Appendix 1. Intermediate level of summary

***How do students think and learn?***

Principle 1: Students’ beliefs or perceptions about intelligence and ability affect their cognitive functioning and learning.

* **Explanation**
* **Students with a “growth” or “incremental” mind-set** are open to the challenges which develop their ever-changing intelligence or ability; are likely to attribute their failure to the lack of effort.
* **Students with a “fixed” mind-set** are defensive on the challenges which threaten the proved excellence(performance-base) of their intelligence or ability; are likely to attribute their failure to the lack of ability.
* **Relevance For Teachers**
* Teachers can foster students’ “growth” or “incremental” mind-set with applying different strategies which usually focus on the attribution of success or failure to students’ effort.
* However, the appropriateness of any feedback will depend on many factors based on teacher judgement of the situation; Teachers should consider the relation between attribution behavior and student’s mind-set.

Principle 2: What students already know affects their learning.

* **Explanation**
* **Conceptual growth** occurs when students add knowledge into what they already know; new knowledge is consistent with prior knowledge.
* **Conceptual change** occurs when the learning material no is inconsistent with prior knowledge.
* **Formative assessment** is initial assessment for understanding of students’ current understanding of a specific subject; This assessment leads to the judgement of the type of learning (conceptual growth vs conceptual change).
* **Relevance For Teachers**
* Teaching strategies are different depending on the type of learning.
* For conceptual growth, teachers should help students engage in meaningful, thoughtful interaction with the information to be learned.
* For conceptual change, teachers should help students’ consciousness of the discrepancy between prior knowledge and correct material or concepts.

Principle 3: Students’ cognitive development and learning are not limited by general stages of development.

* **Explanation**
* Students have cognitive structures that guide their understanding when encountering text and events.
* In **contextualist approaches** to cognitive development and learning, cognition can be interpersonally based. This approach is especially effective the target material is located nearly to what students already knows (***zone of proximal development***). It support the idea that cognition can be “situated”, whereby people learn knowledge through the live practice.
* **Relevance For Teachers**
* Beyond the consideration of students’ developmental level, teachers can facilitate student reasoning through strategies from contextualist approaches.

Principle 4: Learning is based on context, so generalizing learning to new contexts is not spontaneous but instead needs to be facilitated.

* **Explanation**
* **Student transfer or generalization of their knowledge and skills** is not spontaneous or automatic, but can be facilitated and supported; it becomes progressively more difficult the more dissimilar the new context is from the original learning context.
* **Relevance For Teachers**
* For students transfer of knowledge, teachers should encourage students to apply their prior knowledge, which is acquired in specific context, to new and unfamiliar materials embedded in real and multiple context.

Principle 5: Acquiring long-term knowledge and skill is largely dependent on practice.

* **Explanation**
* **Deliberate practice**, rather than rote repetition, leads to new knowledge or skills that can later be developed into more complex knowledge and skills.
* The advantages of rehearsal and deliberate practice: (a) the likelihood that learning will be long term and retrievable is increased, (b) student ability to apply elements of knowledge automatically and without reflection is enhanced, (c) skills that become automatic free up students’ cognitive resources for learning more challenging tasks, (d) transfer of practiced skills to new and more complex problems is increased, and (e) gains often bring about motivation for more learning
* **Relevance For Teachers**
* Teachers need to encourage students to practice by pointing out that expending effort lead to improved performance
* By realistic and well designed practice to maximize students’ opportunity to succeed, teachers can motivate students in engage in (deliberate) practice.

Principle 6: Clear, explanatory, and timely feedback to students is important for learning.

* **Explanation**
* Clear, explanatory, and timely feedback increase student motivation or understanding.
* **Relevance For Teachers**
* It is effective to provide student with specific information about their current state of knowledge and performance as related to learning goals; Feedback considering future goals or including guidance for discovering correct answer is also effective.
* The tone and targeting of feedback matters for students’ motivation. Minimize negativity and address significant aspects rather than excessive details. Suggest frequent praise about small and evident improvement, especially facing a new and challenging tasks.

Principle 7: Students’ self-regulation assists learning and self-regulatory skills can be taught.

* **Explanation**
* **Self-regulatory skills** - attention, organization, self-control, planning, and memory strategies - can be taught and enhanced through direct instruction, modeling, support, and classroom organization and structure.
* **Relevance For Teachers**
* Clear goals and tasks which are broken down as meaningful unit with clear guide(criteria, time, opportunity) are helpful.
* Teachers can help processing activity such as evaluating the short- and long-term consequences of their decision for long-term remembering.

Principle 8: Student creativity can be fostered.

* **Explanation**
* Creativity is defined as the generation of ideas that are new and useful in a particular situation, and students’ creativity can be developed and nurtured by education.
* Creativity and innovation are **the result of disciplined thinking** rather than purely spontaneous or frivolous thinking.
* **Relevance For Teachers**
* Teachers should encourage students to be open to diverse approach for solving problems and completing tasks.
* Teachers can foster creativity through various activities designed to promote alternative thinking in collective setting.
* Creativity needs to be placed in right time. Teachers should help students develop an improved sense of the appropriate time for mobilizing creativity.

***What Motivates students?***

Principle 9: Students tend to enjoy learning and to do better when they are more intrinsically rather than extrinsically motivated to achieve.

* **Explanation**
* **Intrinsic motivation** refers to engaging in an activity(learning) for its own sake. Intrinsically motivated students are more likely to approach their tasks in ways that enhance learning.
* **Extrinsic motivation** indicates participating in learning tasks as a means to an end. Extrinsically motivated students may be so focused on the reward that learning is superficial.
* Intrinsic and extrinsic motivation are **not at opposite ends of a motivation continuum.** Students engage in learning for **both motivation.**
* Extrinsic motivation is very important to producing positive educational outcomes
* **The type of motivation changeable**
* **Relevance for teachers**
* Teachers should support students’ fundamental need to feel competent and autonomous; Avoid too much controlling.
* Supporting students’ intrinsic motivation to achieve does not mean that teachers should completely eliminate the use of rewards.

Principle 10: Students persist in the face of challenging tasks and process information more deeply when they adopt mastery goals rather than performance goals.

* **Explanation**
* **Mastery goals** are oriented toward acquiring new skills or improving levels of competence. The individuals with mastery goals may strive to develop competence by learning as much as they can.
* **Performance goals** are motivated to demonstrate that they have adequate ability or to avoid tasks in an effort to conceal a perception of having low ability. The individuals with performance goals may strive to display their competence by trying to outperform others.
* In typical classroom situations, when students encounter challenging materials, mastery goals are generally more useful than performance goals.
* **Relevance for teachers**
* To fostering mastery goals, teachers should focus on effort, deliver evaluation privately, avoid social comparisons, consider mistakes as opportunities to learn, individualize the pacing of instruction, designing cooperation activity which sometimes combined with competition.
* There are times when performance goals can work well in situations that are themselves a performance.

Principle 11: Teachers’ expectations about their students affect students’ opportunities to learn, their motivation, and their learning outcomes.

* **Explanation**
* Self-fulfilling prophecy in educational setting refers that when faulty expectations of teachers are communicated to a student (whether verbally or nonverbally), that student may begin to perform in ways that confirm the teacher’s original expectation. The reason for this is that whether accurate or not, expectations influence treat students.
* Faulty expectations are more likely to occur when the contexts in which information about prior achievement may be least available or reliable and when students may have grounds to question their abilities.
* **Relevance for teachers**
* It is best for teachers to communicate high expectations to all students and maintain appropriately high standards for everyone in order to avoid negative self-fulfilling prophecies. For this purpose, teacher should continually assess the reliability of the information that they use to form expectation, and conduct self-check about right treatment on the basis of expectations.

Principles 12: Setting goals that are short term (proximal), specific, and moderately challenging enhances motivation more than establishing goals that are long term (distal), general, and overly challenging.

* **Explanation**
* **Goal setting** process is important for motivation because students with a goal and adequate self-efficacy are likely to engage in the activities that lead to attainment of that goal.
* **Self-efficacy** is also increased as students monitor the progress they are making toward their goals, especially when they are acquiring new skills in the process.
* **proximal, specific, and moderately challenging** goals are beneficial on achievement outcomes.
* **Relevance for teachers**
* It is desirable to keep a written record of goal progress checked regularly by both the student and the teacher
* Being proficient at setting moderately challenging goals, students may become **intermediate risk takers** (not aspiring too low or too high)
* Series of specific goals is one way of developing more distal goals.

***Why are social context, interpersonal relationships, and emotional well-being important to student learning?***

Principle 13: Learning is situated within multiple social contexts.

* **Explanation**
* The social contexts surrounding and influencing learners are interconnected complexly as a form of layers.
* **Relevance for teachers**
* Teachers can facilitate learning by relating the understanding of cultural background of students to curriculum
* Given potential variations in cultural experiences, it is critical that the teacher facilitate a “classroom culture” that ensures shared meanings, values, beliefs, and behavioral expectations and provides a safe and secure environment for all students.
* Teacher can enhance their understanding of students’ cultural background and students’ relevant experience by establishing connections with families and local communities and seeking opportunities to participate in the local community.

Principle 14: Interpersonal relationships and communication are critical to both the teaching–learning process and the social-emotional development of students.

* **Explanation**
* Classrooms, which are filled with the interpersonal relationship among participants, provide a critical context for teaching social skills such as communication and respect for others.
* Developing successful relationships with peers and adults is highly dependent on one’s ability to communicate thoughts and feelings through verbal and nonverbal behavior.
* **Relevance for teachers**
* Providing A safe and secure environment, establishing clear behavioral expectations related to social interactions, injuncting and inverevening any form of bullying, suggesting planned opportunities for practice, promoting peaceful resolution of students conflicts, are specific strategies for healthy social-emotional development of students.
* Effective student communication requires teaching and practice of component skills.

Principle 15: Emotional well-being influences educational performance, learning, and development.

* **Explanation**
* The components of emotional well-being include sense of self (**self-concept, self-esteem**), a sense of control over oneself and one’s environment (**self-efficacy, locus of control**), general feelings of well-being (**happiness, contentment, calm**), and capacity for responding in healthy ways to everyday stresses (**coping skills**).
* Being emotionally healthy depends on understanding, expressing, and regulating or controlling one’s own emotions, as well as perceiving and understanding others’ emotions (empathy).
* Understanding others’ emotions is influenced by how students perceive external expectations and acceptance on the part of significant others in their classroom, family, peer group, community, and societal environment.
* **Relevance for teachers**
* Teachers can help facilitate emotional development by using emotional vocabulary, modeling appropriate emotional expression and reaction, teaching emotion regulation strategies, promoting emotional understanding of others, and encouraging all students regardless of past performance.

***How can the classroom best be managed?***

Principle 16: 6 Expectations for classroom conduct and social interaction are learned and can be taught using proven principles of behavior and effective classroom instruction

* **Explanation**
* behaviors conducive to learning and appropriate social interaction are best taught at the beginning of the academic year and reinforced throughout the year.
* **Relevance for teachers**
* Implementing proactive disciplinary strategies, focusing early phase of academic year(the first 2 weeks of school) to establish rule and expectation with clear, specific, and timely instruction are valuable strategies.

Principle 17: Effective classroom management is based on (a) setting and communicating high expectations, (b) consistently nurturing positive relationships, and (c) providing a high level of student support.

* **Explanation**
* At both the classroom and the school level, the development of an effective learning climate is based on structure and support.
* **Relevance for teachers**
* Students profit from a predictable structure and high expectations for both academic achievement and classroom behavior.

***How to assess student progress?***

Principle 18: Formative and summative assessments are both important and useful but require different approaches and interpretations.

* **Explanation**
* **Formative assessments** are used to guide and shape classroom instruction directly. It take place before or during instruction, can be “on the fly,” and have the explicit purpose of improving current learning. This assessments, in the service of achieving learning goals, are more likely to incorporate learning progressions and include discussion, collaboration, self- and peer assessment, and descriptive feedback.
* **Summative assessments** are used to produce an overall judgment of student learning progress or the effectiveness of educational programs. It measure learning at a particular point, usually at the end of a unit of study, semester, or academic year, and by design provide limited opportunities to influence current learning activities. This assessments, given their purpose of evaluating progress against a benchmark, are more likely to be high-stakes, standardized large-scale assessments that evaluate individual work to yield an overall score or performance-level designation.
* Both formative and summative assessments can be developed by teachers or those outside of the classroom. In general, however, formative assessments are more likely to be developed by teachers, and large-scale, high-stakes assessments are more likely to be developed by an external organization
* Overall, the goal of both types of assessments is fundamentally the same—to produce **valid, fair, useful, and reliable sources of information.**
* **Relevance for teachers**
* For formative assessments, teachers should clearly communicate with students, use lessons and other classroom experience, and use this evidence to help understand what students know.
* The effectiveness of formative assessments are depending on the systematic goal setting, judgement of students’ achievement, continuously developed instruction, timely intervention after assessment.
* Teachers can make better use of both formative and summative assessments when they understand basic concepts related to educational measurement.

Principle 19: Students’ skills, knowledge, and abilities are best measured with assessment processes grounded in psychological science with well-defined standards for quality and fairness.

* **Explanation**
* Assessments that are both reliable and valid help test score users make appropriate inferences about students’ knowledge, skills, and abilities.
* Essential four questions: a) How much of what you want to measure is actually being measured?, b) How much of what you did not intend to measure is actually being measured?, c) What are the intended and unintended consequences of the assessment?, d) What evidence do you have to support your answers to the first three questions?
* **The validity of an assessment tool is not simply a number.** It is a judgment, over time and across a variety of situations, about the inferences that can be drawn from test data, including the intended or unintended consequences of using the test.
* **Fairness** is a component of validity. **Reliability** of an assessment is also a key factor
* **Relevance for teachers**
* Whenever teachers give an assessment, it is best to consider its strengths and limitations with respect to what they hope it will tell them about their students’ learning.
* Carefully aligning assessment with what is taught, using a sufficient number of questions and item analysis, being mindful the limitation of test in different setting, vasing high-stakes decision on multiple measures, monitoring outcome to determine structural difference among subgroups, can improve the quality of the assessments.

Principle 20: Making sense of assessment data depends on clear, appropriate, and fair interpretation

* **Explanation**
* Scores from any assessment should generally be used only for the specific purposes for which they were designed.
* **Relevance for teachers**
* Effective teaching depends heavily on teachers being informed consumers of educational research, effective interpreters of data for classroom use, and good communicators with students and their families about assessment data and decisions that affect students.
* Data gathered from any assessment are best interpreted in the light of their suitability, appropriateness, and the intended and unintended consequences.