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Project 3: Competency-based Instruction

A Theoretical Framework for Observation of Competency-based Instruction in Schools

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Competency-based instruction (CBI) is pedagogy that integrates differentiated instruction and personalized learning with metacognitive reflection by students and teachers (Sturgis & Patrick, 2010). This instructional method provides myriad components that funnel towards the central goal of increased student achievement. While there are multiple observational frameworks for effective teaching (Berliner, 2004; Danielson, 2007; Gilis, Clement, Laga, & Pauwels, 2008; Marzano, Frontier, & Livingston, 2011; Sampson, 2004), review of the literature yields limited empirical evidence for observing CBI. It is the intent of this paper to provide a theoretical framework for observing and interpreting CBI in schools.

Historical Background

The practical component of education has changed radically in recent years to accommodate the changing views and needs of modern globalization (Dalring-Hammond, 2010; United States, 1983). Education now requires a more agrarian approach in which students receive individualized instruction at an individualized paced; this model contrasts the industrial, one-size-fits-all model of teaching and learning. This requirement is not new to educational practitioners or researchers.

Foundations of Mastery

All students are capable of achievement; however, many fail to realize this potential thorugh the current educational paradigm. Bloom (1968) posited that approximately 90% of students are capable of significant achievement when they are delivered instruction that is consistent with their needs and achievement history. However, Bloom clarifies that the current method of whole group instruction does not meet these conditions adequately. This is the initial basis of CBI in modern classrooms. CBI must be differentiated at the student level instead of the classroom level, as is the current trend.

A more practical approach to mastery (Bloom, 1968) is the approach provided in 1968 by

Keller. In this model, students may work through instruction at their own paces and progress only upon successful demonstration of mastery (Keller, 1968). Keller's (1968) approach is interesting in that it provides the first glimpse of CBI, albeit at the collegiate level. The central components of Keller's approach are advancement through mastery, defined instructional goals, and meaningful assessment though student accountability.

Current Manifestations

The current approach to individualized instruction varies somewhat from the initial model provided by Keller (1968). Ketter and Pool (2001) explore how students respond to the use of assessment as a tool for feedback for improvement of performance using causal-comparative methodology. Their study provides evidence that the use of assessments as feedback for focused efforts is a sustainable and observable component of CBI (Ketter & Pool, 2001). Using statistical analysis of student performance, including MANOVA, Schnakenberg and Sullivan (2000) provide evidence that when students are provided instruction that is consistent with their achievement level, students show significant improvement in knowledge and skill acquisition. This individualized instruction provides chances for teachers to provide remedial instruction to those who would benefit most.

In a broader sense, the current manifestation of mastery and personalized learning has provided evidence of success. When classrooms that provide instruction based on mastery (Bloom, 1968), there is noticeable growth in the distribution of student achievement scores (Guskey, 2007). The concept of student progressing upon mastery is central to growth in achievement. However, this kind of growth can be achieved only when teachers modify current instructional practices.

When providing clear instructional goals and expectations to students (Keller, 1968), there is room for interpretation and student accountability. However, this model of instruction has innate

concerns that must be addressed in the classroom. When Keller's model is applied at the undergraduate and graduate level, it has been found that instructional goals can be difficult to define (Leung, 2002). Leung (2002) also concludes that ill-defined goals and instructional materials can lead to students training themselves for tests instead of learning the material genuinely. Ergo, CBI must include the teacher in instructional delivery rather than as a passive guide.

Central Theory

While the is little empirical work to define what one would observe in a CBI classroom, there is ample evidence as to the components that lend to successful CBI (Bloom, 1968; Guskey, 2007; Keller, 1968; Ketter & Pool, 2001; Leung, 2002; Schnackenberg & Sullivan, 2000; Sturgis & Patrick, 2010). This background leads to the central theory for this framework: Instruction that is designed using a competency-based approach demonstrates specific and observable attributes. The attributes of this theory, elucidated later, include:

1. Advancement through curriculum occurs through mastery.
2. Learning objectives are learnable and understood by the learner.
3. The teacher and the learner utilize varied assessments regularly through instruction.

Advancement Through Mastery

A central component of Bloom's work (1968) is that students may progress through a curriculum by mastering essential components in a prescribed order. This differs from the traditional time-based approach to instruction. This style of progression serves multiple purposes. Initially, this movement allows the instructor to differentiate instruction at the individual student level more easily (Guskey, 2007; Sturgis & Patrick, 2010). In addition, Guskey (2007) shows that students achieve more when they are encouraged to develop mastery of material before continuing to subsequent material.

Observational components of mastery learning. In a classroom that promotes learning through mastery, one would expect to observe instruction that is student-driven. This is not to be confused with student-centered instruction (Danielson, 2007; Marzano et al., 2011; Wiggins & McTighe, 2005). In the case of student-centered instruction, activities or lessons work at the student level instead of the whole-class level. With student-driven instruction, one could expect to see individual students or small groups of students working collaboratively; this could be independent of the teacher (Gilis et al., 2008; Guskey, 2007; Sampson, 2004; Schnackenberg & Sullivan, 2000) or with direct instruction to small groups.

In classrooms in which instruction is built around student achievement one could expect to observe a variety of activities occurring. Differentiation is a fundamental concept to education (Marzano et al., 2011) that correlates to high student achievement. The traditional industrial model of education limits the degree of differentiation that is possible since instruction is given to a whole class. When student have a variety of lessons and activities from which to choose, student engagement and achievement rise (Wiggins & McTighe, 2005). Ergo, a variety of activities designed as to meet the achievement needs of the learner reflect a classroom climate that is focused on mastery rather than seat time.

Learnable and Understandable Learning Objectives

Advancement through mastery is facilitated by objectives that are clearly defined and understood by students (Marzano, 2009). Teachers are accustomed to interpreting national, state, and local standards to design meaningful instruction for students; however, during the process teachers must deconstruct these standards into manageable goals while still retaining the central essence of the standard (Wiggins & McTighe, 2005).

These goals and objectives serve as both indicators of achievement and targets towards which students may direct the bulk of their efforts (Sturgis & Patrick, 2010). As indicators of

achievement, the objectives and goals constructed must be measureable (Marzano, 2009, 2010). While the true essence of a content standard may be esoteric, the applicable components must be explicit and observable to indicate progress towards the essence of content knowledge. Explicit and measureable objectives provide direction for teachers in designing lessons, while also providing insight for students into the nature and extent of effort required for meeting the objective (Danielson, 2007; Guskey & Bailey, 2010; Ketter & Pool, 2001; Marzano et al., 2011; Wiggins & McTighe, 2005).

Observational components of clear objectives. A classroom that uses CBI as the central pedagogical theory would exhibit distinct evidence of clear objectives. While the entirety of the curriculum or standards may not be present in the classroom during lessons, one would expect the students to be aware of their objective for the lesson. Correlational studies and teaching frameworks indicate that student achievement is more likely when clear objectives are made known to the students at some point in the lesson (Danielson, 2007; Marzano et al., 2011; Marzano, Pickering, & Pollock, 2001).

In addition to observed objectives, one would also expect to find that students understood the objectives easily. In this manner, the objective serves as a point of clarification for the student (Marzano et al., 2011). National, state, and local standards are constructed to facilitate and clarify the content requirements for teachers and administration at the school and classroom level; as such, these can be unclear or ambiguous to students. Effective teachers demonstrate attentiveness to student learning and achievement by providing clear and understandable objectives (Berliner, 2004; Danielson, 2007; Sturgis & Patrick, 2010; Wiggins & McTighe, 2005). This could be observed by the use of student-friendly language or conversations with students as to the nature of observed lesson objectives.

Meaningful Assessment

Assessment has become a norm among education in light of high-stakes accountability (No Child Left Behind [NCLB], 2001). Given its role in national stakes, assessment is a part of every classroom. Classrooms that use CBI as a framework utilize assessments for more than reporting performance data. CBI assessments are designed as formative tools to guide and shape individualized instruction (Marzano, 2010). These assessments can occur regularly and take many forms. A key function of these regular assessments is that the results are understandable to students (Guskey & Bailey, 2010).

The most significant characteristic that distinguishes CBI-based assessment from traditional models is that the former focuses on measuring students' actual mastery of specific competencies based on clearly defined standards rather than accumulated credit hours for required courses (Anderson, n.d.). Thus the innate purpose of any form of CBI-based assessment lies in providing accurate, specific feedback in order to reveal the best suitable learning path for each individual student to reach the common standards. In practice, CBI-based assessment mainly falls into three major categories: Prior Learning Assessments (PLAs), summative assessments, and formative assessments (Anderson, n.d.; Newmann, King, & Carmichael, 2007). PLAs offer an effective alternative to assess students' experiential learning "before and outside of" the traditional classroom settings, therefore students can provide their subject teachers with a portfolio containing necessary information on their internship or job experience as evidence to show they have already reached the competency mastery standards without taking certain courses at school (the Center for Adult and Experiential Learning [CAEL], 2013). While summative assessments often refer to standardized tests or any other student evaluation methods aiming to summarize "what a student has learned over a given period of time" (Anderson, n.d.); formative assessments are more flexible in terms of implementation (i.e., classroom observation, peer assessment, class assignments, written communication between teacher and students, interview, debriefing, etc.) and can give

more timely and accurate feedback on teaching and learning so that necessary adjustments can be made accordingly.

Observational components of meaningful assessments. One can expect to see assessments in any classroom. However, when meaningful assessments are utilized for CBI, one can expect to observe several key components.

Meaningful assessments are both regular and varied throughout a single class meeting (Danielson, 2007; Marzano et al., 2011; Sampson, 2004; Sturgis & Patrick, 2010). These assessments may include teacher questioning small groups or individual students. It is also feasible to expect traditional pencil-paper assessments. With CBI, one would expect to observe the teacher suggesting future work or clarification for the student based on the assessment results.

In order for the teacher to guide effectively, the assessments–regardless of nature–must be aligned to the clear objective discussed earlier (Danielson, 2007; Marzano, 2010; Marzano et al., 2011; Wiggins & McTighe, 2005). Such assessment design allows the instructor to pinpoint achievement needs and expresses the breadth of understanding expected. For example, when the objective is written as *I can identify the elements on the periodic table in the alkali family* one would expect to observe assessments in which the student identifies which elements on the periodic table are in the alkali family, whether through multiple choice, short answer, or simple response to teacher questioning.

The ultimate purpose of meaningful assessment in a CBI classroom is to serve as a reflective tool for students and teachers (Danielson, 2007; Gulikers, Bastianes, & Kirschner, 2004; Guskey & Bailey, 2010; Marzano, 2010; Marzano et al., 2001; Sampson, 2004; Sturgis & Patrick, 2010). Studies have shown that higher achievement is correlated with feedback on assessment (Marzano et al., 2011). In a classroom using CBI, one would expect to see a teacher providing feedback on assessments. This feedback could manifest as oral clarification, prompting for

clarification, or written feedback or direction. In other words, feedback would extend beyond a simple right or wrong notation. One would also expect students to reflect on the assessment results and feedback in some way.

Authentic tasks in performance assessments. Aligned with clearly defined learning objectives, teachers are expected to design and develop authentic tasks for students to practice and reach those objectives. In the view of Newman and his colleagues (Newmann et al., 2007, p. 33), authentic tasks require construction of knowledge, disciplined inquiry, and value beyond school. Compared to traditional models of typical tests, authentic tasks involve practical use of systematic knowledge to tackle a rather complex task based on students' best judgment. Authentic tasks encourage student innovation and are supported by appropriate consultation and feedback (Wiggins, 1998, p. 23). However, it is also noted that authentic tasks tend to fail their purpose if without effective feedbacks that are evidence-based, standard-relevant, performer-friendly in terms of timeliness, frequent and ongoing, realistic, and enables self-assessment and self-adjustment (Wiggins, 1998, p. 49).

Assess student understanding in performance assessments. According to Wiggins (1998, pp. 86-88), one of the most important purposes of education is to promote students' true understanding which covers five facets: (a) to be able to explain and interpret theories or concepts at the sophisticated level; (b) to be able to apply knowledge in various contexts and self-adjust accordingly; (c) to be able to take perspectives based on effective critical thinking; (d) to be able to demonstrate empathy; and (e) to be able to self-assess and demonstrate self-knowledge by recognizing one's own prejudices and presumptions, etc. In order to evaluate whether students' understanding reach the above-listed five standards, Wiggins (1998, pp. 91-99) advocates authentic assessments based on high interactivity, recurring tasks, student self-assessment, and longitudinal rubrics. The assessments must be able to tackle the circumstances where

misunderstandings are most likely to occur on the part of students, enable students to "see the big picture", and allow them to apply the learned knowledge/skills in different contexts (Wiggins, 1998, p. 94).

Quality assessment standards. Kuhs, Johnson, Agruso, and Monrad (2001, p. 4) suggest the general characteristics of quality assessments by asking the following questions:

1. Does the assessment focus on knowledge and skills that were taught in the class and are outlined in district curriculum guides and in state and national content standards?
2. Does the assessment provide information about student learning that represents typical performance?
3. Does the assessment provide opportunities for all types of students to demonstrate what they have learned?

More specifically, Kuhs and his colleagues (Kuhs et al., 2001, p. 157) provide a sample assessment system model that details in different types of assessments, as shown in Figure 1.

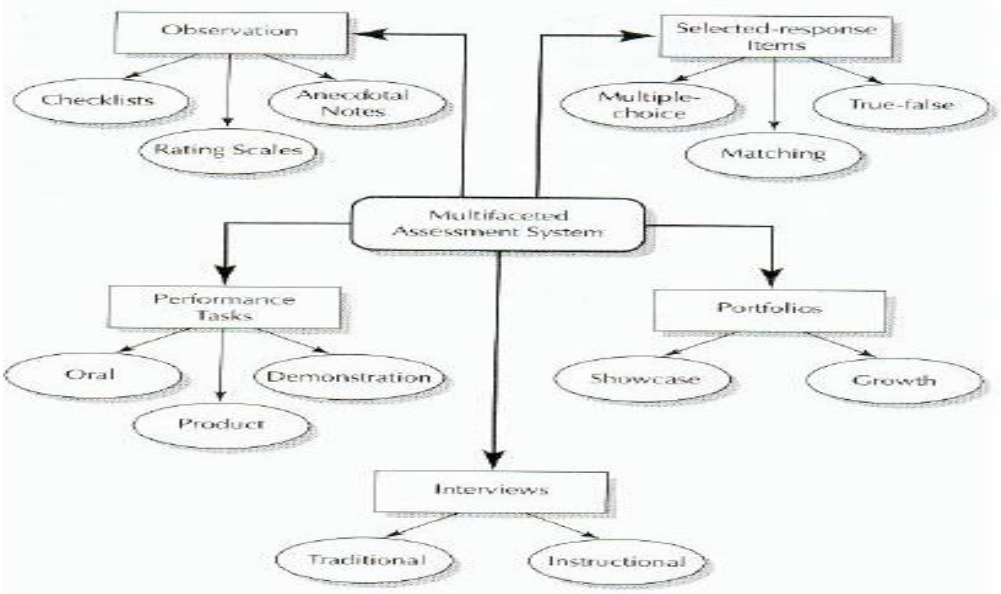

Figure 1. Kuhs et al.'s Multifaceted Assessment System.

Assessment *of*, *for*, and *as* learning. Scarborough (2007, p. 218) makes distinction between three types of assessment based on their connections to student learning. First, assessment *of* learning is mostly summative, taking place at limited times over a given period of time (often at the end of each semester). As the current dominant type of assessment at most schools, it serves to provide information about student learning outcomes in relation to other students (i.e., most standardized tests). Thus in assessment *of* learning, both teachers and students play a passive role, and it is often difficult for them to use the assessment results in improving their teaching and learning effectively. Second, in assessment *for* learning, frequent, ongoing formative assessments replace one-time summative test to better inform teachers in order to make due adjustments to their curriculum, assignments, teaching content, and teaching pace in facilitating students' learning in the next stage. Finally, assessment *as* learning focuses on motivating students to self-assess and self-adjust, rather than relying on teacher feedback only. The differences of these three types of assessment are shown in Figure 2 below:

Approach	*Purpose*	*Reference Points*	*Key Assessor*
Assessment *of* Learning	Judgments about placement, promotion, credentials, etc.	Other students	Teacher
Assessment *for* Learning	Information for teachers' instructional decisions	External standards or expectations	Teacher
Assessment *as* Learning	Self-monitoring and self-correction or adjustment	Personal goals and external standards	Student

Figure 2. Features of assessment of, for, and as learning (Scarborough, 2007, p. 219).

Observational Framework

This is where I have planned to detail the observation protocol once our team has

developed it further. See Table 3.

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Table 1. Characteristics of Competency-Based Assessment

Characteristics	Common Activities /Strategies	Indicators	Sources of Evidence/Data Collection Tools	References	Note
Flexibility	Prior Learning Assessment (PLA)	**PLAs** test what students have learned before and outside of the classroom related to certain subject matters	Multiple Approaches to PLA (as recommended in the CAEL website)	the Center for Adult and Experiential Learning; Anderson, http://www.skilledup.com/blog/competency-based-education-assessments/	evaluation of military and corporate training and coursework
					Standardized Tests
					Course Challenge Exams
					Student Portfolios
Authenticity	Performance Assessments	Authentic Tasks	Figure 2.1 (Wiggins, 1998, p. 23) & Figure 2.5 (Wiggins, 1998, p. 38)	Wiggins, 1998 Wiggins, 1990 Marzano et al., 1993 Lissitz & Shafer, 2002, Keyser & Howell, 2008	
		Performer-friendly Feedback	Figure 3.1 (Wiggins, 1998, p. 49)		
Promoting Student Understanding	Performance Assessments	"Five Facets of Understanding"	Evidence of Understanding (Wiggins, 1998, p. 86-88) Assessing Understanding (Wiggins, 1998, p. 91-99)		

Demonstration of Student Learning	Assessment Portfolio	Quiz Prompt Performance Task Project	Figure 8.3, 8.4, & 8.5 (Wiggins, 1998, p. 201-204)	Wiggins, 1998 Wiggins, 1990 Gomez, 1998	
Assessment ***as*** Learning	Performance Assessment/Portfolio /Project-Based Assessment	Self-Monitoring Self-Correction /Adjustment	1. Rubric for Assessing the Quality of a Performance Task (Scarborough, P.227) 2. Rubric for Assessing the Quality of a Rubric (Scarborough, p. 228)	Scarborough, 2007, http://www.niu.edu/CEET/p20/scholarship/vol1/A7.pdf	
Individualized Diagnostics	computer-based testing	Randomization Interactive interface Formative /Summative	A taxonomy of applications of CBA	Thelwall, 2000, p. 39	
Criterion-referenced	Modular Assessment	Objective Questions Practical Assessment Checklist & Rating Scales Modular Examination Performance Logbook Record keeping	Appendices (Sample Tests)	Organizations of American States (OAS), 2006 http://www.moe.gov.tt/Docs/ICIU/CBET_Assessment.pdf	

		Form Student Employability Skills Inventory			
Peer Involvement	Peer Assessment	Peer Review Peer Reflection		Organizations of American States (OAS), 2006 http://www.moe.gov.tt/Docs/ICIU/CBET_Assessment.pdf	

Table 2. Characteristics of Competency-Based Instruction

Theory	Characteristics	Strategies	Indicators	Core References
Mastery learning	Students study content until they demonstrate mastery then progress through the curricula as a class.	• Frequent assessment (Bangert-Drowns, Kulik, & Kulik, 1991)	• Criterion-referenced standards and additional time for students (Guskey, 1987)	(Bloom, 1968)
Personalized System of Instruction (PSI)	Students receive differentiated instruction in response to assessment results; generally, remediation or enrichment. Students progress as a class.	Mastery Learning in addition to… • Provide feedback on assessments (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991) • Allow students to self-select groupings (Keller, 1968, (Rosenholtz & Rosenholtz, 1981) • Focus on written materials (Buerkel-Rothfuss, Gray, & Yerby, 1993) • Self-pacing (Buerkel-Rothfuss et al., 1993) • Motivate through lecture and discussion rather than deliver content (Keller, 1968)	• Differentiated curricula based on assessment results (Simpson, 1981) • Student choice in assignments (Schnackenberg & Sullivan, 2000) • Positive student perception of learning (Hambleton, Foster, & Richardson, 1998)	(Keller, 1968)
Standards-Based Learning/Grading (SBG/L)	Students receive instruction tailored to deconstructed standards	PSI in addition to… • Assessments are used formatively (Bangert-	• Assessments influence instruction (Natirello, 1987)	(Guskey & Bailey, 2010) (Marzano, 2010) (Wiggins & McTighe,

	and then assessed on individual standards and offered opportunity for remediation. May move as individuals or as a class.	Drowns, Kulik, & Kulik, 1991) • Group students by varying ability (Mevarech, 1991) • Supports weak students (Damavandi & Shekari Kashani, 2010)	• Less variation in student achievement (Rosenholtz & Rosenholtz, 1981) • Clearly defined standards (Natirello, 1987; Smith, 1984)	2005)
Competency-based Instruction (CBI)	Students utilize differentiated instruction tailored to specific standards—called competencies—but only progress to the next standard when they demonstrate mastery. Students move as individuals.	SBG/L in addition to… • Feedback should guide students to correct responses (Bangert-Drowns, Kulik, Kulik, et al., 1991) • Do not focus on high-stakes test prep (Ketter & Pool, 2001) • Qualified teaching assistants should be available to deliver and monitor instruction (Buerkel-Rothfuss et al., 1993)	• Do not grade all student work (Simpson, 1981) • Assessments are authentic to competency (Gulikers, Bastianes, & Kirschner, 2004; Leung, 2002) • High levels of student engagement (Danielson, 2007; Sturgis & Patrick, 2010) • Competency is determined by successful completion of multiple components (Buntat et al., 2013)	(Sturgis & Patrick, 2010)

Table 3. Potential Classroom Observation Protocols for CBI

Protocol	Appropriate Grades	Key Themes*	Source
Framework for Teaching	K-12	Teacher planning Differentiated instruction Assessment analysis Classroom culture	Danielson, C. (2007). *Enchancing professional practice: A framework for teaching* (2nd ed.). Alexandria, VA: ASCD.
Effective Supervision *	K-12	Teacher planning Instructional methods Students engagement Varied assessment	Marzano, R. J., Frontier, T., & Livingston, D. (2011). *Effective supervision: Supporting the art and science of teaching*. Alexandria, VA: ASCD.
Science Management Observation Protocol (SMOP)	6-12	Student engagement Inquiry-style learning Student-centered/driven instruction	Sampson, V. (2004). Science management observation protocol: Using structured observations to improve teacher's management of inquiry-based classrooms. *The Science Teacher*(10), 30-33.
AdvancedED *	K-12	Teacher-Student interaction Classroom climate Instructional design	AdvancED. (2011). *Standards for quality: Schools.* Retrieved from http://www.advanc-ed.org/webfm_send/288
CLASS Tool	K-3 Upper elementary Secondary	Emotional support Classroom organization Instructional support	Teachstone Training. (2014). *Teachstone: Building connections: Enhancing learning.* Retrieved from www.teachstone.com