Pedagogy

System Design /Instructional Methods and Materials

ALL's educational framework is of a "systems-engineered multi-push" design. That is, all components of its "educational system" that meaningfully impact learning are evaluated, operationalized, implemented, and fine-tuned to enhance student achievement. *ALL*'s educational system, pedagogy, and instructional materials are grounded, by rigorous research within the cognitive and behavioral sciences. *ALL* utilizes a "Benchmark Growth Model" that continuously improves, guided by data driven analysis and ongoing research within the science of learning, teaching, and motivation.

Instructional Level / Matching students to their functional level: No student grouping is completely educationally and developmentally homogeneous. Same age, same grade students vary greatly in academic preparation, family or peer support, drive, and talent. The more homogeneous students' academic range, within a classroom, the more opportunity a classroom teacher has to provide instruction at an optimal level for every student, and the more quickly and comfortable students will progress. In order to reduce variance within each classroom, students at *ALL* are selected for classroom membership based on a variety of factors including their functional level in declarative knowledge and procedural skills,along with their social development; not age or grade.

ALL's open-ended content design along with pedagogical protocols, allows students to progress at their own pace without the restriction if grade-level-content barriers nor lock-step-pacing. Instructional scaffolding techniques are designed to promote self-sustained student learning in a competitive but support environment. Instructional level and rigor are continuously adjusted to meet each student's challenge level (threshold where content can be mastered only through effortful learning) but not at a level that will overwhelm students (failure threshold: content cannot be mastered without significant help or unrealistic effort). Self-leveling instructional materials and system design ensure that each student receives instruction at his/her individualized challenge level (zone of proximal development, ZPD). Curricular and system design ceiling effects (constraints on higher than grade level achievement) and cumulative-failure effects (weak prerequisite skills due to years of poor instruction and/or low performance

expectations) have been remove. No student is required to wait for another student to learn, nor is any student driven so hard as to experience inordinate frustration. Although students are empowered to control their own rate of progress, they must meet or exceed minimum criterion referenced expectations.

Classroom Culture /Classroom Dynamics: Although every classroom is a unique potpourri of personalities, the instructor has substantial influence in shaping students' interpersonal behaviors. The teacher is trained to use practices focused on helping students develop social interactions which facilitate an esprit de corps; creating of a supportive, risk-free learning environment. The socio-dynamics in each classroom radiates an ambiance which includes the following:

- an appreciation and acceptance of student differences and a recognition that each student is worthy or respect, can make meaningful contributions, and each has the responsibility to contribute to the classroom community
- a reverence for civilization's tradition of protecting its children from the travails of adulthood in that those children may acquire the knowledge and wisdom to themselves become the bearers of civilization and the stewards of the next generation
- an expectation that every student has the ability to reflect upon his/her prior experiences and make responsible academic and social choices; an expectation that mistakes are part of a continuous process of improvement
- an awareness that what is learned today (e.g., content, social skills, knowledge, control of one's own learning) will impact each student's future (e.g., financial, intellectual, professional, emotional) (what you do today will impacts what you will be able to do tomorrow)
- an enjoyment of learning and excitement for sharing knowledge with others

Teachers and instructors adhere to the following tenets:

- The purpose of school is to provide each student with equal access to education.

- The role of the teacher is to encourage student learning and provide access to knowledge.
- Students are expected to self-regulate their behavior and learning, and to become a participating productive member of classroom culture.
- Although students are expected to resolve differences equitably, the classroom teacher is the final arbiter when children choose not to resolve difficulties
- Everyone is a student and teacher. Everyone has a responsibility to help every other individual learn (the instructor will provide training in “good teacher practices” and “good student practices”).
- Every student has the right to learn. No student has the right to interfere with another’s learning.
- No one is capable of forcing anyone else to learn against their will, no should they try. Every student has the right to fail and the ability to succeed with effort

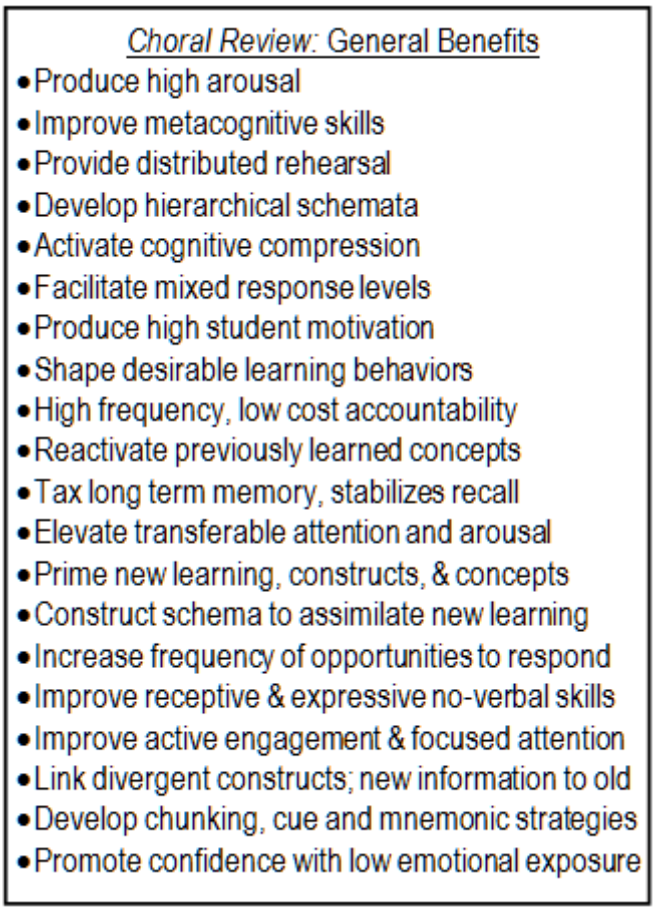
Each student’s innate curiosity, emergent talent, and drive “to know” are cultivated. Individual achievement and polite participation are extolled. Overt comparisons and the pitting of one student’s ambition against another’s sense of personal worth are avoided. No student’s success is dependent on another student’s failure. Each student is treated as a contributing member of the group while individual differences are accepted and unique needs and talents are recognized. The expression of acumen, responsible conduct, and socially disciplined citizenship are among the beneficial outcomes related to clear behavioral and academic expectations.

Instructional Practices/ Methods and Components: Elementary School (grades K-5) and Secondary School (grades 6-12) utilize similar pedagogy but slightly different methods of application. Although, traditional text books are utilized summative and formative student performance data is collected via Expert Trials and Challenge Exercise. Instructional components and practices utilized by both the Elementary and Secondary schools include: direct instruction in Metacognitive Knowledge and Skill Development; Choral Review; Choral Exercises; Individual and Small Group Gating; Need-To-Know Discussions; Want-to-Know Symposia; Global Lectures; Call and Response Oral Activities; Preceptorials; Town Hall Forums, student driven classroom management; Expert Trials (mastery exams); Challenge Exercises (application exams/essays); Small

Group and Individual Projects; Laboratory Investigations; Direct instruction and development of soft skills; and Nonverbal shaping.

INSTRUCTIONAL COMPONENTS: "Within class" instructional activities and strategies include formalized *Oral Activities*, *Expert Trials* (mastery learning), *Challenge Exercises* (application of learning), teacher driven *Global Lectures*, student driven *Need-To-Know* discussions, *Heuristic Discussions*, *Preferred Activity Gating,* cooperative group projects, individualized projects, classroom etiquette and protocols, various motivational strategies, Teacher Mentors, Student tutors, Student Guides, feedback and intervention.

Oral Activities: Structured oral activities reinforce content knowledge and greatly increase the efficiency of the learning process. Oral strategies are used to: reinforce knowledge scaffolds, meaningfully associate conceptual "chunks" and imbed content knowledge into long-term memory. Large knowledge domains are compressed into hierarchical chunks. These activities include: choral rehearsal, choral review, call and response, oral gating, reciprocal peer coaching, and collaborative teaching. Daily oral exercises provide opportunities to develop student attending-behaviors such as: self-directed attention, selective attention, divided focus, attention intensity, and reflective thinking. Effort is made to both generalize and internalize (automatize) productive learning behaviors.



Choral Reviews: are of a short duration and high frequency. Choral Exercises may occur throughout the day. These Reviews provide opportunities for: rehearsal with elaboration; reactivation of previously learned content; cognitive consolidation (i.e., lecture content is condensed into nomenclature with organizational, conceptual, and often mnemonic value); shaping automatic learning behavior (tempo and disposition), and stimulation intrinsic motivation. Choral reviews are surprisingly effective at establishing a pace and arousal level that continues throughout the day. When executed effectively, they are exceedingly fun for the students.

Choral Review / Choral Exercises Features:

- *Frequency / Distributed Rehearsal*: Choral Exercises are scheduled daily and spontaneously utilized throughout the day. Targeted content is distributed over time and memory traces are reactivated.
- *Duration*: Exercises take from 5 to 15 minutes.

- *Consolidation, Mental Constructs, and Associations*: Previously learned constructs are associated with new constructs (thus avoiding the memorial isolation effects of “pigeonholing”) re-associating and strengthening memory traces (i.e., neurons that wire together fire together).
- *Increases Working Memory Capacity*: Instructor utilizes “successive approximation” strategies to extend the temporal endurance, item capacity, and resilience to distraction of students’ working memories.
- *Rhythm and tempo*: Tempo is rapid. Shifts between concepts are smooth (conceptually connected) and seamless (there are no long pauses).
- *Voice and volume*: Student voices are of medium volume. The group voice is blended harmoniously (no voice is heard above others, each voice can be heard). Voices are synchronized and all students start and end together (no student races ahead). Voices are lucid and distinct. Instructors learn to “selectively attend” to specific voices, providing opportunity to establish a simple yet effective feedback loop (non-verbal) used to “shape” individual student motivation, confidence, and attending behaviors.
- *Non-verbal communication*: Teacher utilizes facial expression, eye contact, posture, subtle gestures, and physical proximity to increase attention levels, focus, participation, and confidence. Teacher enlists eye-fix and eye-contact, in a non-disruptive and high-frequency style, encouraging individuals with low participation rates or low confidence to join in the Choral Exercises. Utilizing scanning, facial expressions, and sampling, teacher assesses and assures full and continuous participation. Teachers frequently employ subtle reinforcing gestures to encourage those who begin to respond and ensure that those who have been responding to continue responding.
- *Reasoning Heuristics / Analogies*: Fast and frugal coding generalizations are actively constructed having the effect of significantly reducing cognitive load. The process of analogy generalization models “thinking” strategies that have a high

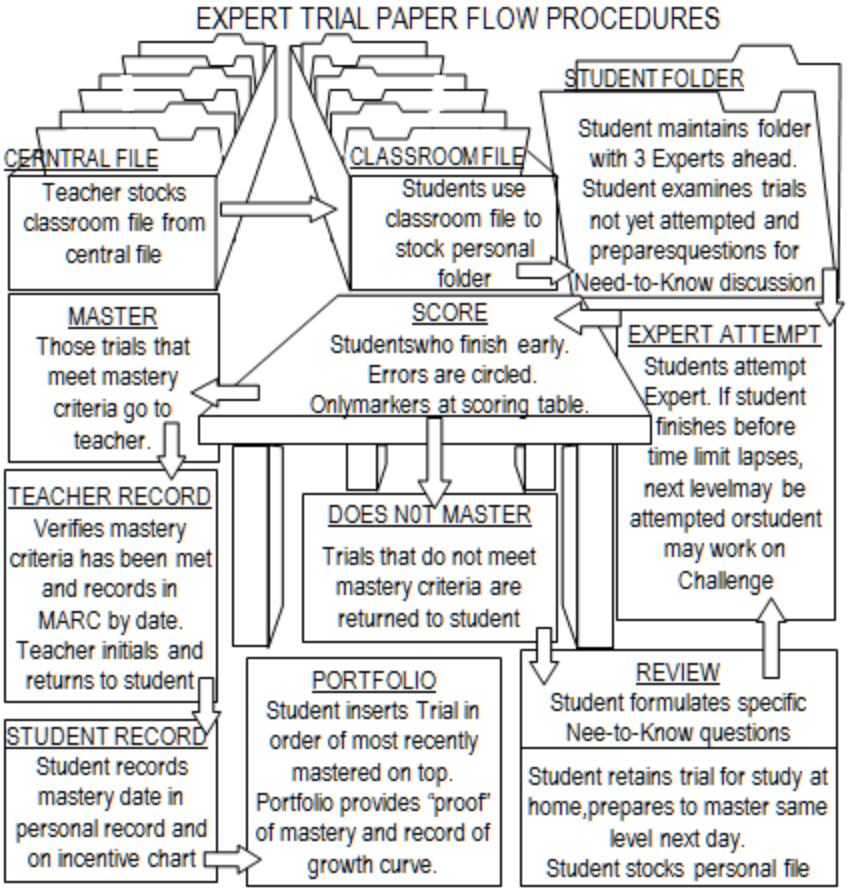
probability of being adopted, adapted, and generalized by individual students to understand and solve novel problems.

- *Fade*: A teacher will diminish visual and auditory cues as the group proficiency and cohesion increase.
- *Mixed Response Levels*: The instructor will use a plethora of non-verbal communication devices to cue whole group, part group, and individual response. If mixed response cues are used to develop desirable behaviors in an individual, a teacher will intermittently move from whole group responses to individual until desired response and engagement behaviors are continuously exhibited (shaping through successive approximations).
- *Mastery*: Teachers will initially rehearse cognitively compressed content in conceptually sequenced order (cognitive map, display based map, mental maps). When whole group confidence is evident, the teacher will modify the response expectation to an alternate, more challenging order. When confidence is again evident, the teacher will randomize the response expectation. When confidence is again evident, the teacher will remove the mastered rehearsal target from the daily list of topics to be rehearsed and place it in the "hiatus list" for subsequent intermittent review.
- *Learning Probes*: The teacher will use "Oral Accountability Probes" to check for: recall efficiency, mastery level understanding, level of confidence (individual and group), intentional extensions (transfer, generalization, extrapolation, problem solving transfer, or active knowledge construction), fluid response dexterity (the ability to associated targeted knowledge with previously learned material in a unique unrehearsed but conceptually sound manner).

Interactive Global Lectures: are whole class instructor directed discussions (often dialectic) of targeted content in which knowledge scaffolds and schemata are actively constructed. Although lectures are teacher guided, students are encouraged to make rational deductions and predictions in the process of constructing scaffolds. The instructor, through a host of verbal and non-verbal techniques, ensures students' active

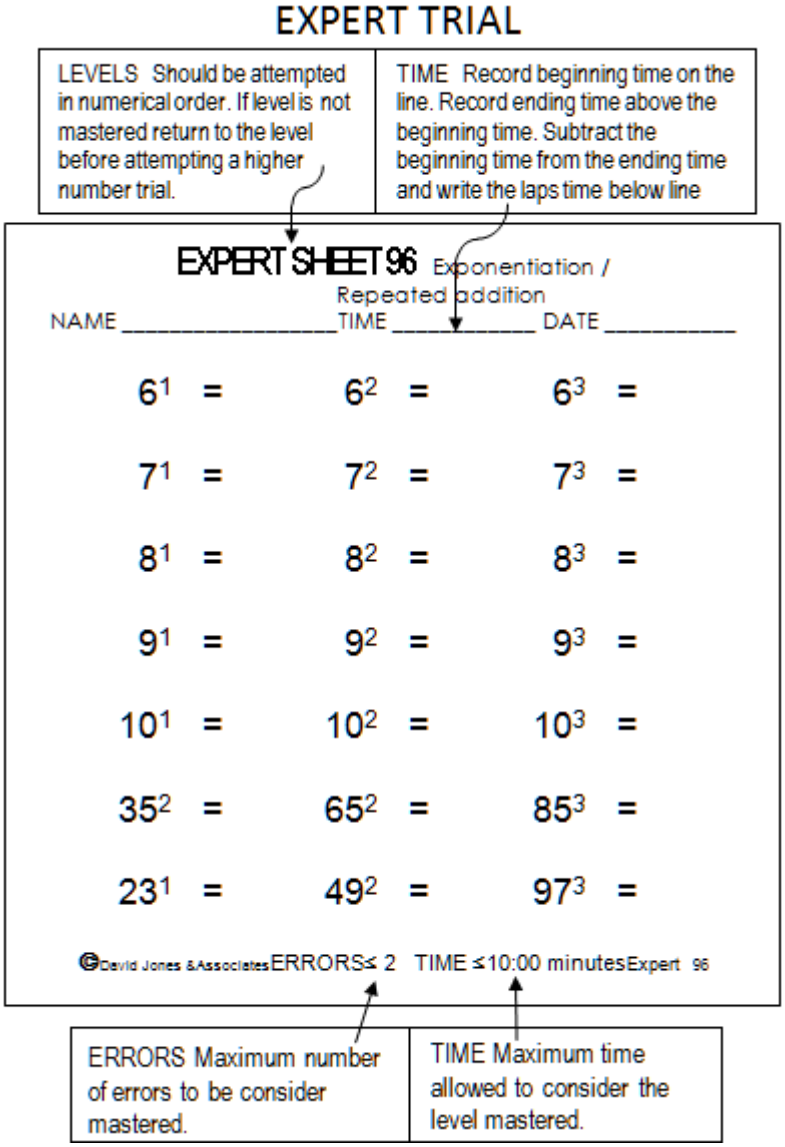
engagement, heightened levels of arousal, focus (every student attending 100% of the time), and a high frequency of opportunities-to-respond (approximately 4 per minute). Global Lectures have “Socratic” characteristics including a high rate of instructor questioning (both rhetorical and direct) that stimulates each student to reasoning logically while developing mental constructs. Using “task-end-analysis” and data (real-time student performance data) driven process, the instructor plans lectures and ensures that targeted content is evenly distributed and fully covered by the end of the grading period. Targeted content is organized and presented utilizing a “simultaneous instructional model” rather than the traditional “sequential model. That is, the “Big Picture” is the first topic of discussion; “Global” concepts that summarize the targeted learning objectives are introduced before topic details (i.e., a scaffold is constructed, on which to hang subordinate-constructs / hierarchical schemata). As details are introduced they are related back to the “Big Picture” and previously introduced schemata. Students are required to develop notetaking skills utilizing a modified Cornell / Metacognitive template. Students are allowed to use electronic devices provided they are not used for any other purpose than academic, during school hours. Instructors construct “cognitive maps” to assist student understanding of relationships between “chunks” of knowledge. An example of one such “cognitive map” is the “Arithmetic Counting Operations” illustrated on this page. Instructors are trained to engage students at different levels of confidence and knowledge simultaneously within the lecture environment.

Need-to-Know Discussions: are whole class student directed discussions. Students identify areas in which they need further explanation and formulate and submit specific questions to the instructor prior to the Need-to-Know discussion. The instructor organizes and groups the questions. During the interactive discussion, student’s peers answer questions, and the instructor elaborates on their responses so-as-tooverlap the range of students’ performance and achievement levels. Additionally, through the use of various techniques, the instructor shapes students’ critical analysis skills, logical reasoning skills, and dialectical thinking skills. The instructor provides explicit instruction and guided practice in learning-to-learn behaviors, including; scripted problem-solving strategies, self-monitoring skills, and self-directed learning. If a student fails to complete an assignment but has made a good-faith-effort (searching notes, consulting internet resource, reading reference texts, etc.) the student formulates a specific question in preparation for the “Need-To-Know” discussion. Students maintain a Need-to-know “Question Log” along with the answers to their questions.



Expert Trials / Continuous Assessments: Expert trials are administered daily, provide for continuous evaluation of "growth" and support high student accountability. They are formative "power" exams that fuel data driven feedback loops in each subject. They represent the "mastery" component of the overall instructional design and focus principally on declarative knowledge and mental constructs. They measure individual student's progress rather than group performance, however when the data is analyzed as grouped data, they are a reliable measures of instructor effectiveness. Expert Trials provide for distributed practice and generate fine-grained (cover content in detail), evaluative data that drives instruction, guides student academic intervention, and informs in-service needs of instructors. That is, unlike traditional summative exams, which are administered only two to three times a semester and only "sample" what is learned (after-the-fact), Expert Trial procedures evaluate students' acquisition of knowledge and skills in detail (in real-time.) Expert Trials are of a self-leveling design such that difficulty level is matches each student's proficiency level (challenge level). Expert Trials are easy to "master" if the learner understands the targeted content and become successively more difficult if the learner does not possess "deep" understanding. Such design allows students to reach their individualized challenge level quickly. Expert Trials provide objective criterion referenced measures of each student's "mastery" of targeted content.

Expert Trials evaluate the effectiveness of targeted learning as well as consolidation of learning into larger knowledge structures (consolidation with prior knowledge.) Trials specify a maximum testing time and a maximum number of errors (cut scores) for each level. If the maximum error rate or time limit is exceeded, a student must re-study and retake the same level the next day. If time and error rate is at or less than the specified "cut-score" limit, the next sequentially numbered trial is attempted. If students wish, and the allotted time permits, more Trial numbers may be attempted. Formative (the evaluation instrument is involved in both the teaching and evaluative process) Expert Trials help students rapidly progress to their challenge level (ZPD). Expert Trials are



self-limiting; if the student finds the learning task relatively easy, s/he is encouraged to increase the rate at which the evaluations are completed. The *Expert Trials* are a mastery component in which students' progress at rates commensurate with their effort. There is no penalty for repeating levels other than a reduction in rate of learning and delay in completing the

requirements. If students complete the evaluation materials and other requirements prior to the time other students complete this work, the student may choose to accelerate their acquisition of knowledge and/or enter an elective class.

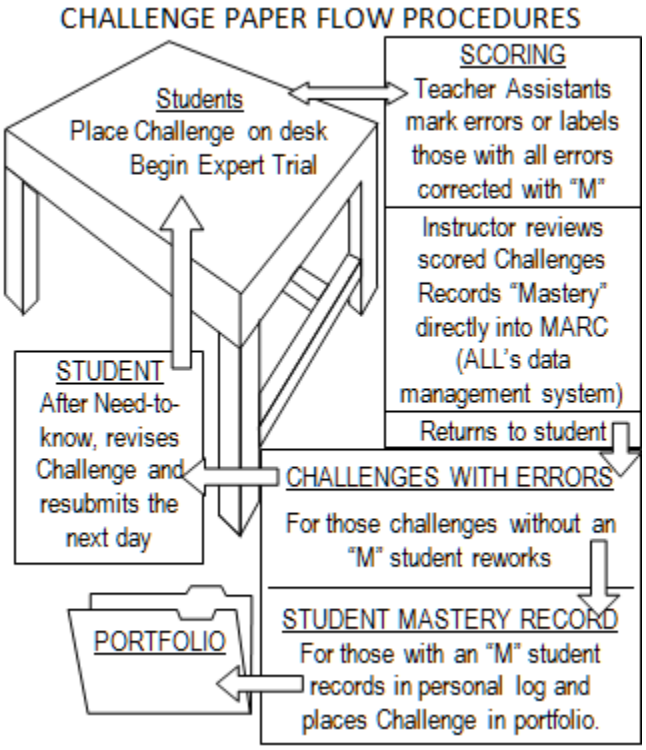
Expert Trials are proctored in each subject every day; contain from 12-30 short answer, essay, process, and/or construct questions (dependent on subject); and must be completed within fifteen to twenty minutes. The anticipated "Mastery" rate average is approximately 2.4 trials for each subject, for each week of instruction, however there is no maximum rate (ceiling) and students may progress at rates commensurate with their effort and ability. Students participate with the instructor to ensure feedback is provided in close temporal proximity to effort; by the end of the time allotted for testing (approximately 15 minutes) the majority of students will have their scored Expert Trials returned to them (see: Expert Trial Paper Flow insert this page). Generally, a Need-to-know discussion will follow immediately.

EXPERT TRIAL incentive chart

Student Name	63	64	65	67	68	69	70	71	72	73	74	75	76	78	79
Edgar Adrian	1/24	1/25	1/26	1/27	1/30	1/31	2/1	2/2	2/3	2/6	2/7	2/8	2/9	2/10	2/13
Emily G. Balch	1/25	1/27	1/31	2/2	2/3	2/6	2/8	2/10	2/13	2/15	2/17	2/20	2/22	2/4	
Fanny Burney	1/23	1/23	1/24	1/24	1/24	1/25	1/25	1/24	1/26	1/26	1/36	1/30	1/30	1/31	1/31
Gaois Caesar	1/23	1/23	1/24	1/24	1/24	1/25	1/25	1/25	1/30	2/2	2/8	2/10	2/15	2/20	2/24
Robert Darwin	1/23	1/23	1/24	1/24	1/24	1/25	1/25	1/25	2/7	2/17	2/24				
Maxine Elliott	2/6	2/7	2/8	2/9	2/14	2/17	2/24								
Kasim Ferishtah	1/23	1/23	1/24	1/24	1/25	1/25	1/26	1/27	2/3	2/2	2/6	2/8	2/10	2/15	2/14
Carl Gauss	1/23	1/23	1/27	1/27	1/27	2/3	2/3	2/3	2/10	2/14	2/16	2/17	2/21	2/22	2/22
Caroline Hazard	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/23	1/26	1/28
Yunus Ibn	1/243	1/25	1/26	1/27	1/30	1/31	2/1	2/2	2/6	2/7	2/13	2/14	2/20	2/21	
Carlos Juan	1/23	1/23	1/27	2/3	2/10	2/17	2/24								
Kathe Kollwitz	1/24	1/26	1/24	1/27	1/23	1/25	1/26	1/25	1/27	1/26	1/25	1/30	1/31	1/30	2/2
Edith Luchins			1/24		1/23				1/27		1/25				
Andrei Markov		1/24		1/25	1/26		2/30		2/24			2/14			2/15

Challenge Exercises / Continuous Assessments: Challenge Exercise procedures are both formative and evaluative. Challenge Exercises represent the "application" of knowledge component of the overall instructional design and focus predominantly on the development of procedural knowledge, expansion of problem solving skills, and generalization and application of declarative and procedural knowledge in unique circumstances. The Challenge Exercise protocols and design provide extensive feedback loops (i.e., goal directed effort ⇄ corrective feedback). Challenge Exercises are included in classwork and comprise a substantial percentage of the homework assigned. Challenge Exercises are sequentially numbered with higher numbers corresponding to increasing sophistication of cognitive demands and require cumulative

content knowledge recall. However, it does not always follow that higher numbers represent greater difficulty. Similar to the Expert Trials, the difficulty level of sequentially numbered Challenge Exercises decrease abruptly when new concepts are introduced and increase incrementally as the intricacy and depth of constructs and skills are developed (both forward and backward chaining skill development strategies are imbedded within the Challenge design). Unlike Expert Trials, Challenge Exercises do not have cut scores, after receiving feedback students



correct all their errors and resubmit their work for evaluation. Only on-time good-faith-effort and error-correction data are recorded by the students, in their personal records, and by the instructor, in the official record (see: Challenge Summary Record this page). Challenge Exercises are embedded and sequentially numbered within several of the subject content series Expert Trials. Challenge Exercises are not proctored or timed and students participate along with the instructor to ensure timely feedback is provided. Anticipated mastery rate is approximately 2.5 Challenge Exercises, for each week of instruction; however, there is no maximum rate (ceiling). Students may progress at a rate commensurate with effort and functional ability (see: Challenge Procedure Paper Flow, this page). Embedded in the Challenge series are a variety of cognitive primers and incidental topics used to inspire group discussion and elaboration.

Homework: Students have "Homework Options" every day. The encouragement of goal oriented behaviors make most homework a pleasant and desirable experience for

parents and students. Most students are able to complete homework assignments within one hours (with the exception of long-term assignments) however, some students require more time-on-task while others require less. Neither homework nor seatwork is busy-work, nor is it used as punishment (at school or at home). If a student is not completing homework on a regular basis and not using homework time effectively, it is recommended to parents that they limit study time to a maximum of one hour and note doing so, in the “Teacher-Parent Dialogue Record” that travels home and to school every school day. Most assignments are due the following school day; some complex assignments extend over a longer term but require incremental evaluations. Instructors check and record progress on homework daily.

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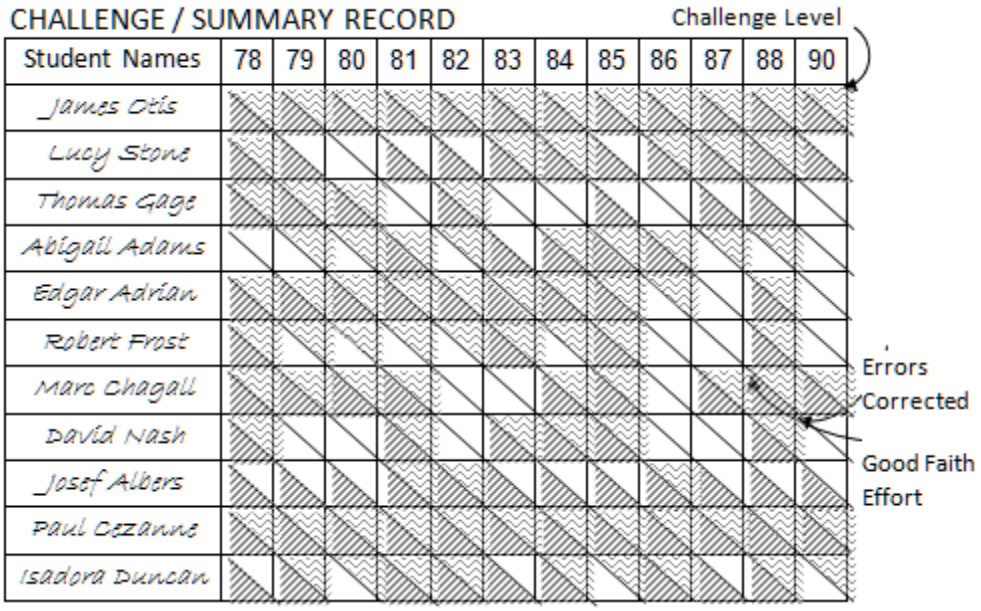
Expert/ Challenge Conventions and Requirements:

1. Students reach minimum threshold numbers to meet requirements for course of study. Students receive “Course of Study Credit” when threshold “range” has been meet or exceeded.
    2. Content requirements are not time dependent: They may be met in a two semesters or sooner
    3. Students move to sequential content when requirements are met regardless of term or semester
    4. Students receive “Course of Study Credit” when threshold has been met or exceeded

5. “Time in Residence” and “Course of Study Credit” are not synonymous

2. 

No ceiling effect/ unencumbered access to appropriate level of difficulty: No constraints shall be placed on student progress which reduces the possibility of measuring further growth.
    2. Students must not be required to wait for lectures to attempt “Experts” or “Challenges.”
    3. Students must not be required to slowdown or wait for the class to “catch-up.”
    4. Student must be allowed to attempt more than one trial during a designated proctored time.
    5. Proctoring protocols must be standardized such that all instructor are allowed to proctor
3. No accumulated ignorance effect/ embedded self-leveling challenge effect: Students advance through sequential content relative to their functional level.
    2. A Trial not mastered, shall be attempted during the next proctored opportunity.
    3. Challenges not mastered must have all errors corrected then resubmitted.

4. Difficulty stepping between sequential Trials (Challenge and Expert) is roughly equal and achievable in the allotted time (1:1 power ratio) with directed effort but not without.
5. Avoidance of cherry-picking: Students may not attempt Trials beyond target mastery range (spread 3 not mastered beyond last mastered).
6. Content difficulty may require multiple years, if mastery is too slow, instructor interventions are required (three or more attempts on any one Expert or Challenge without mastery)
7. Students must demonstrate targeted skills upon mastery, assessed with independent measures.

4. Record Keeping: Accurate and cumulative records must be maintain from year to year
    2. Average minimum mastery pace per five contact days shall not be less than 2.4 (any slower rate interferes with motivation) (if mastery rate is too slow teacher interventions are required)
    3. Accurate, real-time, student performance records must be maintained daily
    4. Assessment instruments and dynamic assessments protocols shall be standardized; maintaining instrument reliability and interrater reliability; within and between classrooms
    5. Data entered in MARC must be “clean” and must remain un-confounded.
    6. At the beginning of the academic year students must start a series at the number they ended the previous year. Accurate end “numbers” must be entered in MARC.
5. Expert Series and Challenge Series Inclusions and Selected Design Characteristics. Each content-subject series includes:
    2. Criterion referenced assessments with significant “depth of knowledge” demands,
    3. Reading comprehension questions,

4. Writing (e.g., essay, short answer) questions,
5. Includes nomenclature questions within content domain,
6. Problem solving questions within content domain.

Topic Reading Assignments: Reading topics are assigned as both homework and in-school reading. Reading is expected to be completed IN ADVANCE of lectures and as related to some Expert Trials and/or Challenge assignments

Content Area Average Grade: (Academic Growth Letter Grade, top line, e.g., MATHEMATICS, LANGUAGE) Need-To–Know / Participation, Choral Review / Participation, and Homework Completion can often predict or explain an average grade. Outcome knowledge and skill acquisition are weighted more heavily than activities which are designed to support such acquisition. Therefore it is possible, although unlikely, that a student can receive negative evaluations in Need-to-Know, Choral Exercises, and Homework Completion; receive progress grades of A's in Challenge Exercises and Expert Trials; and receive an overall grade of A in the content area.

Metacognitive Skills, Personality Traits, Soft Skills: Students receive intensive instruction in a variety of metacognitive and soft skill topics embedded within subject content instruction. Skills and strategies are explicitly taught, modeled and reinforced from both declarative and procedural knowledge perspectives. Students receive ample opportunities to practice metacognitive and soft skill techniques while applying them to learning specific academic content. Additionally, instructors actively shape individual and group learning behaviors (metacognitive, soft, and trait) across all instructional domains (e.g., lectures, group learning, individual inquiry, etc.) Foci include: self-management; interpersonal competencies; team-working skills; critical thinking and problems solving skills; openness to learning and ideas; ability to cooperate and agreeability; conscientiousness; emotional intelligence; organizational and planning skills; communication skills; strategic thinking; self-monitoring and control. As students begin to exhibit independence and gain competence, they are given increasing responsibility for directing, planning, implementing and regulating their own learning. Metacognitive knowledge may develop independently of metacognitive regulation.

A culture of metacognitive awareness is a central to *ALL*'s view of "classrooms as learning communities." Implicit to this idea is that teachers, and parents are not the ideal

managers of all aspects of planning, monitoring, regulating, and feedback; rather teachers and parents provide the transitional support necessary for students to experience academic success, but then “fade” support as students gain competence as strategic thinkers and active learners. Through direct instruction guided practice in metacognitive declarative knowledge and strategies, members of ALL’s learning communities, learn to activate their “executive functions” (cognitive control over learning process), suppress impulsive behaviors (when counterproductive to group or individual learning,) and plan learning activities strategically. Skill specific strategies are taught in situ across learning domains (e.g., “Learning in a Lecture Environment;” “Optimizing Learning in a Seminar Format;” etc.)

Habitual fixed-pattern behaviors that are detrimental to learning (e.g., inappropriate orienting behaviors; attention seeking behaviors; disruptive behaviors; off-topic “trolling” behaviors) are supplanted with automatized “procedural” mental behaviors that are conducive to learning (e.g., working memory behavior in which one relates newly introduced idea to prior constructs while simultaneously extrapolating concepts not yet introduced.) Behavioral scripts, diffusion chaining, and overt shaping (principally successive approximations and feedback loop chaining) are utilized to automatize a host of metacognitive procedural skills and adaptive learning behaviors.

*Monitored Learning / Continuous Growth Model:*Teaching practices utilized at *ALL* help students form meaningful associations between what they have learned and what they are learning. Declarative knowledge, procedural knowledge, and the development of “learning to Learn” skills are taught through direct intensive instruction. Students come to understand that learning is a cumulative lifelong process, not an all-or-none mental state. Students come to realize that they are in control (locus of control) of their own academic success and that their efforts will be rewarded both in the long-term and short-term. Students are encouraged to be strategic thinkers and are explicitly taught metacognitive skills embedded within the instruction of subject content. Pedagogical practices provide for a large variety of authentic applications of cognitive skills which facilitate academic success such as: strategic planning; organizational chunking; task analysis; domain analysis; logical extrapolation; hierarchical knowledge trees; learner activated metacognition; soft-skill development; and development of desirable personality “traits” (conscientiousness, openness, and agreeableness). *ALL* helps students develop active learning and self-regulated behaviors, and encourages students to control and direct their own education towards defined goals. Learning expectations are rigorous yet within reasonable anticipations that each student can meet their individualized goals with effortful endeavor. Each academic year, students pick up from

where they left off the previous year in both declarative knowledge, and procedural knowledge acquisition.

Formative Feedback Loops: Expert Trials, Challenge assignments, homework, incremental exams and projects provide formative and summative evaluations of individual student performance. Continuous formative evaluations of each student's progress towards their individualized goals is made possible through the Expert Trials and Challenge protocols along with their high frequency administration. Instructors input student data directly into MARC (*ALL*'s automated data analysis and management system) as it is generated, where the official school record is maintained. Students maintain dated records of their progress in their personal log.

With the use of "MARC" students, parents, instructors, and administrators have real-time access to "trend-analysis" predictions of individual student progress. Expert Trials and Challenges are fine-grained (test in high detail, rather than sample), provide for deep learning and rehearsal of previously learned content; build new knowledge and procedural skill on previously learned material; are administered at a high frequency (daily), are returned to the student only minutes after completion; and are immediately followed by a corrective "Need-to-know" feedback sessions guided by high quality student outcome data. (See: Expert Trials / Challenge Exercises / Homework).

Assessment of Progress: A variety of assessment tools utilized at *ALL* produce overlapping data streams that represent related but distinctly different objectives including: Appropriate placement of students; Reports to parents or guardians of assessment outcomes documenting their child's progress towards individualized student learning objectives (SLO); Providing students with individualized data driven, feedback (assessment) loops with which they can monitor and adjust their own progress; Providing instructors with data driven real-time feedback loops, with which they can monitor teaching effectiveness in each content subject; Providing administrators with data driven real-time feedback loops with which they can monitor instructor effectiveness, by content subject, by grade, by student demographics, and the school as a whole; Guiding the selection of in-service training topics; And providing data driven evaluations that can inform the further development and revision of subject content materials and pedagogical strategies.

Student Progress Reports and Midterm Progress Reports: End of term Student Progress Reports are mailed to each student's home address at approximately

fourth-five day intervals. Midterm Student Progress “Trend Reports” (reports predicating end-of-term letter grades) are mailed home midway through each term. However, with the use of MARC parents, teachers, administrators, and students can view progress towards individualized goals in real-time (daily/hourly) over a secure internet link. The instructor enters raw data directly into MARC where it is condensed, processed, and directed to various output reports, including the Student Progress Report.

The following is an example of a typical end-of-term student progress report. Column one (Subject Domains) and column eight (Instructional Series) may vary slightly within classrooms and substantially between classrooms. Column two (Start Number) is the student’s level in the indicated series at the beginning of the term. Column three (End Number) is the student’s level at the end of the term. Their difference is used to calculate column four, Percent of the individualized goal. Column five is the Letter Grade (A-F) based on the student’s “Growth” relative to individualized Goal. Column six indicates the student’s functional grade level relative to the student’s actual grade level (ABG-above grade level; ATG-at grade level; BLG-below grade level). Column seven (Subject Weighted Grade) is the student’s grade (A-F) in the Subject, weighted across subject Domains.

Accelerated Learning Laboratory Student Progress Report — Second Quarter 2016-17

Student Name: Instructor: Grade Level: Tardy Days_____ Absent Days_____

Subject Domains	Start Number / Level	End Number / level	Growth Percent of Goal	Letter Grade	ABG ATG BLG	Subject Weighted Grade	Instructional Series (The instructor has drawn a line drawn through those items that do not apply)
MATHEMATICS							
Expert Trials							Numeric Operations; Intermediate Algebra; College Algebra
Challenge Exercises							
RHETORIC / Conventions / Rhetorical Devices and Tropes / Grammar / Parallel structure							
Language Trials and Challenges							Grammar / Writing Conventions / Syntax and Semantics
ORATION / gesture, voice, register, pitch, relationship with audience, ethos, pathos, logos, elocution, argument, organization, pace, phrasing							
Public Speaking Exercises							Assignments vary by classroom instructor
CROSS CONTENT COMPOSITION							
Style / Writing Quality							Prompts & objectives vary by classroom instructor
Penmanship							Penmanship Trials: Cursive, Print, Assessed Writing Component
Punctuation							Assessed Writing Component
Grammar							Assessed Writing Component
LEXICON / ORTHOGRAPHY							
Trials							Functional Phonics Series / Dictated Phonics Series / Lexicon
Challenges							Lexicon / Spelling Support Assignments
ORAL READING (includes fiction and subject content reading)							
Decoding / Phonetic Awareness							Varies by classroom instructor / Dynamic Assessment
Sight-words & Syllabic Awareness							Varies by classroom instructor / Dynamic Assessment
Comprehension / Inference Awareness							Varies by classroom instructor / Dynamic Assessment
Cadence / Fluency							Varies by classroom instructor / Dynamic Assessment
READING / Cross Content & Content Embedded							
Reading Assignments							General Science / Physical Science / Anatomy
Number of Books / Elective Reading							Student Selection
SCIENCE							
Expert Trials / Challenge Exercises							General Science / Physical Science / Anatomy & Physiology
Laboratory Challenges							Varies by classroom instructor / Series
SOCIAL STUDIES							
Political Science / History Trials							Varies by classroom instructor
Geography Trials and Challenges							Political & Physical Geography Trials & Challenges
FOREIGN LANGUAGE							
Speaking							Varies by class
Reading / Writing							Varies by class
FINE ARTS (Visual Arts)							Linear Perspective / Figure-Landscape Drawing / Art History
PHYSICAL EDUCATION							Physical Training / Swimming / Structured Activities
HOMEWORK							Average Percent on Completed Assignments

Benchmark Growth Model/ Composite Classrooms: ALL incorporates a learner centered instructional model in which academic growth, from each student's individualized baseline, is given greater weight than reaching grade level standards. For the student who is already functioning well above grade level, setting a grade level goal commensurate with age can be discouraging. For such a student, *ALL* will set a goal that is rigorous but reasonable, even if it requires completing AP calculus and AP physics in the eighth grade (not unheard of at *ALL*). For the student whose skills are so poor that reaching grade level within the foreseeable future is unachievable, setting a grade level goal commensurate with age might guarantee academic failure. For such a student, *ALL* will set goals that are rigorous but reasonable, such that the student will experience frequent success, and that will eventually lead to the acquisition of grade level proficiency. *ALL* recognizes that motivation and passion are increased when learning-task-demands are within a student's ability to succeed with effort, but above a student's ability to succeed without meaningful effort. *ALL* recognizes that success increases passion and motivation, and greatly expands students' ZPD range. *ALL* also recognizes that both, success with little effort, and failure due to task-demands that

require unreasonable effort, greatly decrease motivation, passion and diminishes students' ZPD range. *ALL* believes it essential to place students at the appropriate challenge levels where they can succeed with meaningful effort; not at their "cumulative failure level" where they simply fall increasingly behind. When students have not mastered the required skills to reach grade proficiency, are segregated into classes based on only grade level, they are unlikely to succeed. When students who have already exceeded grade level proficiency standards, are segregated into classes based on only grade, they are unlikely to reach their potential. In both cases, our society suffers.

ALL's "benchmark" growth model produces accelerated academic growth and offers realistic hope for students who are behind, to eventually meet or exceed grade level expectations. Ironically, *ALL*'s growth model also offers pronounced advantages to advanced students who are curious about everything, motivated by scholarly achievement, and who recognize the enduring benefits of academic success. No student is required to wait for an instructor or other students to progress. Instructional strategies which address broad variations in student knowledge includes an open-ended content design which allows students to progress at their own pace without being restricted by either grade-level-content barriers or lock-step-pacing. Students work at their challenge level and ceiling effects (grade-level-content barriers) have been eliminated.

Seldom does a group of same grade students produce an educationally homogeneous classroom. Students are not uniform in regard to academic preparation, family or peer support, drive, or developed talent. With the realization that a school is comprised of individuals whose learning characteristics vary from student to student, it follows that students possess needs specific to their particular strengths or weaknesses. As a consequence, each student has a unique learning profile. At *ALL*, Students receive instruction at their functional level. They are allowed to benefit from their unique cognitive resources and receive resources consistent with their needs. Curricular materials are sequenced and stepped to challenge but not overwhelm the students. Although students are empowered to control their own progress, they are required to meet or exceed specific minimum growth goals. Students are expected to progress towards these goals commensurate with their prior knowledge and cognitive characteristics. Over time, most students can be expected to accelerate beyond traditional grade level expectations. However, if a student is not learning at a rate commensurate with ability, teachers and staff do 'what-ever-it-takes' to ensure academic success.

Students are expected to achieve mastery as demonstrated by objective and clear outcome criteria. Each student accrues a cumulative portfolio that testifies to the breadth and depth of learning achievement. Instructional level is not constrained by a student's age or grade. Classroom spread relative to students' academic level and learning behavioral profiles, is reduced through the use of multi-grade classrooms. Students are selected for classroom membership based on academic level and learning behavioral profiles not age or grade. Multi-grade classrooms support appropriate instruction level for each student. Additionally they provide for a mix of older and younger children, facilitating a broad range of natural and desirable social behaviors (e.g., nurturing, spontaneous cross age cooperation, teacher-learner flexibility).

List of Academic Goals and Targets: Within the MARC Environment, fine grained student performance data is evaluated and output reports are automatically produced that include many of the goals and targets listed below:

- By the first day of the schoolyear, each enrolled student shall be assigned a rigorous but realistic individualized "yearend" (end of the schoolyear) academic growth goal in each content subject; relative to each student's baseline measures, grade benchmarks, instructional level, performance level, calculated average learning curve trend (past growth performance).
- Each student's yearend-goal, in each content subject, shall be divided into "midterm," and "quarter-end" academic growth goals for first, second, third, and fourth quarters; relative to the number of weeks in each quarter.
- Each student's quarter-end-goal, for the first quarter shall be divided into "weekly" and "daily" academic growth goals in each subject area; relative to instructional days.
- Between the end of the first quarter and beginning of the second quarter, each student's first quarter-end-goal shall be reviewed and if necessary, adjusted to reflect a rigorous but realistic yearend-goal, second-midterm-goal, second-quarter-end-goal, weekly-goal, and daily-goal; likewise for second quarter to third quarter, and third quarter to fourth quarter.

- Student performance, classroom-wide shall be ranked on the basis of "preparedness" within each content subject. Each subject ranking shall be divided into three coherent (meaningful cut scores) clusters. Each subject-performance-cluster shall be assigned rigorous but realistic yearend-goals, first-midterm-goals, first-quarter-end-goals, weekly-goals, and daily-goals; based on cluster averages.
- Student performance, school-wide shall be ranked on the basis of "preparedness" within each content subject. Each subject ranking shall be divided into three coherent clusters. Each subject-performance-cluster shall be assigned rigorous but realistic goals
- MARC will automatically compile various other classroom-level and school-level demographic subject-performance-clusters, and assign rigorous but realistic goals based on a given algorithm.
- When there is more than ten percent variance between a measured outcome and goal, MARC shall produce output detailing such variance on a daily basis over time.

Assessment of the progress of individual students, student cohorts, and the school toward data defined educational targets: A growth model of academic achievement is used in determining individual student, student cohort, classroom-level, and school-level progress towards identified goals and targets. Group academic performance is evaluated on basis of averaged individual student performance within the defined group. At the beginning of the school year, specific academic goals are delineated for individual students, classrooms, subgroups within classrooms, cohorts, and the school as a whole. Goals for various groupings are determined by averaging the outcome history (learning curves and baselines) of individual members within the particular group and adding a rigorous but realistic growth factor for each content-subject. Reduction in academic variation within each classroom that increases achievement outcomes for all students, is achieved by aggregating students with similar baselines scores and learning curves through trajectory trend analysis.

MARC (Measurement and Analysis Report Compiler): "MARC" (*ALL*'s automated data analysis and management system) is a repository for raw data related to academic

performance; collected from sources such as formative evaluations (Expert Trials, Challenges, Homework, etc.), summative exams, and standardized tests (SAT, ACT, AIMS, Az MERIT, etc.); as well as from sources ancillary to academic performance, such as raw data collected from parent and student perception surveys, student attendance, and educator in-service training attendance. MARC is equipped with specialized algorithms and statistical tools so as to perform a variety of collection, organization, analysis, graphing, and reporting tasks. Among the significant advantages MARC makes possible is the ability for parents, teachers, administrators, and students to view student progress towards individualized goals in real-time (daily/hourly) and to view simple to understand predictions (graphs) as to whether progress towards goals is on-track. Within the MARC Environment, meaningful and measurable academic data relevant to student progress and proficiency, educator and school performance, and pedagogical and instructional material effectiveness is collected and stored in rational data arrays; such data when analyzed provides valid and reliable indicators with which to drive wise and informed educational choices. Students, Parents, Instructors, and administrators have variously restricted (secure) access to MARC's output reports on line.

Assessment of academic progress in real-time: Direct input protocols greatly reduces instructors' data collection and analysis efforts; leaving instructors with increased opportunity for high quality student contact time. The instructor enters raw data directly into MARC where it is automatically processed, analyzed and directed to various output reports. In each core content-subject, *ALL* utilizes a series of criterion referenced proprietary instructional and evaluative materials. Each content-series contains "Expert Trials" (mastery power-exams) and "Challenge Exercises" (application/ procedural knowledge assessments) that are sequentially numbered. Numbers correspond to discrete topics within the general subject of each series. Student "mastery rates" across series numbers, on these instruments, together with outcomes from various types of dynamic assessments, generate continuous data streams, within each content-subject, which measure student growth over time. MARC analyzes these data streams together with other relevant factors such as item p-values. The report that is produced includes, among other things, a prioritized list of discrete topics, within each content-subject, arranged by the greatest need of instruction for the largest number of students. The instructor uses this information to fuel continuous feedback loops. This information provides many opportunities for educators to modify instructional practices, interventions, goals, and targets (group of students or individual students) based on data driven judgements relative to progress. MARC automatically "flags" individual student and group performance (interval linked growth towards defined goals) with a measured variance of greater than ten percent from goal. Both performance that falls below and exceeds targeted goals is flagged. Additionally, MARC collects and analyzes

data concerning the number of times each Expert or Challenge has been attempted prior to mastery and the frequency of proctored opportunities.

Expert Trials, Challenges exercises, and other dynamic assessments across all core content subjects provide fine-grained measures of content knowledge which inform corrective *Need-to-know* feedback sessions (see: Need-to-Know Discussions). “Expert” and “Challenge” numbers are expected to correlate with, and be predictive of, student outcome scores on standardized exams normed on grade level benchmarks. Each student’s progress is recorded daily in MARC and progress within the core subjects towards specific individual and group goals along with long-term and short-term “trend” predictions that are automatically calculated and reported within the MARC environment.

Students may progress at varying rates but each student is assigned individualized growth goals in each content subject series. In most cases, it takes several years for a student to complete a specific content series. At the beginning of each year, each student begins on the “number” in each subject series, s/he finished the year before. This number suffices as the student’s baseline measure when (s)he returns the next year. Baselines are determined for new students utilizing criterion referenced intake evaluations which inform placement decisions. Each student’s baseline measure is used to gage progress (growth). Students and parents and/or guardians are provided with summative reports indicating incremental progress (difference measures) or growth from the student’s measured baseline scores towards the student’s individualized goal (see: Student Progress Reports). Students receive explicit in situ training and direct instruction in metacognitive strategies. Students are trained to monitor their own progress, reflect upon inputs (effortful learning procedures) and outcomes (growth towards a goal) and adjust learning strategies and/or behaviors (see: Metacognitive Skills).

Teachers’ responsibilities regarding student data/ student outcomes are used to inform instruction:

Teachers’ roles and responsibilities regarding the use of student data include:

- Properly entering each student's academic mastery/retake data (e.g., Expert, Challenge, assignment) directly into MARC in a timely (daily) manner (see: II.A.1.a. Expert Trials, Challenge Exercises);
- Ensuring that confidentiality safeguards (FERPA) regarding student data are maintained;
- Within the MARC Environment and during normal classroom operations, teachers are responsible for monitoring student progress towards individualized goals;
- Viewing flagged "off goal" individual student, class-wide, and targeted group outcomes, across all subjects and planning effective interventions where indicated;
- Monitor students' timely progress towards their individualized goals and assist when required;
- Providing students with explicit metacognitive instruction, relative to the use of meaningful data for self-monitoring and planning progress towards defined goals;
- Frequently reviewing student maintained classroom records (e.g., incentive charts), student portfolios, students' personal records;
- Reviewing students' self-monitoring activities, self-reflection and strategic planning for success; and providing corrective feedback when needed;
- Teachers are responsible for implementing appropriate and supportive interventions for poor student performance, in a timely manner;
- Teachers are responsible for acknowledging exceptional student performance supported by meaningful and measurable outcomes;
- Daily reviewing MARC data outputs across all content-subjects and adjusting instruction where indicated;
- Ensuring the smooth function of data driven, continuous feedback loops across all content-subjects;
- Keeping a log of pedagogical strategies, specific content procedural or declarative knowledge topics, classroom issues, and or the effective use of

MARC outputs to guide instruction that require additional professional development;

- Self-assess performance;
- Prioritize and submit requests for in-service training or in-class modeling relative to student progress towards defined goals as indicated by measurable and meaningful outcomes, at or before the end of each week.

Student performance data is used to improve instruction: Pedagogy, curricula, instructional materials, evaluation instruments, and use of technology may be altered or revised as indicated by measures of student learning outcomes. Instructional materials and assessment instruments utilized in all content-subjects are evaluated on the basis of their ability to: deepen learning; accurately measure student knowledge and academic growth in real-time; predict student performance; and forecast academic growth across intervals of time, including several grade levels. Each item within each series of Experts, series of Challenges, and series of dynamic instructional and evaluative instruments are evaluated on the bases of: p-value (difficulty index); predictive analytics (time series, regression, association, outliers), point-biserial correlation (discrimination index), concurrent-validity, predictive validity, and concordance (inter-rater reliability). Additionally, student performance data is used to improve the efficacy and design of ALLMEE (ALL's Measures of Educator Effectiveness).