Improving Academic Performance through a Unique Curriculum Development Process

By Dr. Colin R. Brown and Lindsay J. Prendergast, M.Ed.

Abstract

The purpose of this study was to determine the impact of implementing a unique and systematized version of curriculum planning and documenting across all levels of a Pre-K-Grade 12, US-curriculum, and international school in the Dominican Republic. Based on the Backwards by Design philosophy, cemented with a standards-based approach highlighting aligned assessments, the researchers sought to observe how weekly curriculum documenting would provide structure and a deliberate focus on the standards. As the researchers were administrators at the school, evidence was collected over five consecutive school years, 2014-2019 in order to determine the effect on student learning of this specific curriculum planning process.

In 2014, in the international school where the research occurred, the importance of clearly articulated and vertically aligned curriculum standards became a priority. The school adopted the Common Core Standards for English and Mathematics that Fall, yet the curriculum around those standards was not well fleshed-out nor was there evidence of consistency in the planning or teaching practices. Subsequently, results on standardized assessments such as Measure of Academic Progress (MAP), Scholastic Aptitude Test (SAT) and Advanced Placement (AP) indicated poor to satisfactory academic achievement.

Researchers Dr. Colin Brown and Ms. Lindsay Prendergast looked to rectify this situation by implementing a unique and systematized version of weekly curriculum planning and documentation based on the Backwards by Design philosophy. It was expected this intervention would positively influence teaching and learning practices through:

1. Zeroing in on standards and teaching practices on a weekly basis.
2. Guaranteeing teachers have a clear understanding of their weekly objectives.
3. Providing greater attention to detail during the planning phase.

Literature Review

The practice of curriculum development is one of the most critical components of teaching, yet research on the effect of particular planning processes is limited in its agreement. Elements of planning may be dictated by district leaders, or driven by little more than teacher's personal interests. Regardless, effectively designed curriculum has a significant effect on student learning. According to researcher John Hattie, teacher clarity or, "a research-based process for narrowing and focusing activities, cutting away aspects of instruction…by identifying the most critical parts of instruction" (us.corwin.com, 2017), has an effect size of 0.75 on student learning. Despite this importance, there exist various gaps in the research around differing curriculum development practices. The intent of this literature review is to analyze existing curriculum documentation processes and identify where future investigation is needed.

Advocates for intentional and deliberate design of curriculum are often grounded in principles developed by the behavioral psychologist and researcher Ralph Tyler. In *Basic Principles of Curriculum and Instruction*, the result of his Eight-Year Study, Tyler pioneered the organization of curriculum design around four basic principles: 'The Tyler Rationale' (1975).

1. Defining appropriate learning objectives.
2. Establishing useful learning experiences.
3. Organizing learning experiences to have a maximum cumulative effect.
4. Evaluating the curriculum and revising those aspects that did not prove to be effective.

Of distinction in Tyler's work is not only the establishment of learning objectives, but placing those objectives at the forefront of the planning process. He argued, 'the problem with education is that educational programs lack unmistakably defined purposes' (Tyler, 1975). The principles outlined in 'The Tyler Rationale' are also regarded as the philosophical underpinnings for a more modern, widely acclaimed curricular planning approach, Understanding by Design.

Subsequent practitioners of curriculum design varied in their adherence to Tyler's principles, though a lasting influence had been made in the idea that learning objectives, or standards as they came to be called, were an effective focus when placed at the forefront of the planning process. In *Evolution of Research on Teachers' Planning*,

> Yinger (1980) identified three stages in the planning process: the problem-finding stage (content, goals and own knowledge), the problem formulation and solution stage (the design of instructional activities carried out through continuing processes of mental or hypothetical testing and adaptation), and implementation and evaluation of the activities as they unfolded in the classroom setting (Munthe, Conway, 2017).

This model, which has predominated trends in curriculum development in recent decades, emphasizes placing instructional activities immediately following the learning standard. Assessments were found to occur after the activities; such assessments were often, though not always, meant to guide future instructional activities. Continued research by Yinger found that, "teachers tend not to change the instructional process in midstream, even when it is going poorly" (Munthe, Conway, 2017). Following Ralph Tyler's research, in 1973, theorist James MacDonald claimed, "Teachers often make curriculum plans by first considering the type of learning experience or activity they can provide, based on available materials and their knowledge of a subject area" (Koeller, Thompson 1980). Yet a risk of designing activities before assessments involves teachers' propensity to select them on factors unrelated to student learning. "The activities listed in these units often seem to be engaging and kid-friendly - fine qualities as long as the activities are purposefully focused on clear and important goals" (Wiggins & McTighe, 1990). Today, these traditional lesson planning processes are often taught in teacher preparation courses. Critics, however, assert such plans yield limited impact on student learning. "When teachers are designing lessons, units, or courses, they often focus on the activities and instruction rather than the outputs of the instruction. Therefore, it can be stated that teachers often focus more on teaching rather than learning" (Bowen, 2017).

Effective curriculum planning should, inherently, yield measurable results in student learning. Yet, designing activities first and assessments 'after the fact' all too often reveals that the activities may not contain evidence of learning. As a result, students do poorly on the test. In the past, teachers have even blamed the students for not learning what they were taught (Aviles, Grayson, 2017). As practitioners recognized the flaws in curriculum design around activity-oriented teaching with no clear purposes, the concept of planning curriculum in a 'backwards' manner began to revolutionize modern curriculum design. The backwards design planning process is based on the steps of first identifying desired results, followed by determining assessment evidence and, lastly, planning learning experiences and instruction.

Though the original concept of planning backwards can be attributed to Ralph Tyler, the significant altering of the process sequence is credited to Grant Wiggins and Jay McTighe, who conceptualized their work in the book, *Understanding by Design* (1990). Researchers assert that when teachers utilize this process, student learning is measurably greater, and classroom instruction leads to both specific outcomes and transferable skills (Fuglei, 2015). As described by Professor Ryan Bowen of the Vanderbilt University Center for Teaching:

> The incorporation of backward design also lends itself to transparent and explicit instruction. If the teacher has explicitly defined the learning goals of the course, then they have a better idea of what they want the students to get out of learning activities…it eliminates the possibility of doing certain activities and tasks for the sake of doing them. Every task and piece of instruction has a purpose (2017).

When applied correctly, the process of designing curriculum in a backward manner can significantly enhance not only the quality of teaching, but the resulting student learning as well.

McTighe and Wiggins' approach is rooted primarily in planning instruction in terms of Units - a chapter, theme, or period of time spent addressing a specific concept or skill. Although they caution teachers against relying solely on end-of-unit assessments as evidence of learning, this remains an innate risk of unit-style planning. The authors mention this in *Understanding by Design* as a 'Misconception Alert': "When we speak of evidence of understanding, we are referring to evidence gathered through a variety of formal and informal assessments during a unit of study or a course" (1990). Yet planning for extended time periods (weeks, even semesters) runs the risk that teachers may not, in fact, adjust instruction throughout the planned time period as they move towards a culminating assessment. McTighe and Wiggins, however, do not assert that the model in *Understanding by Design* should be applied on a more succinct basis.

The developmental progression of curriculum design has led to widespread favor of the backward planning method. This framework supports the researchers' philosophy that high-quality curriculum should indeed be developed by focusing on the standard (desired outcome) first, followed by the assessment (acceptable evidence) and thereafter, not before, the instructional activities. Such frameworks almost exclusively tout the effectiveness of Unit planning over extended periods of time. The researchers believe that their unique style of curriculum development on a weekly basis acutely zeros in on the standards, assessments and activities. The research within attempts to explore how this process will positively impact student academic achievement.

Methodology

Through numerous professional development workshops and conferences, teachers were trained by the researchers to develop and document curriculum using a weekly planning template and identifying the specific planning details for each day and period of instruction.

	Class:	Class:	Class:	Class:
Standards and Benchmarks				
Assessment				
Activities				

Step 1: Identify Standards or Benchmarks for the Week

To begin the process, teachers must identify and choose the standard which will be explicitly taught and assessed for that particular week. Once identified, teachers were given the liberty to modify the standard or benchmark to ensure it truly represented what would be explicitly addressed during the week. For example, if the standard chosen was: "Students can add and subtract two-digit numbers with regrouping," but the teacher knew they would only be able to cover addition during the week, they would cross out the part that would not be covered. Therefore, the standard would look like this: "Students can add ~~and subtract~~ two-digit numbers with regrouping." The purpose for allowing this change helped teachers be meticulous about what the objective was for the week. Additionally, teachers were also encouraged to add specific detail to the standard where appropriate. For instance, if the standard was, "Students are able to isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant, or CVC) words," teachers were encouraged to add the specific words the students would be working with during the week. For example, "Students are able to isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant, or CVC) words." (*bat, cat, sat, mat, rat, fat and hat*). Again, this addendum to the standard was purposeful in order to hone in on the precise goal for the week.

Step 2: Choose Assessments to Appropriately Address Standards

This step in the process ensures teachers are critically evaluating and deciding what evidence can be garnered that will demonstrate student proficiency towards the objectives. Teachers have full autonomy over which assessments they choose. The only constraint is that there must be clear and direct linkage between the assessments and the standards.

Each assessment piece is directly linked to the standard to ensure it will give rich information regarding student progress. Simply giving a "Chapter Test", perhaps provided by a textbook, where some of the questions could relate to the standards being addressed but others do not, as the assessment piece would not suffice. However, a summative test designed by the teacher which included specific questions that targeted specific standards addressed would be acceptable. Additionally, formative assessments which were directly linked were also acceptable. The rigidity of the expectations for standards-assessments linkage was purposeful. By reinforcing this, teachers must think critically about the standard and appropriate assessments; ultimately, this ensures teachers have a clearer vision of the objectives they want students to attain during the week, and, specifically, what to observe to analyze their progress.

Step 3: Plan Activities and Learning Experiences

Teachers are now able to creatively plan instructional strategies, activities and necessary resources for student learning. During this stage, teachers want to explicitly provide teaching and learning opportunities which will best prepare students to demonstrate their acquired knowledge or skills

Standards and Benchmarks	3.MD.A.1 – Draw a picture graph and scaled bar graph to represent a data set with several categories.
Assessments	• Exit slip – pictograph class's favorite color • Draw a scaled bar graph using the data from class's favorite team • 1-1 conference with student discussing pictograph

on the assessments. Again, the activities and assessments must be linked. As in the example below, the researchers believe detailed planning encourages teachers to provide more succinct, focused and powerful learning experiences.

Step 4: Submitting Weekly Curriculum Document and Feedback

The final step of the process was for teachers to submit their weekly curriculum document to administrators for feedback. Administrators provided weekly feedback directly on the curriculum document and set up bi-weekly meetings to guide accordingly. Ongoing guidance and feedback from the researchers (administrators of the school) ensured that teachers gained valuable pedagogical experience and developed clear expectations of the process.

Data Collection & Sampling

For the purpose of this research, the authors decided to measure the effect of our weekly, standards-based curriculum documentation process using a selection of internationally-recognized, valid, reliable and research-proven student learning assessments: the NWEA Measures of Academic Progress (MAP), the College Board Scholastic Aptitude Test (SAT), and College Board Advanced Placement (AP) exams. Analysis involved the researchers collecting the following data for inclusion in this study:

1. Comparison of average grade-level MAP scores to the NWEA international norms
2. Comparison of average SAT scores to international averages published by College Board
3. Total number of passing scores on AP exams in comparison to the prior school year
4. Percentage of passing scores on AP exams for our school in comparison to the percentages achieved in the Dominican Republic and the global averages

The sample groups of students consist of grade levels between Kindergarten and 12th Grade. Due to enrollment changes, there were small changes in the makeup of each grade; nonetheless the data were collected by the average score of each grade level for that testing period.

Results

The researchers aimed to measure how this unique curriculum design approach would directly impact student learning and gathered evidence of improved academic performance on standardized tests including MAP, SAT and AP assessments. The results indicate that over the five-year period from 2015 to 2019, students made considerable gains and showed consistent growth in performance on all standardized tests (MAP, SAT and AP).

Discussion

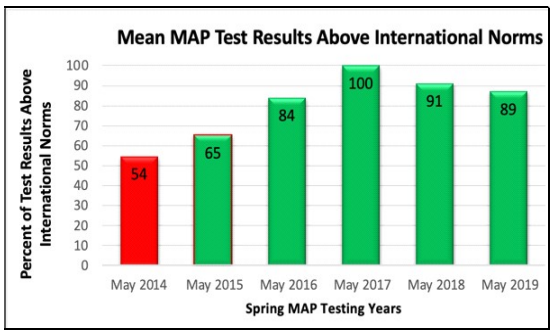
Given the sustained, consistent increase in student achievement results on theses assessments throughout the years of this study, the researchers have identified a clear connection between these results and the intervention implemented at the onset of the study: implementing a unique and systematized version of weekly curriculum planning and documenting which is based on recognized learning standards (Common Core, Aero, and NGSS) and aligned with the backwards planning process. Future studies may be conducted to continue validating the results of the researcher's work and to determine its potential to be replicated in different settings, with different groups of students and teachers.

Conclusion

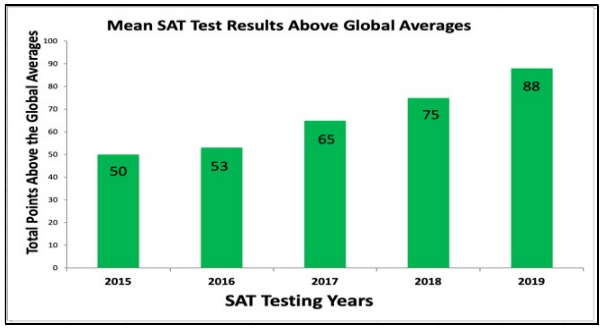
The action research conducted in this study confirmed the researchers' hypothesis: implementation of a comprehensive curriculum planning process and documentation thereof, utilizing a unique weekly format following the sequence of identifying first the standard, then assessment, and finally the instructional activities, would result in more focused teaching and learning practices, and, ultimately, improved academic performance.

Standards and Benchmarks	3.MD.A.1 – Draw a picture graph and scaled bar graph to represent a data set with several categories.
Assessments	• Exit slip – pictograph class's favorite color • Draw a scaled bar graph using the data from class's favorite team • 1-1 conference with student discussing pictograph
Activities	I Do – We Do – You Do • Model constructing a bar graph, explaining parts of a bar graph (axis, titles, units of measurement, etc.) and how to use the data set to create a scale and label parts of the graph • Teacher and students construct a bar graph • Students construct a bar graph with guidance from teacher • Students independently construct a bar graph

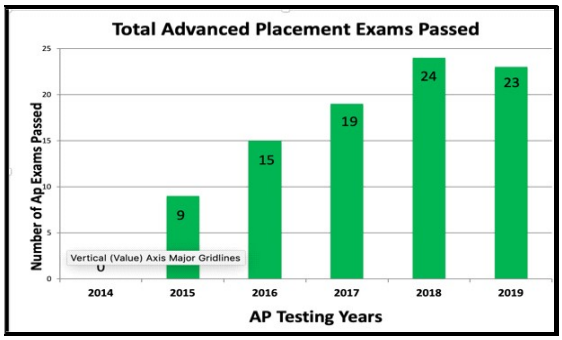
Measure of Academic Progress (MAP)

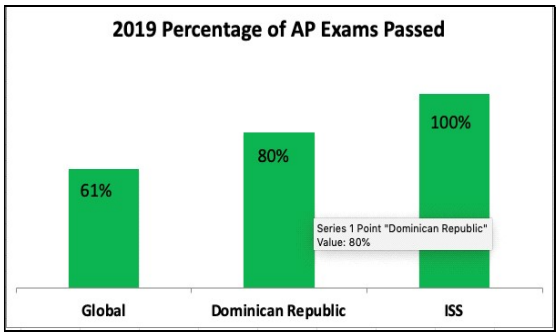


Scholastic Aptitude Test (SAT)



Advanced Placement





The research question, "Can highly-focused curriculum documentation increase student learning?" was answered affirmatively by annual, significant increase in the achievement results on MAP, SAT and AP. The research question, "Does developing curriculum in a manner tightly-aligned to academic standards and aligned vertically from one grade level to another improve student learning?" was also affirmed by the aforementioned positive results of the standardized assessments. Though the limitations presented by the study occurring only within one school with one sample set of students and teachers, the action research conducted supports the researchers' original theory. To further validate results, the researchers should consider expanding the scope and duration of the activities in new school settings.

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Dr. Colin R. Brown is the Head of School at the American School in Taichung, Taiwan. He has led workshops around the world on new initiatives in education.

Lindsay Prendergast, M.Ed., has been in education for fifteen years as an Administrator, Counselor and Special Education teacher.