obvious weaknesses.
2	The system is performing quite well.	On balance, strengths outweigh weaknesses.
3	The system is not performing very well.	On balance, weaknesses outweigh strengths.
4	The system is performing badly.	There are no obvious strengths and several significant weaknesses.

Period 2

Inclusion in the Lower Primary classroom

Learning activity 2. Cooperative group task: Classroom strategies for inclusion

The purpose of this learning activity is for you to reflect on the International Bureau of Education's characteristics of a classroom that is becoming inclusive to identify supporting strategies.

Review each of the characteristics of a classroom that is becoming inclusive. Table 9.2 outline strategies that can support the fostering of that characteristic in a KG/Lower Primary classroom.

Table 9.2. Strategies to support a KG/Lower Primary classroom to become inclusive

Characteristics	Strategies
Teaching is planned with all students in mind.	
Lessons encourage the participation of all students.	
Students are actively involved in their own learning.	
Students are encouraged to support one another's learning.	
Support is provided when students experience difficulties.	
Classroom discipline is based on mutual respect and healthy living.	
Students feel that they can speak to somebody when they are worried or upset.	
Assessment contributes to the achievement of all students.	

Figure 9.2. Lessons encourage the participation of all students[173]

Period 3

Linking to prior learning: Teacher beliefs

In Year 2 of Educational Studies, you reflected upon your beliefs relating to teaching diverse learners and developing a supportive and safe learning environment, by responding to a survey. That survey is presented in Table 9.3.

Table 9.3. Student teacher survey on inclusion

Survey statements	Strongly agree	Agree	Disagree	Strongly disagree
1. All students have value and worth				
2. All students can learn				
3. Diversity is valuable and can enrich the learning of all students in the classroom				
4. All students belong within the classroom learning community				

173 Myanmar KG Teacher Guide, Ministry of Education.

Teachers' beliefs about their students impact on the nature of the relationships that they foster in the classroom – that is, both teacher–student and student–student relationships. Indeed, teachers' beliefs about their students and learning have the power to either:

- create or reinforce barriers (e.g., *"Diversity is challenging and compromises the learning in my classroom"* – the opposite of survey statement #3).
- remove barriers to learning (e.g., *"All students have value and worth and can learn"* – a combination of survey statements # 1 and 2).

KG classroom becoming inclusive

Box 9.3 presents a vision of an inclusive KG learning environment within which students' relationships with the teacher and fellow students affirm them as:

- individuals; and
- members of a diverse community of learners.

Box 9.3. KG classroom becoming inclusive[174]

Active and collaborative learning

The learning and teaching programme provides opportunities for all students to:

- express their ideas;
- discover their strengths and the unique contributions that they make;
- collaborate with others; and
- develop relationships.

174 Ontario Ministry of Education, (2016, p. 50).

Ongoing formative assessment

Teachers observe students throughout the day to determine how best to adjust the learning environment, contexts for learning, and pedagogical strategies in order to:

- meet the particular needs of each child; and
- support children's learning through relationships.

Connecting to students' diverse backgrounds

Teachers include learning opportunities that reflect students' diverse backgrounds – for example, they introduce stories, poems, songs, dances, and games – and they have students bring items from home into the classroom.

Figure 9.3. Students express their ideas and collaborate with others[175]

175 Myanmar KG Teacher Guide, Ministry of Education.

Figure 9.4. Students discover their strengths and develop relationships[176]

Figure 9.5. Teachers observe and interact with KG students[177]

176 Myanmar KG Teacher Guide, Ministry of Education.
177 Myanmar KG Teacher Guide, Ministry of Education.

Learning activity 3. Beliefs and practices: Building relationships

The purpose of this learning activity is for you to outline strategies that create a KG/Lower Primary learning environment, which fosters highly productive and positive teacher–student and student–student relationships.

In Table 9.4, reflect on your beliefs about students, teaching and learning, and/or inclusive education in a KG/Lower Primary setting.

Outline strategies to foster highly productive and positive teacher–student and student–student relationships in a KG/Lower Primary classroom. Draw on all of your learning across Year 3 Educational Studies.

Table 9.4. Beliefs and practices

Core beliefs	
Generate strategies to foster relationships	

Period 4

Learning activity 4.Poster: Design of physical learning environment

The purpose of this learning activity is for you to design the physical learning environment of a KG/Lower Primary classroom to maximise student engagement, learning, and inclusion.

Review the design considerations identified in Box 9.4. Rank them in order of perceived importance. What other considerations do you think are important? Add these considerations to Box 9.4.

Collaboratively design the physical learning environment of a KG/Lower Primary classroom with a view to maximising student engagement, learning, and inclusion. You can use Box 9.5 for preliminary sketches.

Box 9.4. Design considerations for the classroom learning environment[178]

1. Is student-centred learning (i.e., Play-based and inquiry-based learning) supported by the classroom layout, resources, and materials?
2. Does the learning environment make students' thinking and learning visible? For example, are students' work and, importantly, works-in-progress displayed around the classroom? How do the items displayed on the walls enhance and extend students' thinking?
3. Are the classroom's learning areas flexible so that they provide opportunities for purposeful collaboration and teacher–student and student–student conversations?
4. Are there enough materials and resources to engage students without overwhelming them? Are they developmentally appropriate? Do they promote appropriate risk-taking?
5. Are there materials and resources that support students' development of literacy, numeracy, and technological proficiency?

178 Adapted from Ontario Ministry of Education, (2016).

6. Does the learning environment allow for multiple points of entry? Do materials and resources support different student readiness levels, learning profiles, and interests?
7. Do the materials and resources reflect the diversity of the students in the class? For example, are the students' backgrounds (e.g., cultural, linguistic, family structure, socio-economic) represented in the choice of reading materials?
8. Are materials and resources accessible to the students? For example, are differentiated supports, such as photos, labels, and other visual aids, in place to help all students make informed and independent choices?
9. Is the learning environment mostly built with and by the students? Are students engaged in the process of determining and organising materials in and around the room? Are students involved in how and when the learning areas change and evolve?
10. In what ways does our learning environment support the development of students' self-regulation skills? Are there areas where students could read or work quietly and independently?
11. Does the classroom setting reflect the natural environment? For example, can students manipulate natural and found objects in the classroom? How can diverse settings for inquiry and imaginative play be used to promote learning that can be brought back into the classroom?

Additional design considerations:

Box 9.5. Classroom design sketches

Review questions

1. Why does UNESCO's International Bureau of Education use the terminology 'systems, schools, and classrooms that are *becoming inclusive*' as opposed to 'inclusive systems, schools, and classrooms'?
2. What are the dimensions of an educational system that is becoming inclusive? Provide one indicator for each of the dimensions.
3. How does attention to the social and physical learning environment relate to the inclusive education agenda?

9.2. Role of Technology in the Learning Environment

In this sub-unit, you will explore how technology can be used to support students' inclusion and development of competences related to innovation and citizenship.

9.2.1. Technology – inclusion, innovation, and citizenship

Expected learning outcomes

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

- Reflect on how technologies can support inclusion in Myanmar KG/Lower Primary classrooms;
- Reflect on personal use of technologies to support creativity and innovation; and
- Review literature-informed characteristics of global citizenship to scope aligned KG/Lower Primary teaching and learning activities and supporting technologies.

Period 1

Individualised Education Plans

In Year 2 of Educational Studies, you learnt about **Individualised Education Plans (IEP)**, which inform international best practices in supporting students, with additional needs, to access and participate in schooling. [179] An IEP outlines

179 Mitchell et al. (2010); King et al. (2018).

a) learning goals and outcomes, which are specific to the student, and b) provisions to help reduce barriers to their learning, including the resources and equipment needed for the student to function in the school and classroom environments. To develop an IEP, the classroom teacher works with school leaders, other professionals, and the student's parents or carers.

Augmentative and Alternative Communication

Typically, in the case of students who require **Augmentative and Alternative Communication (AAC)**, speech-language pathologists are part of the professional team. In Years 1 and 2 of Educational Studies, you learnt about students who require AAC, on account of significant impairments in speech, language, reading, and writing.[180] Students may require unaided and/or aided forms of AAC, as determined by their needs. In unaided communication, the student communicates through gestures, body language, facial expressions, or sign language. In aided communication, tools are used – from pen and paper to more complex technology-enabled devices – to help students communicate (Table 9.5). [181]

Table 9.5. Forms of Augmentative and Alternative Communication

Unaided	Aided	
No technology *Requires some motor control*	**Low technology** *Requires non-electronic tools*	**High technology** *Requires electronic tools*
• Gestures • Manual signs • Facial expression • Vocalisations • Verbalisations • Body language	• Pictures • Photographs • Objects • Communication boards • Writing	• Speech generating devices • AAC software that represents symbols or language and is used with computers, tablets or mobile phones.

180 American Speech–Language–Hearing Association [ASHA]. (2019).
181 American Speech–Language–Hearing Association [ASHA]. (2019).

Inclusion

There needs to be progress in Myanmar in terms of the inclusive education agenda and technology infrastructure in schools before:

- All students with disabilities attend schools;
- IEPs are implemented; and
- Those students who require high-technology AAC have access to the appropriate tools.

According to UNICEF's report, *Situation analysis of children with disabilities in Myanmar 2016*, two-thirds (67%) of children with disabilities were not in school, compared to 19% of children without disabilities.[182] The Myanmar Ministry of Education stated that:

> One of the possible reasons behind the disparity in children with disabilities attending school when compared to children without disabilities is that accessible facilities are still lacking at the majority of schools. [183]

Learning activity 1. Ideas board: Classroom use of technologies for inclusion

The purpose of this learning activity is for you to reflect on how the use of technologies can support inclusion in KG/Lower Primary classrooms.

While the focus of this period thus far has been on international best practices, discuss with your peers how *existing* technologies can support inclusive teaching and learning practices within KG/Lower Primary classrooms.

Ensure that you draw upon your learnings from Semester 1 of Educational Studies (Lesson 2.1.1, 'Technology integration across the curriculum' and Lesson 3.2.2, 'Blended learning in KG and the Lower Primary school') in this discussion.

182 UNICEF. (2016).
183 Ministry of Education, (2019, p. 25).

You may also make links to the role of technology in supporting the continuation of schooling for Myanmar students during the COVID-19 global pandemic.

Provide responses in Box 9.6. Be prepared to contribute to the class ideas board and record peers' ideas.

Box 9.6. Use of technologies to support inclusion in KG/Lower Primary classrooms

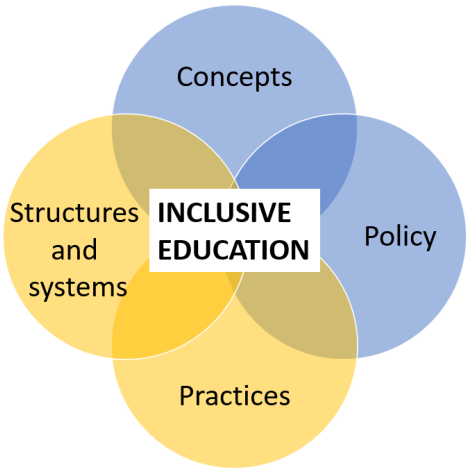
Homework activity. Statement: Classroom use of technologies to support inclusion

The purpose of this homework activity is for you to write a statement of 1-2 paragraphs on the current use of technologies to support inclusive education in Myanmar schools.

Arrive at a synthesis statement regarding the current use of technologies to support inclusive education in Myanmar schools.

In supporting your statement, you may wish to refer to indicators outlined in Table 9.6 (i.e., relevant indicators of the IBE National Review Framework and the SQASF).

Table 9.6. Relevant indicators in IBE framework and SQASF[184]

Educational system becoming inclusive	School Quality Assurance Standards Framework
 **Dimension: Practices** • Schools have strategies for encouraging the presence, participation, and achievement of all learners from their local communities. **Dimension: Structures and systems** • There is high-quality support for vulnerable groups of learners. • All services and institutions involved with children and families work together in coordinating inclusive policies and practices. • Resources, both human and financial, are distributed in ways that benefit vulnerable groups of children.	 **Dimension: Learning and teaching** • Students have learning opportunities and achieve learning outcomes • Students actively participate in learning • Principals, teachers, students, and school staff demonstrate inclusive attitudes and behaviours. **Dimension: Infrastructure and resources** • School infrastructure and resources support effective teaching and student learning.

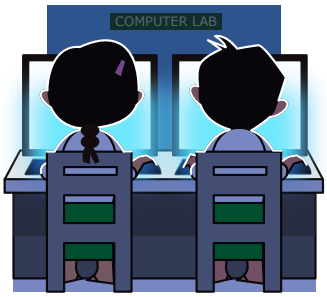
184 Author's own work, used with permission.

Period 2

Technology divides

Access to technological infrastructure is not equal throughout the world. In Year 2 of Educational Studies, you learnt about two different types of digital divides, as outlined in Table 9.7.[185]

Table 9.7. Digital divides

Traditional digital divide between:	Digital use divide between:
Students with access to the internet and devices at school and home 	Students with opportunities to use technology in active and creative ways to support learning 
Students without access to the internet and devices at school and home 	Students who use technology to passively consume content and media 

The US Department of Education acknowledges that closing the traditional digital divide is essential. However, it states:

185 US Department of Education, (2017).

This alone will not transform learning. We must also close the digital use divide by ensuring all students understand how to use technology as a tool to engage in ***creative, productive, life-long learning*** rather than simply consuming passive content.[186]

Students can use technology in active and creative ways in a learning environment where:

- The traditional divide no longer exists; and
- Teachers have been supported to develop deep *technological pedagogical content knowledge* (recall the concept of TPCK or TPACK from Unit 2).

Learning activity 2. Map: Personal use of technologies for innovation

The purpose of this learning activity is for you to document how you personally use technologies to support your creativity and innovation.

'Creativity and innovation' is one of the 5Cs – or 21st century skills – in the Myanmar Basic Education curriculum (Figure 9.6).

Figure 9.6. Myanmar's Basic Education 21st century skills or 5 Cs[187]

186 US Department of Education. (2017, p. 21).
187 Department of Myanmar Examinations. (2019, p. 14).

Students who have the opportunity to develop creativity and innovation skills over the course of their schooling "develop **habits of mind** and other characteristics that serve them throughout their lives". [188]

The Ontario Ministry of Education outlines the characteristics of innovators, as depicted in Figure 9.7. Discuss these characteristics. In Box 9.7, document how you personally use technologies to:

- support your own creativity and innovation; and/or
- develop specific characteristics in Figure 9.7.

Box 9.7. Map: Developing innovation skills

188 Ontario Ministry of Education, (2016, p. 89).

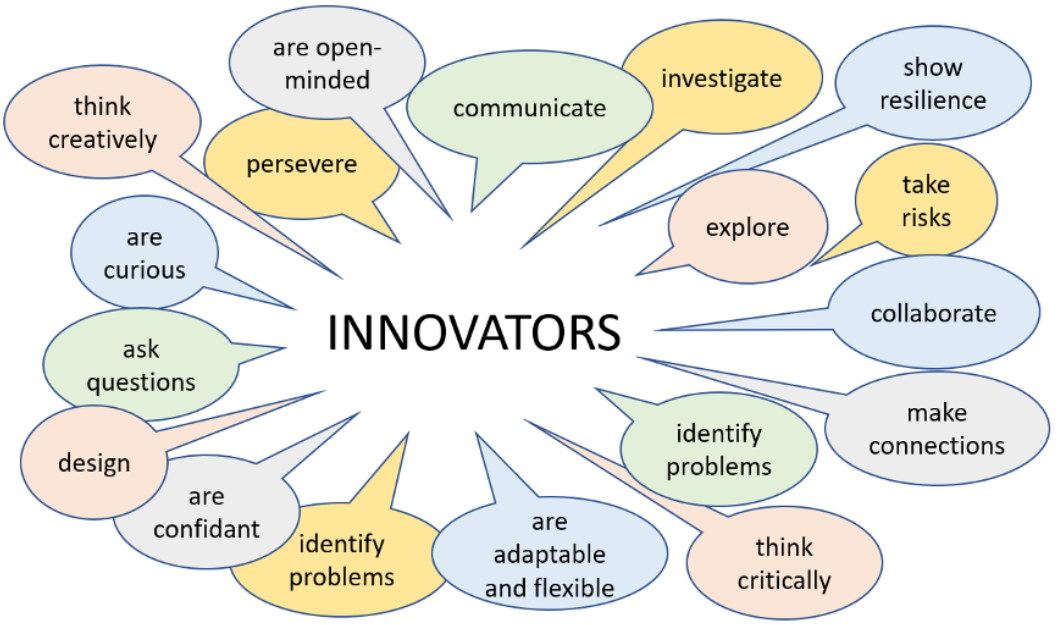


Figure 9.7. Characteristics of innovators[189]

Period 3

Active uses of technology and the Digital Literacy Global Framework

According to the US Department of Education, active uses of technology include:

- Locating, evaluating, using, and creating information;
- Collaborating with peers and experts, in local and global networks; and
- Engaging in design, **coding**, **immersive simulation**, and media production.[190]

These emphases are also captured in UNESCO's Digital Literacy Global Framework, outlined in Table 9.8 – see Competence Area 1 (Information and data literacy), Area 2 (Communication and collaboration), and Area 3 (Digital content creation) respectively.

189 Author's own work, used with permission; based on the Ontario Ministry of Education. (2016).
190 US Department of Education, (2017, p. 21).

The competences in the Digital Literacy Global Framework are intended to be developed over the course of students' schooling. The Framework was developed to inform a methodology to assess progress against Sustainable Development Goal Indicator 4.4.2: *Percentage of youth who have achieved at least a minimum level of proficiency in digital literacy skills.*

Table 9.8. Digital Literacy Global Framework[191]

Competence area	Competence
1. Information and data literacy	1.1 Browsing, searching and filtering data, information, and digital content 1.2 Evaluating data, information, and digital content 1.3 Managing data, information, and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity
3. Digital content creation	3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licenses 3.4 Programming
4. Safety	4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps

Recall that, in Year 2 of Educational Studies, you explored aspects of cyber safety (Competence 4.1-4.3), copyright and academic integrity (Competence 3.3), and managing a digital identity (Competence 2.6). These are foci for your ICT studies as well.

Global citizenship

UNESCO's Digital Literacy Global Framework (Table 9.8) includes an emphasis on:

- interacting, sharing, and collaborating through digital technologies, as well as engaging in ***citizenship*** through digital technologies (Competence Area 2); and
- protecting the environment (Competence Area 4).

191 UNESCO, (2018, p. 7).

According to the research literature: [192]

> Global citizenship is a 21st century approach to living in which principles of ***global responsibility and accountability*** are applied to everyday ***local actions***, and complex global problems are addressed on an individual basis.

As explored in Unit 6 (i.e., Sub-unit 6.2, 'Education for Peace and Sustainable Development'; Sub-unit 6.3. 'Human Rights Education') students require the competencies that can assist them in taking actions to address the interconnected social, political, cultural, and environmental realities of the 21st century.

Indeed, as you can see from Figure 9.6, in addition to 'Creativity and innovation', 'Citizenship and sustainable development' is another one of the 5Cs or targeted 21st century skills in Myanmar's Basic Education.

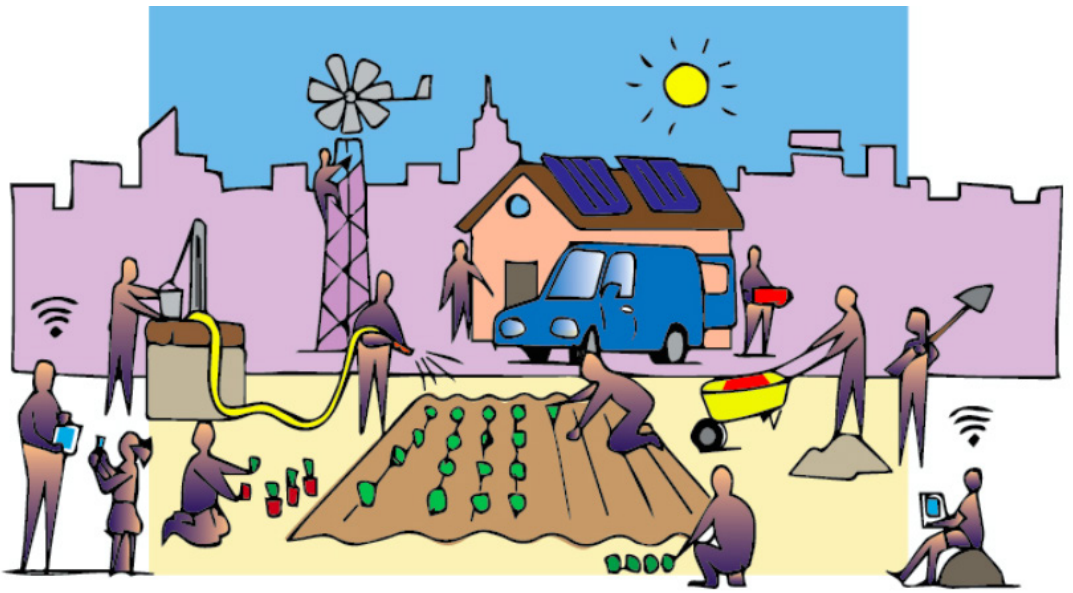


Figure 9.8. Global citizenship[193]

192 Guo,L. (2014).

193 Image by Joaquín González Dorao https://miro.medium.com/max/1050/1*L_xRIxRVAWlcjlVqImN0jw.png from July 26, 2017, Medium article by April Rinne, https://medium.com/@aprilrinne/global-citizenship-leveling-up-d9a74180e927

Learning activity 3. Planning: Classroom use of technologies for global citizenship

The purpose of this learning activity is for you to discuss literature-informed characteristics of global citizenship and scope an aligned KG/Lower Primary teaching and learning activity and supporting technologies.

The research literature identifies the following characteristics of global citizenship: [194]

1. Respect for fellow humans, regardless of race, gender, age, religion, or political views.
2. Appreciation for diversity and multiple perspectives.
3. A view that no single society or culture is inherently superior to any other.
4. Cherishing the natural world and respecting the rights of all living things.
5. Practising and encouraging sustainable patterns of living, consumption, and production.
6. Striving to resolve conflicts without the use of violence.
7. Be responsible for solving pressing global challenges in whichever way they can.
8. Think globally and act locally in eradicating inequality and injustice in all their forms.

Discuss the characteristics as a group. Are they characteristics that you possess?

Select one of the characteristics.

Identify links to the KG, Grade 1 or Grade 2 Basic Education Curriculum.

Scope a teaching and learning activity that aligns with the selected characteristic.

Indicate how technologies may support either teacher or students in this activity.

194 Guo,L. (2014). para. 2, section 'Conceptualising global citizenship'.

Table 9.9. Global citizenship: Learning activity and supporting technologies

Characteristic: **Links to curriculum:**	
Teaching and learning activity	**How can technologies support the learning?**

Review questions

1. What are the forms of Augmentative and Alternative Communication (AAC)?
2. To what extent are educational technologies being used to support inclusion in the Myanmar context?
3. What are the two digital divides spoken of in the educational literature?
4. What are active uses of technology? How do these uses relate to UNESCO's Digital Literacy Global Framework?

9.3. Classroom Management

In this sub-unit, you will consolidate your understanding of classroom rules and procedures, generate health and safety considerations for a KG/Lower Primary classroom, and consider the use of proactive classroom management techniques in a large KG/Lower Primary class.

9.3.1. Managing student behaviour and safety

Expected learning outcomes

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

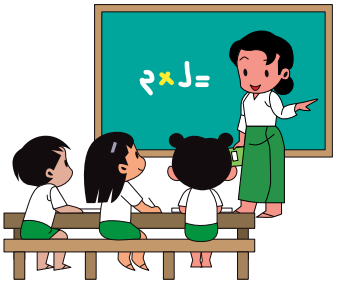
- Generate appropriate procedures for different areas of KG/Lower Primary classroom activity;
- Compile a checklist to ensure a safe KG/Lower Primary classroom learning environment;
- Outline elements of an evidence-informed framework of effective and inclusive classroom management; and
- Consider how a teacher in a large KG/Lower Primary classroom may use proactive classroom management techniques.

Period 1

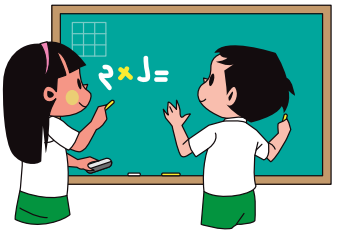
Clear expectations through establishing classroom procedures and routines

From the very first day of the school year, students must know how they are expected to learn and function in the classroom environment. The teacher needs to establish a set of classroom procedures, which establishes the culture of a classroom. Typically, these classroom procedures are not written down. In Years 1 and 2 of Educational Studies, you learnt about a three-step process for teaching classroom procedures to students:[195]

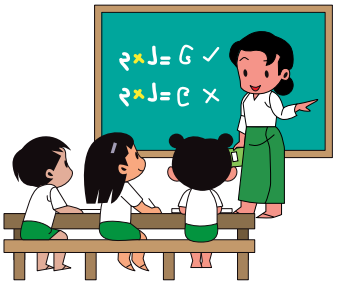
195 Black et al. (2003).



Step 1. *Explain* classroom procedures clearly



Step 2. *Rehearse* classroom procedures until they become routines



Step 3. *Reinforce* a correct procedure and *reteach* an incorrect one

In Year 2 Educational Studies, you learnt that a well-managed classroom has established procedures and routines relating to:

1. Administrative duties
2. Student movement
3. Lesson management
4. Teacher–student and student–student interactions
5. Housekeeping.[196]

Box 9.8 outlines considerations when establishing classroom procedures and routines relating to these five areas.

196 Monastic Education Development Group. (n.d.).

Box 9.8. Considerations when establishing classroom procedures and routines

Administrative duties:

- How does the teacher mark the "Ka" daily attendance register?
- How do teachers give out notes to be taken home for parents?

Student movement:

- How do students enter the class? Should they line up first outside?
- When students are late, how do they get permission to enter the room?
- In what circumstances, can students leave the room? When do they need permission?
- How many students at a time can attend the bathroom?
- Can students leave their seats to sharpen their pencils? Can they put rubbish in the bin?
- When can students leave at the end of the day?

Teacher-student and student-student interactions:

- Do students need to raise their hands for permission to speak or do they simply wait until the speaker has finished?
- How does the teacher signal when they want everyone to respond at once?
- How can students get the teacher's attention when they require assistance?
- Can students ask other students for assistance?

Lesson management:

- How is homework returned?
- How are resource materials distributed?
- What do students do if they have finished a learning activity early?
- How are student notebooks collected for assessment?
- Where do students place unfinished work?

Housekeeping:

- How does the teacher distribute tasks among students, such as cleaning the board, watering the plants, feeding the fish, etc.?
- How does the teacher ensure that the classroom remains tidy?
- What happens if lost items are found?

In this first period, you will consolidate understanding from Year 2 and generate procedures which are appropriate for the KG/Lower Primary classroom relating to these five areas.

In Period 2, the focus is expanded to include a sixth area – health and safety – which also calls for procedures and routines to be established in the KG/Lower Primary classroom.

Learning activity 1. Jigsaw activity: Generating classroom procedures

The purpose of this learning activity is for you to work in an expert group to generate procedures, which are appropriate for the KG/Lower Primary classroom, in one area of classroom activity.

In your expert groups, review the considerations (which are from Box 9.8 and have been presented in the middle column of Table 9.10). You may add further considerations related to the category that you have been assigned.

In response to these considerations, outline procedures that would be appropriate for a KG/Lower Primary classroom (in the right-hand column of Table 9.10).

Draw upon your Practicum experiences, where possible. Share the procedures that you have generated with your home group peers.

Table 9.10. Classroom procedures

Expert group category	Considerations	Procedures
Group 1: Administrative duties	• How does the teacher mark the attendance roll? • How do teachers give out notes to be taken home for parents?	
Group 2: Student movement	• How do students enter the class? • When students are late, how do they get permission to enter the room? • In what circumstances, can students leave the room? When do they need permission? • How many students at a time can attend the bathroom? • Can students leave their seats to sharpen their pencils? Can they put rubbish in the bin? • When can students leave at the end of the day?	
Group 3: Teacher-student and student-student interactions	• Do students need to raise their hands for permission to speak or do they simply wait until the speaker has finished? • How does the teacher signal when they want everyone to respond at once? • How can students get the teacher's attention when they require assistance? • Can students ask other students for assistance?	
Group 4: Lesson management	• How is homework returned? • How are resource materials distributed? • What do students do if they have finished a learning activity early? • How are student notebooks collected for assessment? • Where do students place unfinished work?	

Expert group category	Considerations	Procedures
Group 5: Housekeeping	• How does the teacher distribute tasks among students, such as cleaning the board, watering the plants, feeding the fish, etc.? • How does the teacher ensure that the classroom remains tidy? • What happens if lost items are found?	

Period 2

Procedures relating to health and safety also need to be established in KG/Lower Primary classrooms. The relevant TCSF competency is as follows:

- B3.2.1 Create, explain, display and enforce the agreed classroom rules and procedures to ensure student health and safety

The next learning activity allows you the opportunity develop this competency.

Learning activity 2. Class brainstorm: Health and safety checklist

The purpose of this learning activity is for you to develop a health and safety checklist for the KG/Lower Primary classroom that you designed in Period 4 of Lesson 9.1.1.

- Read the excerpt from one national education authority on health and safety in the classroom in Box 9.9.
- Discuss potential health and safety issues in a KG/Lower Primary classroom environment.
- Generate a health and safety checklist for the KG/Lower Primary classroom.

Box 9.9. Health and safety in the classroom[197]

Students must be made aware that health and safety are everyone's responsibility – at home, at school, and in the outdoors. To ensure the safety of students, learning areas need to be equipped with ***appropriate materials and resources*** – for example, art materials need to be non-toxic, and educators need to be aware of any possible danger that could arise from inappropriate use.

Procedures and routines provide opportunities for children to learn about health and safety. Students must be aware of any ***required safety drills*** and of ways of interacting with one another to ensure that they are not putting themselves or their peers in danger.

In a safe learning environment, the educators will:

- be aware of up-to-date ***safety information***;
- follow ***policies and guidelines*** related to health and safety;
- model safe practices at all times;
- discuss health and safety issues with students;
- plan the learning environment with safety as a primary consideration;
- involve the students in devising ways to make the environment safe for all;
- ***observe students*** to ensure that safe practices are being followed; and
- have ***plans*** in place in case of an ***emergency***.

197 Ontario Ministry of Education. (2016, pp. 106–107).

Figure 9.9. Classroom safety checklist[198]

198 Image: Checklist template by LyKe from Poster My Wall, https://www.postermywall.com/index.php/art/template/4d0b285efd55150303ecbf05f913ba2d/checklist-design-template#.YQZswdZuIaF

Evidence-informed framework of effective and inclusive classroom management

An evidence-based framework of effective and inclusive classroom management sees the teacher:[199]

- Maximise structure through:
  - a ***physical classroom environment,*** which reduces distraction and crowding and is conducive to learning; and
  - establishing ***procedures and routines***.
- Generate a small number of positively stated class ***rules*** and actively supervise and interact with students;
- Engage all students in learning by using a ***variety of evidence-informed*** teaching, learning, and assessment approaches, strategies, and techniques;
- ***Acknowledge appropriate behaviours*** through individual and group encouragement; and
- Use a continuum of strategies to ***respond to inappropriate behaviours*** from non-intrusive techniques to providing students with clear choices and consequences.

Figure 9.10. Actively engage all students in learning[200]

199 Simonsen et al. (2008).
200 Myanmar KG Teacher Guide, Ministry of Education.

Period 3

Linking to prior learning

In Year 2 Educational Studies, you also explored the following lines of inquiry regarding classroom rules:

1. Why are school and classroom rules important?
2. How do teachers set rules?
3. What are consequences?
4. Is physical punishment appropriate in a school?

The following quiz allows you to revisit some key themes regarding classroom rules.

Learning activity 3. Quiz: Classroom rules

The purpose of this learning activity is to activate prior learning on establishing class rules.

Undertake the quiz in Box 9.10. The questions are a mix of multiple choice questions (MCQs), short answer questions, and true/false questions.

Box 9.10. Quiz questions on classroom rules

1. Classroom rules are important because they:

   a) set boundaries for students' behaviour
   b) serve to create a supportive and safe learning environment
   c) provide students and parents with a sense of security
   d) all of the above.

   Answer:

2. How many rules should be established for a classroom?

   Answer:

3. It is not appropriate to co-establish rules (and consequences) with students. Students simply do not have the knowledge and experience to determine what is appropriate for a classroom. True/False

   Answer:

4. Rules are only effective when:

   a) they are made explicit to students (e.g., displayed on a wall poster)
   b) they are monitored
   c) there are consequences for not obeying them
   d) all of the above.

   Answer:

5. How can rules be effectively communicated to KG and Lower Primary students if they are unable to read?

   Answer:

6. Consequences are punishments. True/False

   Answer:

7. Define positive consequences and negative consequences.

   Answer:

   - Positive consequences result if
   - Negative consequences result if

8. Is physical or verbal punishment an appropriate negative consequence?

   Answer:

Proactive classroom management techniques

In Year 2 of Educational Studies, you were introduced to 10 proactive classroom management techniques. You had the opportunity to role-play these techniques. Tables 9.11–9.13 present these techniques clustered according to their broad purpose.

- Techniques 1–4 allow a teacher to set clear expectations;
- Techniques 5 and 6 allow a teachers to acknowledge appropriate behaviour; and
- Techniques 7–10 allow a teacher to respond to inappropriate behaviour.

Table 9.11. Techniques to set clear expectations

Technique		Aim	Rationale	Teacher dialogue
1	Establish expectations	To establish clear expectations regarding behaviour.	Students are clear about what is responsible and safe behaviour in the classroom.	[Student runs in class] *We walk in our classroom. Thanks.*
2	Give instructions	To give clear instructions about what to do.	Students understand what is expected of them and can organise what to do next.	*Take out your science notebook. Turn to a new page. Place the date at the top of the page. Thanks.*
3	Wait and scan	To wait and look at students for 5-10 seconds after giving an instruction.	Students have time to process the instruction. It communicates to students that they are expected to follow the instruction.	No teacher dialogue
4	Prompt while acknowledging	To acknowledge students who have followed instructions while prompting others to follow.	It cues other students to follow instructions. It contributes to a positive learning environment.	*Mg Mg, I see that you have your Science notebook ready for the lesson. Thanks.*

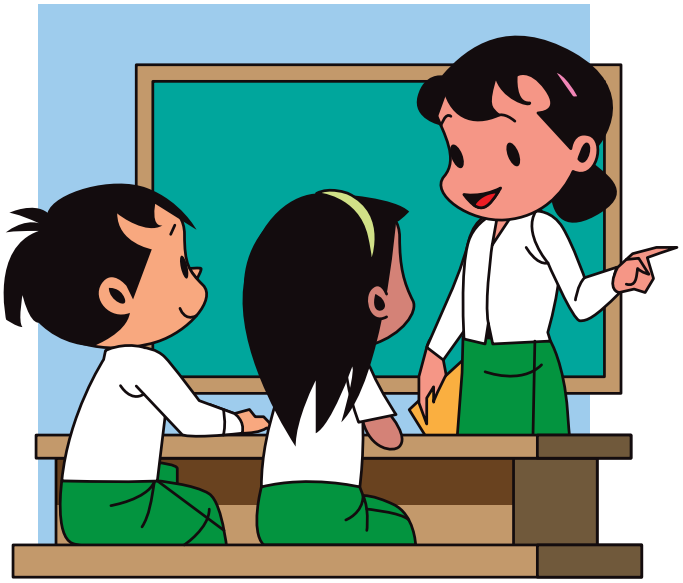


Figure 9.11. Technique 2 – Give instructions

Table 9.12. Techniques to acknowledge appropriate behaviour

Technique		Aim	Rationale	Teacher dialogue
5	Encourage through body language	To use physical closeness, body gestures, and facial expressions to encourage productive behaviour.	Body language is an integral part of communication. It strengthens relationships and contributes to a positive learning environment.	No teacher dialogue; technique uses body language only (e.g., smiling, 'thumbs up' sign).
6	Encourage through statements	To encourage students to become more aware of their competence by commenting on productive behaviour.	It gives students information about their competence. It focuses on strength and esteem-building.	*This group is on task. They are discussing several ways that they can solve the problem.*

Figure 9.12. Technique 5 – Encourage through body language ('thumbs up' sign)

Table 9.13. Techniques to respond to inappropriate behaviour

Technique		Aim	Rationale	Teacher dialogue
7	Choose not to attend	To give minimal attention to safe off-task or inappropriate behaviour	It avoids disrupting the class and giving attention to unproductive behaviour	No teacher dialogue
8	Redirect to the learning	To prompt students who are off-task with a redirection to the learning	It provides a learning-focused prompt.	*Thin, have you finished your paragraph?* *Aye Aye, would you like some assistance?*

Technique		Aim	Rationale	Teacher dialogue
9	Give a choice	To respectfully engage students who are disrupting others and provide available choices and consequences	It puts the responsibility for the decision-making onto the student	[Yi Yi is disrupting peers] *Yi Yi, you have a choice to complete your work now OR stay in during the break and complete it then. Make your choice.*
10	Follow through with the consequence	To remain calm and strong despite a student's ongoing disruptive behaviour	It models assertive behaviour. If a critical incident (i.e., anyone's safety is at risk), then send for immediate help.	[Yi Yi continues to disrupt] *Yi Yi, you will need to stay in during the break time, to make up for lost time.*

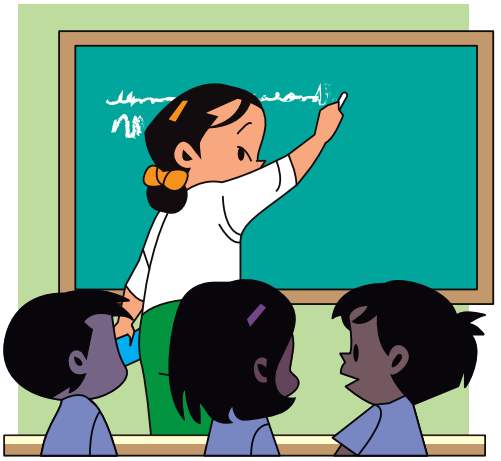


Figure 9.13. Technique 7 – Choose not to attend

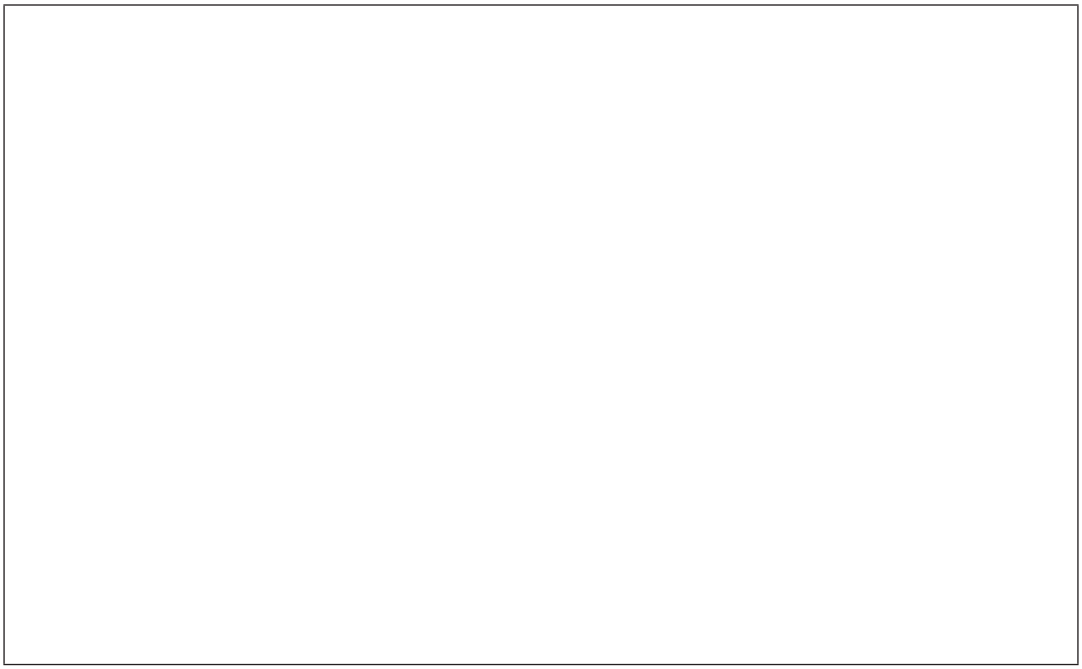
Figure 9.14. Technique 9 – Give a choice

Learning activity 4. Scenario: Proactive classroom management techniques

The purpose of this learning activity is for you to write a scenario situated in a large KG/Lower Primary classroom that sees the teacher employ as many proactive classroom management techniques as possible.

Write a scenario that sees the teacher employ as many of these proactive classroom management techniques as possible in a **large** KG/Lower Primary classroom.

Box 9.11. Classroom scenario



Review questions

1. Why are classroom procedures and rules important?
2. What is the three-step process for teaching classroom procedures?
3. What are key areas of classroom activity where procedures are needed?
4. Identify elements of an evidenced-informed framework for effective and inclusive classroom management.
5. Compile proactive classroom management techniques in a figure.

Unit Summary

Key messages

- UNESCO's International Bureau of Education (IBE) identifies sets of characteristics for an *educational system*, school, and classroom that are '*becoming inclusive*'. This reference points to inclusion as an ongoing process of learning – at no point is a classroom, school, or educational system ever entirely inclusive.
- Teachers' beliefs about their students and learning:
  - impact on the nature of the teacher–student and student–student relationships that they foster in the classroom; and
  - can have the power to either create or reinforce barriers or remove barriers to learning.
- Design considerations for the physical learning environment include whether it:
  - is conducive to student-centred learning and inquiry, including areas for collaboration and conversations;
  - makes students' thinking and learning visible, through display of student work and works-in-progress;
  - has appropriate and adequate teaching and learning materials and resources, which promote literacy and numeracy, reflect students' diversity, and allow for risk-taking, independence and self-regulation; and
  - allows for connection with the natural environment.
- Students with significant impairments in speech, language, reading, and writing require unaided and aided forms of Augmentative and Alternative Communication (AAC).
- An Individualised Education Plan (IEP) outlines a) learning goals and outcomes, which are specific to the student, and b) provisions to help reduce barriers to their learning, including the resources and equipment needed to function in the school and classroom environment.
- There needs to be progress in Myanmar in terms of the inclusive education agenda and technology infrastructure in schools before all students with disabilities attend schools; IEPs are implemented; and those students who require high-technology AAC have access to the appropriate tools.

- The two digital divides identified in the educational literature are the:
  - *Traditional digital divide* between students with access to the internet and devices at school and home and those without; and
  - *Digital use divide* between students with opportunities to use technology in active and creative ways to support learning and those who use technology to passively consume content and media.
- Active uses of technology include: 1) locating, evaluating, using, and creating information; 2) collaborating with peers and experts, in local and global networks, and 3) engaging in design, coding, immersive simulation, and media production. These uses align with Competence Area 1 (Information and data literacy), Area 2 (Communication and collaboration), and Area 3 (Digital content creation) respectively of UNESCO's Digital Literacy Global Framework.
- Currently, educational technologies are used in a limited way in Myanmar schools. Some schools are equipped with media labs and computers. However, as the traditional digital divide closes, there will be increasing opportunities to use technologies to support the development of students' skills development in 'creativity and innovation' and 'citizenship and sustainable development.
- Classroom procedures and routines are needed to address administrative duties, student movement, lesson management, teacher–student and student–student interactions, housekeeping, and health and safety.
- Classroom rules set boundaries. Rules can only be effective when they are monitored and there are consequences for not obeying them. Consequences are not punishments. Positive consequences or outcomes result if a student obeys the rules. Negative consequences or outcomes result if a student breaks the rules. Negative consequences should not involve physical or verbal punishment.
- Proactive classroom management techniques can be clustered into three broad purposes: setting clear expectations; acknowledging appropriate behaviour; and responding to inappropriate behaviour.

Unit reflection

Reflect upon the intersections between:

- UNESCO's Digital Literacy Global Framework (Unit 9, Table 9.8)
- Characteristics of a global citizen (Unit 9, Lesson 9.2.1, Period 3, Learning activity 3)

- Educational for Peace and Sustainable Development competencies (Unit 6, Table 6.6)
- Human rights education competencies (Unit 6, Table 6.9)
- Myanmar's Basic Education 5Cs (Unit 9, Figure 9.6).

Further reading

9.1. Social and Physical Environment

Ministry of Education. (2018). *Safe and child-friendly school construction guidelines*. Swiss Agency for Development Cooperation, Myanmar Ministry of Education, Myanmar Ministry of Construction. https://www.humanitarianlibrary.org/resource/safe-and-child-friendly-schools-construction-guidelines

9.2. Role of Technology in the Learning Environment

American Speech–Language–Hearing Association. (2019). *Augmentative and Alternative Communication (AAC)*. https://www.asha.org/public/speech/disorders/AAC.

Moyle, K. (2010). *Building innovation: Learning with technologies*. Australian Council for Educational Research (ACER). https://research.acer.edu.au/cgi/viewcontent.cgi?article=1009&context=aer

US Department of Education. (2017). *Reimaging the role of technology in education: 2017 National Technology Plan Update*. https://tech.ed.gov/files/2017/01/NETP17.pdf

9.3. Classroom Management

Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children*, *31*(3), 351–380. https://www.jstor.org/stable/42899983

Unit 10

Teacher Professionalism

In this unit, you will have opportunity to reflect on practice through multiple frames of reference: the obligations under the Five Precepts of Education, the indicators of Domain C of the TCSF, and scale items from validated models of organisational citizenship behaviour. You will explore the limitations of the traditional model of teacher professional development. You will synthesise principles of effective teacher professional development. You will reflect upon the opportunities that you have had for professional development (i.e., non-formal learning) in Year 3 of your studies, as well as your progress towards the learning goals that you framed at the commencement of the module. Finally, you will reflect on progress on your action research project and arrive at key learnings across projects and school contexts to consolidate understanding of the value of teacher action research.

Expected learning outcomes

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

- Reflect on Practicum experiences to provide examples of how you met professional obligations under the Five Precepts of Education;
- Reflect on Practicum experiences to compare and contrast personal and professional ethics;
- Define organisational citizenship behaviour;
- Discuss the benefits of teachers' organisational citizenship behaviour, as identified in the research and from Practicum observations;
- Reflect on OCB on the part of teachers, peers, and yourself in the Practicum placement, with reference to validated OCB models;
- Discuss the limitations of traditional teacher professional development;
- Identify principles and forms of effective teacher professional development;

- Reflect on the Year 3 experience in terms of professional development opportunities and achievement of Educational Studies learning goals; and

- Communicate action research findings and reflections on the process and value of teacher action research.

Competencies gained

C1.1 Demonstrate values and attitudes consistent with Myanmar's tradition of perceiving teachers as role models

C1.3 Demonstrate understanding of the possible effect of local culture and context on student participation in school

C2.1 Demonstrate commitment to serving the school and community as a professional member of the teaching profession

C3.1 Demonstrate a high regard for each student's right to education and treat all students equitably

D1.1 Regularly reflect on own teaching practice and its impact on student learning

D2.1 Improve own teaching practice through learning from other teachers and professional development opportunities

D3.1 Demonstrate understanding of the importance of inquiry and research-based learning to improve teaching practice

Key terms

Five Precepts of Education, organisational citizenship behaviour, personal ethics, professional ethics, professional autonomy

10.1. Professional Values and Dispositions

In this sub-unit, you will adopt multiple frameworks to reflect on your Practicum experiences. You will utilise the obligations under the Five Precepts of Education, the indicators of Domain C of the TCSF, and scale items from validated models of organisational citizenship behaviour to reflect upon experiences, practices, and behaviours in the Practicum setting.

10.1.1. Professional ethics

Expected learning outcomes

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

- Reflect on Practicum experiences to provide examples of how you met professional obligations under the Five Precepts of Education; and
- Reflect on Practicum experiences to compare and contrast personal and professional ethics.

Period 1

Learning activity 1. Reflection: Five Precepts

The purpose of this learning activity is for you to reflect on Practicum experiences and identify how you met professional obligations under the **Five Precepts of Education.**

In Year 2 of Educational Studies, you learnt about the Five Precepts of Education (Figure 10.1).

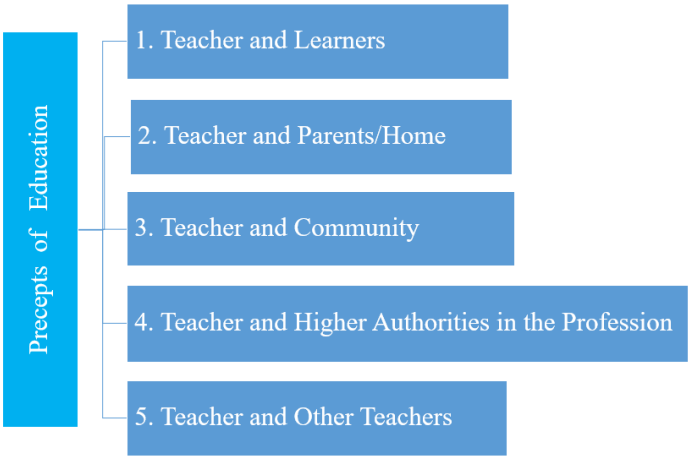


Figure 10.1. Five Precepts of Education[201]

Reflect on the teacher obligations related to each of the Five Precepts of Education, outlined in the middle column of Table 10.1.

For each precept, provide an example of how you fulfilled one of the obligations at your school placement.

Table 10.1. Five Precepts of Education and associated obligations[202]

Precept	Obligations	Example of fulfilling on obligation
Teacher and learners	In fulfilling the obligations of the first precept, the teacher will: • deal justly and impartially with students regardless of their physical, mental, emotional, racial, economic, social, racial, or religious characteristics; • encourage students to work for high goals in the development of their physical, intellectual, creative, and spiritual endowments; • aid students to develop an understanding and appreciation not only of the opportunities and benefits of our socialist democracy but also of their obligation to it; and • accept no remuneration for tutoring except in accordance with government policies.	

201 Image: Daw Sein Moh Moh Lwin, Tutor, Educational Theory Department, Mawla Myaing Education College, 2019, used with permission.
202 Department of Educational Theory. (n.d.).

Precept	Obligations	Example of fulfilling on obligation
Teacher and parents/ the home	In fulfilling the obligations of the second precept, the teacher will: • respect the basic responsibilities of parents for their children; • seek to establish friendly and cooperative relationships with home; • help to increase the students' confidence in their own home and avoid disparaging remarks which might undermine that confidence; • provide parents with information that will serve the best interest of their children, and be discrete with information received from parents; and • keep parents informed about the progress of their children as interpreted in terms of the purposes of the school.	
Teacher and community	In fulfilling the obligations of the third precept, the teacher will: • adhere to reasonable patterns of behaviour accepted by the community for the professional; • perform the civic duties and participate in community activities; • discuss controversial issues from an objective point of view; • recognise that schools belong to all people, encourage participation in the school's purposes, and strive to keep the public informed of the educational programmes which are being provided; • respect the community in which they are employed and be loyal to the school, community, and the Republic of the Union of Myanmar; and • work to improve education in the community and to strengthen the community's moral, spiritual, and intellectual life.	
Teacher and higher authorities in the profession	In fulfilling the obligations of the fourth precept, the teacher will: • conduct professional business through proper channels • refrain from discussing confidential and official information with unauthorised persons; • apply for employment on the basis of competence only; • seek employment in a professional manner; • refuse to accept a position when the vacancy has been created by unprofessional activity; • give and expect due notice before a change of position is to be made; • be fair in all recommendations that are given concerning the work of other teachers; and • engage in no gainful employment, outside of their main duty, where the employment affects adversely their professional status or impairs their standing with students, associates, and the community.	

Precept	Obligations	Example of fulfilling on obligation
Teacher and other teachers	In fulfilling the obligations of the fifth precept, the teacher will: • deal with other members of the profession in the same manner as they themselves wish to be treated; • stand by other teachers who have acted on their behalf and at their request; • speak constructively of other teachers, but report honestly to responsible persons in matters involving the welfare of students, the education system, and the profession; • seek to make professional growth continuous by such procedures as study, research, travel, conferences, and attendance at professional meetings; and • make the teaching profession so attractive in ideals and practices that sincere and able young people will want to enter it.	

Period 2

Learning activity 2. Reflection: Professional ethics

The purpose of this learning activity is for you to reflect on Practicum experiences to compare and contrast **professional** and **personal** ethics.

Internationally, each educational system at the national level or state level is likely to have a Code of Ethics or Code of Professional Conduct. The Five Precepts of Education serves as a Code of Ethics or a Code of Professional Conduct for Myanmar teachers. In addition to the Five Precepts, Domain C of Myanmar's TCSF is dedicated to Professional Values and Dispositions.

With reference to *either* the teacher's obligations under the Five Precepts of Education (Table 10.1) or the TCSF indicators for Domain C (Box 10.1), reflect on:

- One scenario in the Practicum where your personal ethics strongly aligned with a professional obligation/TCSF indicator; and
- One scenario in the Practicum where your professional ethics were in conflict with a professional obligation/TCSF indicator.

Outline these scenarios in Box 10.2.

Box 10.1. Domain C: Professional values and dispositions

Competency standard C1: Service to profession

- C.1.1.1 Comply with professional code of conduct, rules and regulations in line with the five traditional responsibilities of the Myanmar teacher (i.e., Teach students to be disciplined; Teach and explain to your best ability; Teach everything known; Appreciate students and stand up for students whenever needed; Teach to value the professional work of being a teacher)
- C1.1.2 Consistently express positive attitudes, values and behaviours, consistent with what is expected of teachers by students, colleagues, parents and communities
- C1.2.1 Identify theories and concepts that inform underpin approaches to teaching and learning
- C1.2.2 Describes own approach to teaching and learning
- C1.3.1 Show interest in and take time to learn about the students' culture, language and community
- C1.4.1 Use school supplies and resources appropriately

Competency standard C2: Service to community leadership

- C2.1.1 Contribute actively to a range of school and community activities
- C2.1.2 Demonstrate model behaviour as a teacher serving and working in school and community responsibly and accountably

Competency standard C3: Promote quality and equity in education for all students

- C3.1.1 Show awareness of the right to education of every child and a commitment to nurturing the potential in each student
- C3.1.2 Recognise the different social situations and background of students and treat all students equally
- C3.2.1. Organise the classroom to encourage all students' participation in the lesson content, activities and interactions with the teacher
- C3.3.1 Integrate concepts of sustainability, equality, justice and the rights and responsibilities of students into class and school activities.

Figure 10.2. TCSF indicator C3.2.1. Organise the classroom to encourage all students' participation in the lesson content, activities, and interactions with the teacher[203]

Box 10.2. Practicum scenarios

Personal ethics aligned with professional obligation/TCSF indicator

Identify the relevant professional obligation/TCSF indicator:

Describe the practicum scenario:

203 Photo credit: EU/ECHO/Pierre Prakash, https://www.flickr.com/photos/69583224@N05/17070955416. Licence: CC-BY-NC-ND-SA 2.0, https://creativecommons.org/licenses/by-nc-nd/2.0

Analyse why you felt that your personal values/convictions wholly aligned with the professional obligation/TCSF indicator:

Personal ethics were in conflict with professional obligation/TCSF indicator

Identify the relevant professional obligation/TCSF indicator:

Describe the practicum scenario and the course of action you took:

Analyse why you felt that your personal values/convictions were in tension with the professional obligation/TCSF indicator:

Reflect on how might approach this scenario in the future:

10.1.2. Organisational citizenship behaviour

Expected learning outcomes

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

- Define organisational citizenship behaviour;
- Discuss the benefits of teachers' organisational citizenship behaviour, as identified in the research and from Practicum observations; and
- Reflect on OCB on the part of teachers, peers, and yourself in the Practicum placement, with reference to validated OCB models.

Period 1

Definition and models of organisational citizenship behaviour

Organisational citizenship behaviour is shown when an employee goes beyond their official job description and performs acts in the workplace such as voluntarily helping others, taking on additional responsibilities, and promoting initiatives and the organisation.[204]

One early and validated model of OCB[205] identified five dimensions:

- *Altruism:* Helping either colleagues or clients
- *Courtesy:* Adopting polite and respectful behaviours that prevent problems for others
- *Conscientiousness:* Accepting and complying with policies and procedures
- *Civic virtue:* Taking on extra responsibilities and being involved in the professional life of an organisation
- *Sportsmanship:* Tolerating inconveniences.

204 Lavy, S. (2019).
205 Organ, D. (1988).

Another model that robustly measures OCB[206] differentiates between behaviours that are directed towards or benefit:

- Individuals in the workplace (e.g., supporting other colleagues), and
- The organisation as a whole (e.g., promoting improvement initiatives).

Learning activity 1. Classification: OCB scale items

The purpose of this learning activity is for you to build understanding of behaviours that articulate with models of OCB from the literature.

Review each of the clusters of scale items in Table 10.2. Identify the OCB dimension (i.e., altruism, courtesy, conscientiousness, civic virtue, and sportsmanship) that each cluster of items is associated with. An example has been provided for you.

Table 10.2. OCB behaviours[207]

Scale items	Dimension
• I attend meetings that are not compulsory but considered important. • I attend functions that are not compulsory but help the organisation's image. • I keep up with changes that are happening in the organisation. • I read and keep up with announcements and memos.	*Civic virtue:* Taking on extra responsibilities and being involved in the professional life of an organisation.
• My attendance at work is above the norm. • I do not take extra breaks. • I obey the organisation's rules and regulations even when no one is watching. • I believe in giving an honest day's work for an honest day's pay.	
• I help others who have been absent. • I help others who have heavy workloads. • I help orient people even though it is not required. • I help others who have work related problems.	
• I take steps to try to prevent problems with other workers. • I am mindful of how my behaviour affects other people's jobs. • I try to avoid creating problems for colleagues. • I consider the impact of my actions on colleagues.	
• I do not spend time on trivial matters. • I do not focus on what is wrong at the expense of the positive. • I do not exaggerate the level of challenge of a task. • I do not always find fault with the organisation.	

206 Williams, L., & Anderson, S. (1991).
207 Jepsen, D., & Rodwell, J. (2006).

Period 2

Teachers' OCB

Teachers' OCB comprises a broad range of actions related to:

- helping students, colleagues, principals, and other stakeholders; and
- contributing to the school, school cluster, or education department at large (e.g., suggesting changes and improvements and advocating for the school and profession).

Most of these behaviours happen daily and are crucial for classroom and school functioning.

Although the role requirements for teachers are often very clearly prescribed, such as following set curricula and timetables, teachers have high levels of **professional autonomy.** Hence, they have typically many opportunities for OCB.[208]

Findings from the research literature

The research literature[209] reveals important findings regarding OCB in teachers.

- Support from teacher colleagues is associated with positive outcomes, such as:
  - reduced stress, exhaustion, and burnout; and
  - increased work engagement, performance, and energy among staff.
- The sense that their work contributes to others' wellbeing is shown to enhance teacher's relationships with others, job satisfaction, and positive emotions. Indeed, "a growing body of evidence suggests that prosocial behaviour (in various life arenas) promotes positive emotional rewards for the giver." [210]
- Regular support from principals and school leaders is one way to promote OCB among teachers.[211]

208 Jimmieson, N., Hannam, R., & Yeo, G. (2010).
209 Cited by Lavy, S. (2019).
210 Lavy, S. (2019, p. 3).
211 Finding of Lavy, S. (2019).

- However, importantly, in some workplace contexts, OCB may sometimes be driven by organisational politics or supervisor expectations. Evidence suggests when OCB is no longer discretionary then there can be negative impacts, such as teacher stress, burnout, and decreased job satisfaction.

Figure 10.3. Collegial support[212]

Learning activity 2. Reflection on colleagues' behaviours: Two-factor model

The purpose of this learning activity is for you to reflect on the behaviours of the teachers in your Practicum school from the perspective of the two-factor model of OCB.

Reflect upon examples of teachers' OCB in the Practicum setting. In Table 10.3, list behaviours of teachers in the Practicum setting, which you observed, that comprise OCB.

212 UNESCO Myanmar. (2018). https://bangkok.unesco.org/content/myanmar-begins-designing-validation-study-teacher-competency-standards-framework. Licence Creative Commons CC-BY-SA 3.0 IGO

Organise these behaviours according to those directed at individuals (i.e., students, colleagues) and those undertaken to support the school as a whole.

Share your work with your peers. Ensure that the behaviours that you listed are voluntary and go *beyond* the standard requirements of the role.

Table 10.3. Teachers' OCBs in the Practicum setting

Directed towards or benefitted	
Students or colleagues	**School**

Period 3

Learning activity 3. Peer interview and role-play: Five-factor model

The purpose of this learning activity is for you to reflect on your peer's and your own behaviours in the Practicum placement from the perspective of the five dimensions of OCB.

Interview your peer to ascertain examples of OCB that they displayed in their Practicum experience. Record your peer's responses in Table 10.4. In turn, your peer will interview you.

Choose one example of OCB to role-play for a group audience as a means of sharing.

Table 10.4. Your peers' OCB in the Practicum setting

Dimension	Example
Altruism: Can you provide an example where you helped colleagues on your placement?	
Courtesy: Can you provide an example where you adopted polite and respectful behaviour that prevented problems for others?	
Conscientiousness: Can you provide an example where you complied with policies and procedures?	
Civic virtue: Can you provide an example where you took extra responsibilities in order to be involved in the life of the school?	
Sportsmanship: Can you provide an example where your tolerated inconveniences?	

Review questions

1. How do the Five Precepts of Education position teachers?
2. How do the Five Precepts relate to the TCSF?
3. Who or what stands to benefit from teachers' organisational citizenship behaviour?

10.2. Professional Growth and Development

In this sub-unit, you will consider principles and forms of effective teacher professional development. You will have opportunity to reflect on your own growth in Year 3 of Educational Studies, in terms of achievement of learning goals. Further, you will reflect on your action research project, undertaken in the Practicum placement. You will synthesise findings across projects and contexts to consolidate understanding of the process and value of teacher action research.

10.2.1. Teacher professional development

Expected learning outcomes

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

- Discuss the limitations of traditional teacher professional development;
- Identify principles and forms of effective teacher professional development; and
- Reflect on the Year 3 experience in terms of professional development opportunities and achievement of educational studies learning goals.

Period 1

Principles and forms of effective teacher professional development

The international literature[213] indicates that educational systems and schools need to intentionally create the conditions and culture to support teachers to engage in collaborative professional development. To be most effective, collaboration should be driven by analysis of student data and focused upon the development of teachers' practice.[214]

213 Department of Education and Training. (2018); Harris, A. (2011); Leithwood, K., & Azah, V. (2017).
214 Harris, A., & Jones, M. (2012).

Recall from Unit 1 of Year 3 Educational Studies that teachers' collective efficacy is strengthened, when:

- teachers' adaptations to practise actually result in improved student learning; and
- these improvements can be evidenced in student learning and achievement data over time.[215]

In a school with high levels of collective efficacy, individual teachers do not feel singularly responsible for creating change. Instead, "leadership is stretched over colleagues working *inter*dependently".[216]

Indeed, an effective model of teacher professional development sees teachers leading and learning from each other within their own practice/school contexts.[217] This egalitarian model aligns with a view of schools as learning communities, wherein individuals share their expertise for the collective good,[218] and repertoires of practice are distributed among teachers.[219]

The literature[220] proposes a collaboration continuum (Figure 10.4) ranging from "weak forms" (e.g., sharing stories) to "strong forms" (e.g., evidence-informed inquiry into practice), including such forms as:

- collectively interpreting data and evidence to identify challenges and areas for improvement;
- peer observation and feedback;
- coaching, mentoring and team teaching; and
- joint action research projects.

You explored some of these strong forms of teacher collaboration in Lesson 1.2.2 'Teachers as leaders'.

215 Donohoo et al. (2019).
216 Harris, A. (2015, p. 11).
217 Harris, A. (2015).
218 Hargreaves, D. (2010).
219 Brook et al. (2007).
220 Little, (1990) cited in Hargreaves, A., & O'Connor, M. (2018).

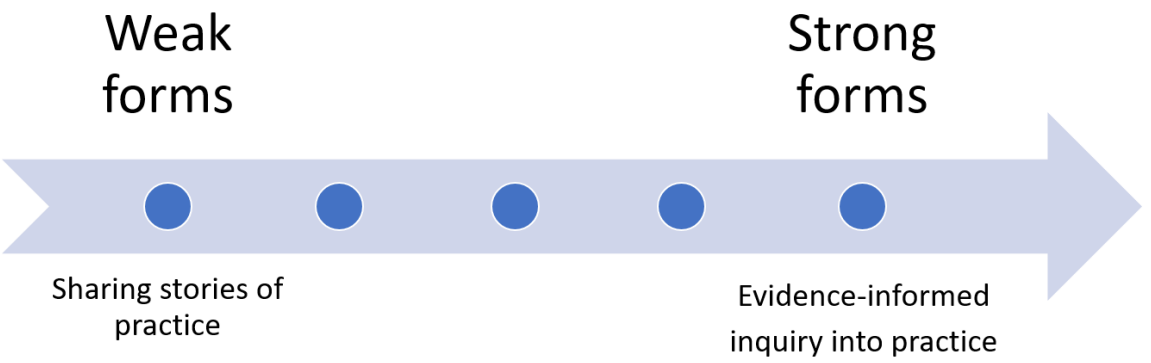


Figure 10.4. Collaboration continuum[221]

Policies, structures, protocols, tools, and technologies need to be put in place that support peer-to-peer processes,[222] enabling teachers and leaders to:

- focus their classroom observations and provide high-quality feedback;
- participate in professional conversations without damaging collegial relationships; and
- collect, analyse, and interpret student learning and achievement data and other evidence to consider implications for enhanced practice.

Important shifts in teacher professional development involve:

- relocating professional development from outside of schools to within schools or professional learning communities;
- focussing collaborative discussion on actions related to cluster and school improvement goals; and
- moving away from centrally-determined and/or popular topics to aligning professional development with the capacities needed to achieve improvement goals.

221 Author's own work, used with permission.
222 Hargreaves, A., & O'Connor, M. (2018).

As such, teacher professional development becomes "an integral part of both school and system improvement problem-solving processes".[223]

Learning activity 1. Reading: Principles of effective teacher professional development

The purpose of this learning activity is for you to read this lesson's content and distil principles of effective teacher professional development.

Read the textbook section, 'Principles and Forms of Effective Teacher Professional Development'.

In Box 10.3, you are required to:

- distil principles of effective teacher professional development; and
- list strong forms of teacher professional development.

Draw upon these principles and examples to reflect upon the effectiveness of:

- a more traditional form of professional development wherein teachers may attend a one-off course or workshop away from the school; and
- the current Cascade Model of Teacher Professional Development in Myanmar.

223 Leithwood, K., & Azah, V. (2017, p. 43).

Box 10.3. Principles and forms of effective teacher professional development

Effective teacher professional development is: Strong forms of collaborative teacher professional development include:

Period 2

Learning activity 2. Reflection: Teacher perspectives and opportunities

The purpose of this learning activity is for you to reflect on teacher survey and interview data relating to teacher professional development.

Part A

Review the graph in Figure 10.5. It depicts data generated through the 2013 OECD Teaching and Learning International Survey (TALIS). The TALIS asks teachers and school leaders about working conditions and learning environments at their schools.

The graph shows that teachers who frequently participated in collaborative professional development reported higher levels of job satisfaction. The job satisfaction scale was derived from teachers' responses to questions related to their 'satisfaction with the current work environment' and 'satisfaction with the profession'.

Answer the following question:

- Why do you think opportunities for frequent collaboration is related with higher levels of job satisfaction?

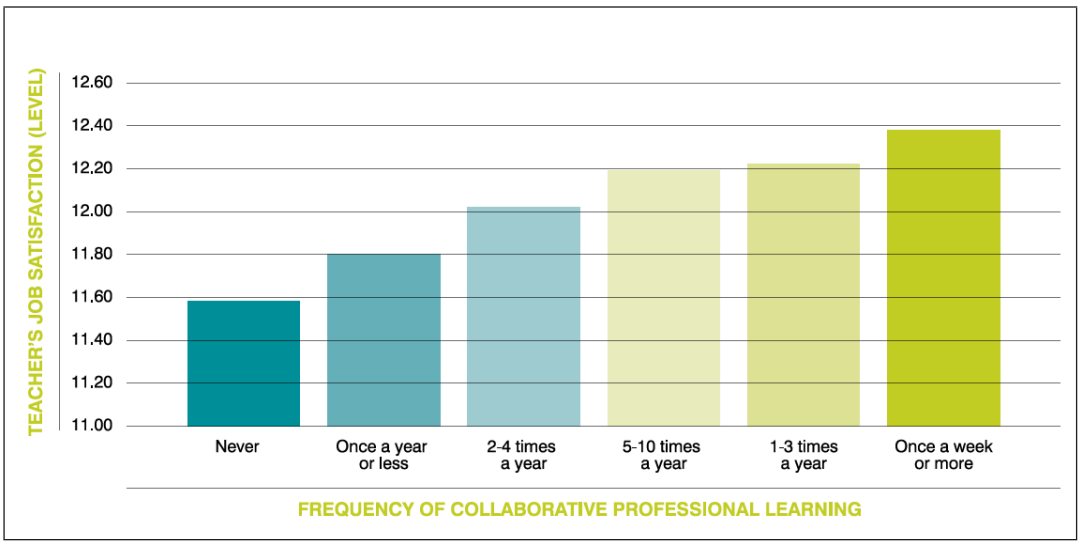


Figure 10.5. Teachers' frequency of collaborative professional development by their level of job satisfaction[224]

224 Image: Australian Institute for Teaching and School Leadership. (n.d.)

Part B

Read the research findings outlined in Box 10.4. In this study,[225] teachers were interviewed regarding their experiences and expectations regarding teacher professional development.

Answer the following question:

- What is the reason for the gap in experience and expectations of teachers regarding professional development?

Box 10.4. Research study of teacher expectations of professional development

A recent study of teachers' perspectives, in Southern Asia, showed a substantial gap between their expectations and experiences of professional development programmes. In their professional development, teachers were largely exposed to lectures and discussions, and the use of charts and flashcards.

Instead, they held expectations of professional development that was active, interactive, reflective, technology-enhanced, and needs-based – that is, focussed on the challenges that arose in their daily practice. The study found that they expected opportunities:

- to collaborate with colleagues in problem-solving and ICT-integrated activities and project-based learning;
- to be exposed to demonstrations of: i) student-centred teaching that aims to build critical and creative thinking, and ii) use of teaching and learning aids;
- for their teaching to be observed by skill-oriented colleagues, who had subject-specific expertise, in order to provide them with constructive feedback; and
- to learn target-setting and implementation, monitoring, and evaluation strategies to achieve those targets.

225 Pokhrel, T., & Behera, S. (2016).

Figure 10.6. Teacher professional development in Myanmar focusing on ICTs[226]

Reflect on the following questions.

- Did you observe teachers participating in collaborative professional development in the Practicum setting? If yes:
  - What was the focus/purpose of the collaborative professional development?
  - Did it involve collaborating with stakeholders beyond the school (e.g., teachers collaborating within their cluster)?
- Did you participate in any professional development sessions in the Practicum setting? If yes:
  - What was the nature of the professional development?
  - Did it meet your expectations in terms of a high-quality learning experience?
- Beyond the Practicum and your formal studies, did you participate in any professional development sessions (i.e., non-formal learning) this year? If yes:

226 Image: Tam, A. (2017, August 10) https://medium.com/unleash-lab/harnessing-ict-quality-teacher-professional-development-brings-quality-education-75c658f0d6a3.

- What was the nature of the professional development?
- Did it meet your expectations in terms of a high-quality learning experience?

Homework activity. Reflection: Achievement of learning goals

The purpose of this homework activity is for you to reflect on the progress you have made towards achievement of your learning goals for Educational Studies.

In Unit 1, you wrote 3–5 learning goals for Educational Studies and actions that you could undertake to support achievement of your goals.

Consult your Semester 1 textbook. Translate the goals and actions in Table 10.5.

Make comments about the extent to which actions have been undertaken and your learning goals have been achieved.

Table 10.5. Learning Goals for Educational Studies

Learning goals		Actions which can be undertaken to support achievement of goals	Comments
1.			
2.			
3.			
4.			
5.			

10.2.2. Teacher action research

Expected learning outcome

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

- Communicate action research findings and reflections on the process and value of teacher action research.

Period 1

Improving and Innovating Practice

The authors of a 2010 international comparative report[227] of 20 high-improving educational systems found that in systems which had completed the journey from "great to excellent", teacher participation in action research was a strategy used to promote pedagogical innovation.

An international comparative study of teacher and teaching quality,[228] found that participation in action research was an important aspect of teacher professional growth.

Indeed, "research is a way of giving control to teachers."[229] Teachers come to see themselves as researchers and leaders who contribute to improving the effectiveness of the entire system.[230]

Links to Year 3 Practicum

In ***Year 3 Block 9 Practicum***, you undertook a number of preliminary activities and planning activities to support implementation of a collaborative and contained action research project in your 6-week school placement. You:

227 Mourshed et al. (2010).
228 National Center on Education and the Economy. (2016).
229 Matters, G. (2006, p. 39).
230 National Center on Education and the Economy. (2016).

1. Shared examples and observations of action research;
2. Brainstormed ideas for collaborative action research projects;
3. Generated a list of possible action research projects and identified project goals, and the resources and time needed to implement them;
4. Refined the action research projects so that they were able to be implemented in the context of the placement;
5. Decided upon and scoped one of the projects through a *What, Why, Where, When, Who, How* question framework;
6. Developed a collaborative action research plan;
7. Used a simple rubric to review another group's action research plan;
8. Explored elements of reporting on action research; and
9. Reviewed a simple action research report for its comprehensiveness.

In Year 3 Bloc 10 Practicum, you implemented the action research project and kept a journal. In the Practicum placement or debrief sessions, you might have had time to analyse the data that you had collected and considered implications or even adapted your practice.

Learning activity 1. Individual reflection: Progress on action research project

The purpose of this learning activity is for you to reflect on the progress of your action research project first independently before sharing your experiences with your peers.

For this activity, you will use a reflective template (i.e., Table 10.6), which aligns with the seven stages of the action research cycle that you explored across Years 1 and 2 of RPES (Figure 10.7). See Annex 7 for an outline of these steps.

Figure 10.7. Action research cycle[231]

Respond to the guiding questions in Table 10.6. You may wish to consult your Practicum journal.

Table 10.6. Reflecting on progress

Stage	Guiding questions	Reflections
1. Identify a research question or problem	Did you identify a clearly stated research question or problem that was able to be realistically undertaken during placement and can help to improve your practice?	
2. Research your question	Did you research the problem in advance? Did you access relevant background information and perspectives on the issue that assisted you in conducting the action research?	
3. Plan your research	Did you choose appropriate methods for collecting the data, in light of the research question or problem?	
4. Conduct your research	Did you conduct the research largely according to your plan? Did you have to adapt your plan?	

231 Author's own work, used with permission.

Stage	Guiding questions	Reflections
5.Analyse your data	Did you have opportunity to make sense of the data that you collected? Did you consider the implications for future practice?	
6. Act on your insights	Did you already have opportunity in the Practicum to change your practice according to insights from the data that you collected?	
7. Review and make changes	Did you collect any further data to ascertain if those changes were successful (e.g., feedback from your mentor teacher)?	

Period 2

Learning activity 2. Group discussion: Action research experiences

The purpose of this learning activity is for you to convene in your groups from Practicum, if possible, or with peers to discuss your action research experiences and findings.

Convene in your collaborative action research groups from Practicum, if possible. If not, then form a group with other peers. Discuss your responses in Table 10.6 with your peers. Ensure that each group member has opportunity to report on their responses to the guiding questions related to each of the action research stages.

Period 3

Learning activity 3. Presentation planning: Key learnings and examples from practice

The purpose of this learning activity is for you to reconvene in your group and synthesise key learnings from across the action research projects.

Reconvene in your groups. Plan for a 5-minute presentation to the class where you report on key learnings across the action research projects, undertaken by the group's members.

Distil three key learnings from across projects and, where appropriate, provide examples from specific projects and school contexts. Your key learnings may relate to different action research reporting elements (Box 10.5); for example:

- how the particular research problem or question that you planned for in Bloc 9 of the Practicum translated to your particular school context, and any refinements that you needed to make;
- how you most effectively collected feedback from students; and
- how you made sense of data collected from multiple sources.

Please outline your key learnings and examples on flip chart paper.

Box 10.5. Action research reporting elements, as explored in Bloc 9 Practicum

- Background of the problem (ending with a problem statement):
  - What is the problem being investigated?
  - Why is this problem important to study?
- Review of literature and consultation with experts/'knowledgeable others' (e.g., teacher educators, practising teachers):
  - What do we already know about this problem or situation?
- Methodology (participants, instruments, procedures):
  - How was the study conducted?
  - Who were the participants?
  - What data were collected and how?
- Analysis
  - What are the results?
  - What did the data indicate?
- Results
  - What are the implications of these results?
  - How do they agree or disagree with previous research or experience?
  - What do we still need to learn?
  - What are the limitations of this study?

Period 4

Learning activity 4. Class presentation: Celebration of action research

The purpose of this learning activity is for student groups to present to the whole class key findings across action research projects.

Present your findings to the class. Listen and take notes in Box 10.6 during:

- Group presentations
- Teacher educator plenary

Box 10.6. Notes regarding action research projects

Learnings across action research projects
Teacher educator plenary:

Review questions

1. What are the limitations of a traditional model of teacher professional development?
2. List principles of effective teacher professional development.
3. What is the value of teacher action research? Is teacher action research considered a strong form of teacher collaboration?

Unit Summary

Key messages

- Points of reference for reflection on teacher ethical practice include:
  - obligations under the Five Precepts of Education; and
  - indicators relating to Domain C of the Myanmar TCSF (Professional Values and Dispositions).
- Teachers' OCB comprises a broad range of actions related to helping students, colleagues, principals, and other stakeholders, and contributing to the school, school cluster, or education department at large.
- The research literature reveals important findings regarding teachers' OCB:
  - Support from teacher colleagues is associated with positive outcomes;
  - There are also positive outcomes for teachers, who demonstrate OCB;
  - Regular support from school leaders is one way to promote OCB among teachers; and
  - However, if OCB is no longer discretionary, then there can be negative impacts.
- The traditional model of teacher professional development is ineffective because implementation of the new practice often proves challenging when teachers return to their own school context and classroom, without access to further guidance and support.
- A more effective model of teacher professional development sees teachers leading and learning from each other within their own practice/school contexts.
- To be most effective, teacher collaboration should be driven by analysis of student data and focused upon the development of teachers' practice.
- The literature proposes a continuum ranging from "weak forms" (e.g., sharing stories) to "strong forms" (e.g., evidence-informed inquiry into practice) of teacher collaboration.
- Strong forms of teacher collaboration include peer observation and feedback; coaching, mentoring and team teaching; and joint action research projects.
- Sufficient support for teachers to participate in collaborative professional development is needed so that it becomes a central part of both school and system improvement processes.

- The literature shows that teachers who frequently participate in collaborative professional development report higher levels of job satisfaction.
- The literature shows that teacher action research is an important part of professional growth and innovation. Through action research, teachers come to see themselves as researchers and leaders, who contribute to improving the effectiveness of the entire system.

Unit reflection

1. How does teachers' OCB align with:
   - The Five Precepts of Education
   - The notion of teachers as leaders?
2. How you can you deepen the investigation of your practice in a subsequent action research cycle? To answer this question, reflect upon your responses in Table 10.6. Identify what may be the next steps if you had opportunity to continue to investigate your practice in a classroom setting.

Further reading

10.1. Professional Values and Dispositions

Lavy, S. (2019). Daily dynamics of teachers' organizational citizenship behavior: Social and emotional antecedents and outcomes. *Frontiers in Psychology, 10*, 2863. https://doi.org/10.3389/fpsyg.2019.02863

10.2. Professional Growth and Development

Australian Institute for Teaching and School Leadership. (n.d.). *The essential guide to professional learning: Collaboration*. https://www.aitsl.edu.au/tools-resources/resource/the-essential-guide-to-professional-learning-collaboration

Victorian Department of Education and Training. (2005). *Professional learning in effective schools: The seven principles of highly effective professional learnin*g. https://www.education.vic.gov.au/Documents/school/teachers/profdev/proflearningeffectivesch.pdf

Victorian Department of Education and Training. (2018). *Peer observation, feedback and reflection: A guide for principals and school leaders*. Professional Practice Guide. https://www.education.vic.gov.au/Documents/school/teachers/teachingresources/practice/Peer_observation_feedback_and_reflection_guide_for_principals_school.pdf

Glossary

Terms	Elaborations
Analytic rubrics	Rubrics that separate, and articulate, the important skills and knowledge that will be assessed.
Augmentative and Alternative Communication (AAC)	Forms of communication (i.e., both unaided and/or aided) that are required by students with significant impairments in speech, language, reading, and writing. In unaided forms of AAC, students communicate through gestures, body language, facial expressions, and/or sign language. In aided forms, tools are used – from pen and paper to more complex technology-enabled devices.
Axiology	The branch of philosophy that focuses on values and goodness.
Bell curve	See *normal curve.*
Box-and-whisker plots (boxplots)	A graph that represents the distribution of a set of data based on the range and quartiles.
Coding	The process or activity of writing computer programmes (e.g., to program websites, apps etc.).
Construct	Mental structures (or big ideas) that we build to make sense of the world.
Criteria	Properties or characteristics by which to judge quality.
Critical theory	An educational theory which advocates for teachers to help students think critically and challenge societal structures
Descriptors	Qualities required to demonstrate achievement for levels of performance for each criterion.
Distribution	See *variability*.
Dunning-Kruger effect	The phenomenon where people who have little knowledge within an area of learning (i.e., novices) overestimate their ability.
Eclecticism	An approach to philosophy that combines ideas from different philosophical perspectives.
Elaborated feedback	Feedback that provides information to help a student to improve in specific aspects of their learning, such as an explanation of a correct response, how to work out a solution, explanation of a procedure, etc.
Epistemology	The branch of philosophy that focuses on knowledge of knowing.
Error	Values that deviate from the expected pattern (statistical error).
Essentialism	An educational theory that advocates teaching students essential skills and knowledge to successfully function in society.
Evidence	Facts and information that demonstrate the truth or validity of an idea.
Existentialism	A philosophy that rejects the idea of universal truths and advocates individual choice and creation of values.
Five Precepts of Education	Serve as a Code of Ethics or a Code of Professional Conduct for Myanmar teachers. The Five Precepts outline teachers' obligations in terms of: i) learners; ii) parents/ the home; iii) the community; iv) higher authorities in the profession; and v) other teachers.
Global citizenship	A 21st century approach to living in which principles of global responsibility and accountability are applied to everyday local actions, and complex global problems are addressed on an individual basis.

Terms	Elaborations
Guttman's Coefficient of Reproducibility	Measures the extent to which a pattern of responses aligns with a perfect scale (e.g., the degree of perfection of a scale).
Habits of mind	Pattern of intellectual behaviours that leads to productive actions.
Histogram	A graph, consisting of bars that define intervals (bins) in the data. Histograms should be used for continuous data.
Holistic rubrics	Rubrics that provide an overall summary of different levels of quality for the whole piece of work.
Horizontal dimension (of learning)	The breadth of knowledge and skill within an area of learning.
Idealism	A philosophy that sees truth and values as universal and absolute. This knowledge can be discovered through processes of self-examination, discovery and rationalising.
Immersive simulation	Uses technology to implement learning methods that immerse the learner into a given context. For example, immersive virtual environments are used for adult learning in complex situations, where technical systems are difficult to understand and human factors are critical.
Individualised Education Plans (IEP)	Inform international best practices in supporting students, with additional needs, to access and participate in schooling. An IEP outlines a) learning goals and outcomes, which are specific to the student, and b) provisions to help reduce barriers to their learning, including the resources and equipment needed for the student to function in the school and classroom environments.
Integration	Happens when students with additional needs attend a regular classroom. This approach was introduced because of the belief that students with disabilities should have access to the same resources and opportunities as other students. Schools with a focus on integration may provide special programmes or classes for students with additional needs. The curriculum may be altered to suit students' abilities or needs, and they may be given additional learning support within the class. Often the expectation is that students with additional needs will learn to 'fit in'.
Interquartile range	The middle 50% of data values, which sit between the first and third quartiles.
Interrater reliability	A way of measuring the extent to which a group of markers (or raters, or judges) agree. The level of consistency between their judgements.
Learning taxonomies	Describe the levels of development in different types of learning (such as higher-order thinking, complexity of understanding, attitude development, etc.).
Mean	A statistical measure that is the calculation of the average value of a 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.
Measures of central tendency	Statistical measures that use a single value to that reflects the average value for a variable (e.g., mean, median and mode).
Measures of variability	Statistical measures that use a single value to reflect the way in which data is distributed across a data set.
Median	The middle value of the data set when all values are ordered from low to high.
Metaphysics	The branch of philosophy that focuses on rationalising the nature of reality.
Method of assessment	The way by which a concept, skill or content is assessed.
Mode	The most frequently appearing value(s) within the data set.
Normal curve	A bell-shaped curve that that represents a normal distribution.
Normal distribution	A probability distribution that is symmetrical based on the mean.

Terms	Elaborations
Organisational citizenship behaviour	Organisational citizenship behaviour is shown when an employee goes beyond their official job description and performs acts in the workplace such as voluntarily helping others, taking on additional responsibilities, and promoting initiatives and the organisation.
Pearson's r	A statistical measure that represents how well data fits to a linear model.
Peer-assessment	When students evaluate each other's work.
Percentile	A measure that indicates the percentage of a group that is below a particular score.
Percentile rank	A measure that compares the achievement of individual students against the rest of a group.
Perennialism	An educational theory that advocates that teachers should teach knowledge that is universal and fixed, which is relevant to all people throughout time.
Personal ethics	Comprises an individual's moral system or beliefs about what is right and what is wrong, which guide their decision-making and behaviour.
Postmodernism	A philosophical perspective which rejects the idea of a universal truth and focuses on challenging existing societal structures.
Potential development	The level of skill or learning that is just above the zone of actual development. These are skills that have not yet been learnt, but the student is ready to learn.
Pragmatism	A philosophy that rejects ideas of a universal and fixed truth, and rather views reality as constructed by individuals in interaction with their environment.
Professional autonomy	[In terms of teacher autonomy] The professional independence of teachers in schools, especially the degree to which they can make autonomous decisions about classroom practice.
Professional ethics	[In the context of education] Encompass the standards of behaviour expected in the profession. Educational systems at the national level are likely to have a Code of Ethics or Code of Professional Conduct. The Five Precepts of Education serves as a Code of Ethics for Myanmar teachers. In addition to the Five Precepts, Domain C of Myanmar's TCSF is dedicated to Professional Values and Dispositions.
Progressivism	An educational theory that advocates for education to be relevant to ever-changing contexts, tailored to students' interests.
Q-correlation	An estimated measure of the linearity of relationship between two variables.
Quartile	A quarter of a group of data or values that have been divided evenly into four groups. A quartile can also refer to the numerical break point between each of the four quarters.
Range	The spread of data between the minimum and maximum value. It is found by subtracting the minimum value from the maximum value.
Realism	A philosophy that views reality as objective and fixed, and values are universal and do not change over time.
Reconstructionism	An educational theory that advocates for schools to focus on matters of global concern, democracy and social change.
Rubrics	A tool that is used to evaluate judgement-based assessment. They contain criteria, standards and descriptors.
Schools of thought	Another name for the major philosophies; Idealism, Realism, Pragmatism, and Existentialism. These philosophies have certain big ideas in common, which is why they have been grouped together.

Terms	Elaborations
Segregation	Happens when students are educated in settings that are different to that of the majority of their peers. Segregation may take the form of special schools that cater to the specific needs of different groups of students. Language schools, schools for gifted students, schools that cater for students with autism, and schools for children with profound learning disabilities or physical disabilities are all examples of segregation.
Self-assessment	When a person evaluates their own performance.
Social moderation	Where a group of assessors come together to draw qualitative conclusions about student achievement. The aim is to establish consistency and reliability of judgement across raters (or assessors).
Spread	See *variability*
Spurious	When something, such as results or a conclusion, is false because it is not what it appears to be.
Standard deviation	A statistical measure that shows how much the individual values in a data set deviate from the mean.
Standards	Levels of achievement or performance.
Teaching philosophy	A teacher's beliefs, values, ideas and goals about teaching and learning which underpin their professional practice.
Variability	The way that data is distributed across the range of values in a data set.
Variables	Units or elements that contain a range of values that can be analysed, such as height, weight, school attendance or science test scores.
Vertical dimensions (of learning)	The levels of difficulty that are covered within an area of learning.
Zone of actual development	The level of skill or knowledge that a student has already mastered.
Zone of proximal development	The space between what a learner *can do* without assistance *(zone of actual development),* and their *potential development* (the next level of difficulty in learning).

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Annexes

Annex 1. Questionnaire: What is your Educational Philosophy?

This questionnaire was developed to help you identify your educational philosophy. For each question, circle the answer that best reflects your personal view. For some questions you may want to select more than one answer.

Table Annex 1. Educational philosophy auestionnaire[232]

Question	Response
1. What is the essence of education?	A. The essence of education is *reason* and *intuition.* B. The essence of education is *growth*. C. The essence of education is *knowledge* and *skills*. D. The essence of education is *choice*.
2. What is the nature of the learner?	A. The learner is an experiencing organism. B. The learner is a unique, free choosing, and responsible creature made up of intellect and emotion. C. The learner is a rational and intuitive being. D. The learner is a storehouse for knowledge and skills, which, once acquired, can later be applied and used.
3. How should education provide for the needs of man?	A. The students need a passionate encounter with the perennial problems of life; the agony and joy of Love, reality of choice, anguish of freedom consequences of actions and the inevitability of death. B. Education allows for the needs of man when it inculcates the child with certain essential skills and knowledge, which all men should possess. C. The one distinguishing characteristic of man is intelligence. Education should concentrate on developing the intellectual reeds of students. D. Since the needs of man are variable, education should concentrate on developing the individual differences in students.

232 Jersin, P. D. (1972 , pp. 274–267)..

Question	Response
4. What should be the environment of education?	A. Education should possess an environment where the student adjusts to the material and social world, as it really exists. B. The environment of education should be life itself, where students can experience living—not prepare for it. C. The environment of education should be one that encourages the growth of free, creative individuality, not adjustment to group thinking nor the public norms. D. Education is not a true replica of life, rather, it is an artificial environment where the child should be developing his intellectual potentialities and preparing for the future.
5. What should be the goal of education?	A. Growth, through the reconstruction of experience, is the nature, and should be the open-ended goal, of education. B. The only type of goal to which education should lead is to the goal of truth, which is absolute, universal, and unchanging. C. The primary concern of education should be with the development of the uniqueness of individual students. D. The goal of education should be to provide a framework of knowledge for the student against which new truths can be gathered and assimilated.
6. What should be the concern of the school?	A. The school should concern itself with man's distinguishing characteristic his mind, and concentrate on developing rationality. B. The school should provide an education for the 'whole child," centering its attention on all the needs and interests of the child. C. The school should educate the child to attain the basic knowledge necessary to understand the real world outside. D. The school should provide each student with assistance in his journey towards self-realisation.
7. What should be the atmosphere of the school?	A. The school should provide for group thinking in a democratic atmosphere that fosters cooperation rather than competition. B. The atmosphere of the school should be one of authentic freedom where a student is allowed to find his own truth and ultimate fulfillment through non-conforming choice making. C. The school should surround its students with "Great Books" and foster individuality in an atmosphere of intellectualism and creative thinking. D. The school should retain an atmosphere of mental discipline; yet incorporate innovative techniques, which would introduce the student to a perceptual examination of the realities about him.

Question	Response
8. How should appropriate learning occur?	A. Appropriate learning occurs as the student freely engages in choosing among alternatives while weighing personal responsibilities and the possible consequences of his actions. B. Appropriate learning takes place through the experience of problem-solving projects by which the child is led front practical issues to theoretical principles (concrete-to-abstract). C. Appropriate learning takes place as certain basic readings acquaint students with the world's permanencies, inculcating them in theoretical principles that they will later apply in life (abstract-to-concrete). D. Appropriate learning occurs when hard effort has been extended to absorb and master the prescribed subject matter.
9. What should be the role of the teacher?	A. The teacher should discipline pupils intellectually through a study of the great works in literature where the universal concerns of man have best been expressed. B. The teacher should present principles and values and the reasons for them, encouraging students to examine them in order to choose for themselves whether or not to accept them. C. The teacher should guide and advise students, since the children's own interests should determine what they learn, not authority nor the subject matter of the textbooks. D. The teacher, the responsible authority, should mediate between the adult world and the world of the child since immature students cannot comprehend the nature and demands of adulthood by themselves.
10. What should the curriculum include?	A. The curriculum should include only that which has survived the test of time and combines the symbols and ideas of literature, history, and mathematics with the sciences of the physical world. B. The curriculum should concentrate on teaching students how to manage change through problem solving activities in the social studies, empirical sciences and vocational technology. C. The curriculum should concentrate on intellectual subject matter and include English, languages, history, mathematics, natural sciences, the fine arts, and also philosophy. D. The curriculum should concentrate on the humanities; history, literature, philosophy, and art—where greater depth into the nature of man and his conflict with the world are revealed.
11. What should be the preferred teaching method?	A. *Projects* should be the preferred method whereby the students can be guided through problem-solving experiences. B. *Lectures, readings*, and *discussions* should be the preferred methods for training the intellect. C. *Demonstrations* should be the preferred method for teaching knowledge and skills. D. *Socratic dialogue* (drawing responses from a questioning conversation) should be the preferred method for finding the self.

Annex 2. Description of educational systems

The following excerpts provide a description of two educational systems: Singapore (Box Annex 2A) and Finland (Box Annex 2B).

Box Annex 2A. Description of the education system in Singapore[233]

Students in Singapore need to complete Primary school (6 years), Secondary school (4 years) and Post-secondary school (1 to 3 years). Prior to starting Primary schools, students may complete Pre-school or Kindergarten, but this is not compulsory.

The government has tight control over the curriculum and how it is implemented. The curriculum, developed by the Ministry of Education, specifies "Desired Outcomes of Education." These desired outcomes are:

1. Excellence in Life skills;
2. Knowledge skills; and
3. Subject discipline knowledge, which is made up of eight core skills and values: "character development, self-management skills, social and cooperative skills, literacy and numeracy, communication skills, information skills, thinking skills and creativity, and knowledge application skills".

Each subject has its own syllabus and end-of-course exam. When students have completed four years of Primary school, they complete a selection test. The results of this test will determine the level at which students will study basic subjects in the final two years of Primary school. At the end of Primary school, students once again sit a selection test. The results of this test will determine student's pathways in Secondary school.

The Ministry of Education has historically prescribed the desired pedagogical practices for implementing the curriculum. Traditionally, there has been a strong focus on teacher-centred approaches such as lectures. In recent years, it has placed more emphasis on pedagogies that strengthen student engagement and creativity. In recent years, the Ministry has encouraged schools to choose their own pedagogical strategies within the curriculum framework.

233 National Center on Education and the Economy. (n.d.).

Box Annex 2B. Description of the education system in Finland

Finland has a comprehensive education system, ranging from early childhood education and care all the way through to adult education. Pre-primary school, Primary school (basic education) and Secondary school is compulsory for students aged 6 to 18 years old. In Upper secondary school, students can choose between general or vocational education. At the end of Secondary school, students can take a school-leaving exam. Depending on their test score, students can apply for further studies at institutes for vocational education, universities of applied sciences, or universities.[234]

The Finnish Ministry of Education and Culture describes education as "one of the cornerstones of the Finnish welfare society".[235] A unique feature of Finnish education is that education is free of charge. Another feature that makes the Finnish system unique is the extremely high quality of teachers and popularity of the teaching profession. Finnish teachers are highly educated and are trusted to be expert professionals, meaning that they have much freedom to choose instructional methods.[236]

Finland has recently gone through a major curriculum reform; the new curriculum has been implemented since 2016. The main focus of the curriculum reform was on creating optimal conditions for students to learn in an ever-changing world. To best meet student needs, many students were consulted in the reform process. It was envisioned that the new curriculum should:

> enhance students' motivation for deep learning and to achieve good grades as well as to learn to live a sustainable life. It was necessary to rethink practically everything in education in order to enhance students' holistic development and to provide better circumstances for them to learn to live in this complex and fast-changing world and to meet the challenges of the future.[237]

234 Ministry of Education and Culture Finland. (n.d.).
235 Ministry of Education and Culture Finland. (n.d.).
236 Halinen, I. (2018).
237 Halinen, I. (2018, p. 80).

> The result is a curriculum that places students at the heart of all education efforts. The curriculum emphasises the need to value the unique nature of each individual student and promote their individual growth and well-being as an educated person and active citizen. The curriculum promotes student agency in learning, by offering goal-oriented, meaningful and collaborative learning experiences. Rather than a traditional organisation by subject content, the curriculum is founded upon competencies. Basic subject matter knowledge is still taught, but in a multidisciplinary manner. The curriculum is a broad framework, which sets out the broad framing within which municipalities and schools are to decide on the best methods for delivering the curriculum.[238]

238 Halinen, I. (2018).

Annex 3. Learning taxonomies

Table Annex 3A. Dreyfus' Model of Skills Acquisition[239]

Level of proficiency	Description of level	Examples of verbs
Expert	The learner's interpretation of different situations and the actions they take to achieve their goal are intuitive. The learner can analyse and adapt easily to new situations. They know how to manipulate and change the rules successfully.	Improvise, create, design, compose, invent
Proficient	The learner is able to see the ultimate goal of what they are doing. They can prioritise rules and actions according to the situation. They become more successful in adapting their approach to different contexts.	Prioritise, synthesise, justify, critique, evaluate, predict
Competent	The learner now has enough experience to understand the complexity of the skill they are learning. They understand how different contexts require different responses. It can become overwhelming. They begin to focus on a few specific elements. To do this, the learner begins to plan and use rules to guide what they do within different contexts. The learner has a greater understanding of success and failure. This may cause anxiety for the learner as they become more emotionally involved.	Apply, decipher, interpret, translate, plan, formulate, solve
Advanced beginner	The learner has gained some experience. They begin to understand how the rules apply within different contexts. They begin to use cues from the context to react or respond. The learner still needs to follow instructions and examples. Each step is equally important to them.	Recognise, list, reflect, identify, define, compare, replicate
Novice	The learner adheres rigidly to rules which are very specific and not linked to real contexts. Learners do not have the knowledge or understanding to diverge from the rules.	Copy, recite, imitate, attempt, repeat

239 239 Dreyfus, S. E., & Dreyfus, H. L. (1980); Dreyfus, S. E. (2004).

Table Annex 3B. Krathwohl's Affective Domain[240]

Level of proficiency	Description of level	Examples of verbs
Characterisation	The values become internalised and impacts on their understanding of the world, the universe and philosophy of life. The values are reflected unconsciously through the person's behaviours.	Judge, conclude, enact, persuade
Organisation	The learner links and integrates the new idea into the values they hold already. The learner understands the relationship between the ideas and values and is able to order and prioritise them.	Defend, integrate, prioritise, combine, categorise
Valuing	The learner starts to value the idea. As they value the idea, the pursue it to learn more. They develop a sense of certainty about the idea.	Follow, explain, interpret, promote, share, reflect
Responding	The learner complies with the idea and obeys the rules voluntarily. They may find compliance, a satisfying experience.	Report, answer, discuss, respond, conform, participate, present
Receiving	The learner is aware of an idea. As they think about it the learner prioritise or prefer parts of the idea.	Listen, read, observe, notice

Table Annex 3C. Structure of Observed Learning Outcomes (SOLO) Taxonomy[241]

Level of proficiency	Description of level	Examples of verbs
Extended abstract	The learner is able to generalise their understanding of the task or concept to new ideas and contexts. However, they can recognise how the task or concept may need to be adapted within different contexts. This means that there is consistency in how they approach the task or concept. The learner is able to conceptualise the task or concept in abstract ways.	Synthesise, critique, create, hypothesise, design, justify
Relational	The learner takes time to observe the task or concept until they can see the relationship between all elements. They are able to integrate the elements into a cohesive whole. The learner understands how the different elements within a task or concept are interrelated. However, their understanding is context specific, which can lead to inconsistency in their argument or understanding.	Compare and contrast, juxtapose, analyse cause and effect, defend
Multistructural	As the learner interacts with the skill or concept, they begin to identify several relevant elements of a concept or task. However, the learner treats each element as independent from the other parts. This can result in an inconsistent approach or understanding of the task or concept.	Describe, combine, classify, compute, calculate, analyse, examine

240 Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964).
241 Biggs, J. B., & Collins, K.F. (1982).

Level of proficiency	Description of level	Examples of verbs
Unistructural	The learner focuses on one relevant element of a task or concept. They see the task or concept from this narrow perspective.	Identify, pinpoint, find, define, follow, count
Prestructural	The learner has no understanding of the task. Their thinking is not structured or appropriate for the task.	(Not applicable)

Table Annex 3D. Bloom's revised taxonomy[242]

Level of proficiency	Description of level	Examples of verbs
Create	The learner is able to take the elements of a concept and put them together or recreate them to make new, original products or ideas.	Create, design, generate, invent, hypothesise, compose
Evaluate	The learner has depth of knowledge about the concept and is able to use criteria to make judgements.	Prioritise, evaluate, judge, juxtapose, synthesise, critique, persuade, debate, appraise
Analyse	The learner is able to understand the concept as a whole, as well as break the concept down into its component parts. The learner is able to see how the different parts of the concept are related and how they contribute to the whole.	Compare, contrast, examine, categorise, infer, dissect, defend
Apply	The learner is able to apply or enact their learning. They may carry out a process or procedure that is expected in a particular situation.	Build, demonstrate, model, perform, practise, apply, classify, discuss, solve
Understand	The learner is able to construct meaning from a messages that are presented in different ways (such as oral, written, visual, etc).	Explain, interpret, define, summarise, estimate, compare
Remember	The learner is able to recall or retrieve knowledge from memory. They can recognise relevant facts, information or concepts.	Recite, list, recall, trace, locate, tell, repeat, name

242 Krathwohl, D. R. (2002).

Annex 4. Structuring rubrics

Table Annex 4. Example of table to structure rubrics

Constructs	Sub-skills / knowledge	Criteria	Level 0 Not demonstrated	Level 1: Novice and Advanced beginner	Level 2: Competent	Level 3: Proficient and Expert	Framework – Dreyfus' Model of Skills Acquisition
Problem solving	Problem identification	Identifies a problem	The problem is not identified.	Recognises that the garden needs water.	Explains the need to get water from the pond to garden.	Analyses the position of the water in relation to garden.	
	Problem analysis	Proposes solutions to a problem	No solutions are proposed; solutions are inappropriate.	Solution moves water from place to place.	Solution recognises that water flows from high to low ground.	Solution involves using natural and continual flow of water.	
		Experiments to bring water from a high place to a low place	No experiments.		Experimented with different ways to move water.	Experiment was planned and conducted in a logical way.	
	Evaluation of solutions	Designs a solution	The solution is not designed.	The solution is drawn.	Design is labelled.	Design is drafted adjusted and labelled to improve it.	
Collaboration	Participation and inclusion	Participation of each student in the discussion	Some students did not participate.	All students participated.	All students participated equally.		
		Inclusion of all team members in the discussion	Not all students' ideas were valued.	Each student had a turn to present an idea.	Students encouraged each other to share ideas.	Ideas from all students were valued.	
	Negotiation strategies	Team negotiation tactics to reach common agreement	Disagreements were not resolved.	Students developed rules to guide decision making.		Students used logic and reasoning to reach a common agreement.	

Annex 5. Results for Pearson's r

Table Annex 5. Sample calculation results for Pearson's r

Student ID	Diagnostic task score /45	Mean distance Variable 1	Standardised mean distance Variable 1	Summative task score /45	Mean distance Variable 2	Standardised mean distance Variable 2	Product of standardised mean distances (PSMD)
Student 1	29	-1.300	-0.206	36	2.867	0.386	-0.080
Student 2	34	3.700	0.587	40	6.867	0.925	0.543
Student 3	31	0.700	0.111	31	-2.133	-0.287	-0.032
Student 4	34	3.700	0.587	37	3.867	0.521	0.306
Student 5	32	1.700	0.270	42	8.867	1.194	0.322
Student 6	36	5.700	0.904	45	11.867	1.598	1.445
Student 7	29	-1.300	-0.206	32	-1.133	-0.153	0.031
Student 8	39	8.700	1.380	32	-1.133	-0.153	-0.211
Student 9	37	6.700	1.063	45	11.867	1.598	1.698
Student 10	31	0.700	0.111	29	-4.133	-0.557	-0.062
Student 11	29	-1.300	-0.206	28	-5.133	-0.691	0.143
Student 12	29	-1.300	-0.206	38	4.867	0.655	-0.135
Student 13	28	-2.300	-0.365	29	-4.133	-0.557	0.203
Student 14	33	2.700	0.428	41	7.867	1.059	0.454
Student 15	34	3.700	0.587	39	5.867	0.790	0.464
Student 16	24	-6.300	-0.999	31	-2.133	-0.287	0.287
Student 17	45	14.700	2.332	41	7.867	1.059	2.470
Student 18	23	-7.300	-1.158	24	-9.133	-1.230	1.424
Student 19	26	-4.300	-0.682	24	-9.133	-1.230	0.839
Student 20	34	3.700	0.587	42	8.867	1.194	0.701
Student 21	24	-6.300	-0.999	29	-4.133	-0.557	0.556
Student 22	26	-4.300	-0.682	33	-0.133	-0.018	0.012
Student 23	30	-0.300	-0.048	29	-4.133	-0.557	0.026
Student 24	22	-8.300	-1.317	21	-12.133	-1.634	2.151
Student 25	29	-1.300	-0.206	25	-8.133	-1.095	0.226
Student 26	22	-8.300	-1.317	23	-10.133	-1.364	1.797
Student 27	25	-5.300	-0.841	24	-9.133	-1.230	1.034
Student 28	18	-12.300	-1.951	23	-10.133	-1.364	2.662
Student 29	45	14.700	2.332	44	10.867	1.463	3.412
Student 30	31	0.700	0.111	37	3.867	0.521	0.058
Mean	**30.3**		**Mean**	**33.13333**		**Sum of PSMD**	**22.746**
SD	**6.303529**		**SD**	**7.426575**		**Pearson's r**	**0.784**

Annex 6. Pearson's r calculation

Table Annex 6. Table of calculations for Lesson 8.3.4, Learning activity 2

Student ID	Diagnostic task score /45	Mean distance Variable 1	Standardised mean distance Variable 1	Summative task score /45	Mean distance Variable 2	Standardised mean distance Variable 2	Product of standardised mean distances (PSMD)
Student 1	28			27			
Student 2	17			21			
Student 3	32			40			
Student 4	25			27			
Student 5	29			36			
Student 6	34			39			
Student 7	36			36			
Student 8	41			45			
Student 9	33			36			
Student 10	17			15			
Student 11	28			31			
Student 12	40			37			
Student 13	25			34			
Student 14	37			38			
Student 15	32			29			
Student 16	26			30			
Student 17	29			27			
Student 18	25			23			
Student 19	43			38			
Student 20	26			33			
Student 21	11			9			
Student 22	34			28			
Student 23	33			41			
Student 24	30			32			
Student 25	26			23			
Student 26	27			31			
Student 27	28			39			
Student 28	29			37			
Student 29	36			36			
Student 30	36			39			
Mean			**Mean**			**Sum of PSMD**	
Standard deviation			**Standard deviation**			**Pearson's r**	

Annex 7. Action Research Cycle

1. Identify a research question. What do you want to learn more about? What questions do you have about teaching? Research questions should be open-ended questions, for example: How do different teaching approaches in the classroom impact on students' learning?
2. Research your question. Find out as much background information on your topic or question that you can. You can do this by searching the internet, reading books and articles, or talking to other educators, students, parents, etc.
3. Plan your research. Think about how you will gather and record the data you need to answer your question. For example, you could use student work, student feedback, mentor teacher feedback, peer evaluation, and/or self-reflections to answer your question.
4. Conduct your research. Carry out the research using the method(s) you chose in step 3.
5. Analyse your data. Once you have collected information or data, you need to make sense of what it means. Ask yourself: What did I find out about my question? What insights have I gained? What does this research show me? It may help to collaborate with another teacher to analyse your data, to get a broader perspective.
6. Act on your insights. Decide on actions to be taken, based on your analysis of your data, and implement those changes to your teaching practice.
7. Review and make changes. After you have implemented your changes, review the impact the changes you have made to your teaching. Think about whether the changes were successful, and whether other changes or follow-up is needed.

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UNESCO Project Office in Myanmar