

A Synthesis of Competency-Based Instruction: Implications for Developing Classroom

Observation Protocols for Race to the Top–District Kid•FRIENDLY Schools

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## SYNTHESIS OF COMPETENCY-BASED INSTRUCTION

Student-centered instruction is not a new concept in education (Bloom, 1968; Keller, 1968; No Child Left Behind [NCLB], 2001; United States, 1983); nor is the need for individualized student instruction unknown in Kentucky (Senate Bill [SB] 1, 2009). To meet the need for such instruction, the Kid•FRIENDLy program was proposed by the Green River Regional and Ohio Valley Educational Cooperatives—including a combined total 22 school districts—to implement a \$42 million federal Race to the Top grant (Green River Regional Education Cooperative [GRREC], 2012). One component of the larger proposal is to address instructional and achievement needs through the implementation of Competency-Based Instruction, or CBI. This synthesis is an effort to provide a review of relevant literature that led to the current paradigm of CBI. This synthesis will also seek to provide an overview of the Kid•FRIENDLy framework for implementing CBI in Kentucky schools served by the Green River Regional and Ohio Valley Educational Cooperatives. Additionally, this paper will also address discrepancies between the Kid•FRIENDLy framework and literature on CBI. Finally, this synthesis intends to provide foundation for the development of a classroom observation protocol for CBI as well as tools to measure the fidelity of implementation by both Kid•FRIENDLy and the schools that it serves.

According to Kid•FRIENDLy, the goals relevant to CBI are (p. 36)

Goal 3: Improve the academic and non-cognitive outcomes for students

Goal 4: Ensure all students are on track to be college- and career-ready

Goal 5: All students are capable and prepared for postsecondary careers, college, and/or technical schools.

### **The Framework for Kid•FRIENDLy's Competency-Based Instruction**

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The goals of CBI are harbingers of authentic evidence of *learning* instead of the passive completion of a mandated curriculum. The goals of Kid•FRIENDLy's CBI (GRREC, 2012) are designed after the working definition of competency-based pathways by Sturgis and Patrick (2010). The working definition has three essential components that are integrated into the goals of CBI (Sturgis & Patrick, 2010, p. 8-10):

1. Students advance through a curriculum by demonstrating mastery.
2. Learning outcomes should be explicit and measurable.
3. Assessment should be a positive and meaningful learning experience.

While Sturgis and Patrick (2010) define components of CBI, the definition does not address all of the goals and/or needs of CBI according to Kid•FRIENDLy (GRREC, 2012). The Kid•FRIENDLy program also encourages that schools reflect on their grading paradigms. Specifically, Kid•FRIENDLy suggests that schools abolish the use of zero as a grade for missing work. Kid•FRIENDLy proposes that using the numerical zero does not support authentic evidence for learning (Reeves, 2004) and serves to discourage students from using assessment as a meaningful learning tool.

Kid•FRIENDLy (GRREC, 2012) also proposes that instruction provide enrichment or remediation as needed to achieve career and/or college-readiness (SB 1, 2009). To achieve this end, Kid•FRIENDLy encourages schools to foster a curriculum design process that is consistent with several core ideas discussed by Wolf (2010, p.14-16).

- Teachers must implement a curriculum that allows students to move between topics flexibly. This flexibility must also provide for students to learn content and skills anytime, anywhere.
- Teachers must move to a role that facilitates student learning and discovery versus the traditional role of content delivery. This paradigm shift would require

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significant effort on the part of the teacher and the school administration.

- According to Wolf, learning and achievement is best encouraged through authentic, project-based learning opportunities. These opportunities “increase the relevance of learning and improve the students’ ability to apply knowledge and use critical thinking skills” (p. 15).
- The curriculum should be student-driven. This differs from current ideas of student-centered instruction (Marzano, Pickering, & Pollock, 2001; Wiggins & McTighe, 2005) in that student-*driven* instruction provides the students the freedom and opportunity to explore their interests through choice of learning experiences.
- Student-driven instruction is possible through mastery- or competency-based progression through a curriculum (Wolf, 2010, p. 16). Only this type of curriculum design affords students and teachers the necessary flexibility to achieve Wolf’s goals of personalized learning.

### **Kid•FRIENDLy’s Outcomes for Competency-Based Instruction**

The primary goal of CBI, according to Kid•FRIENDLy, is to shift teacher-driven, industrialized instruction towards a more personalized, tailored model in which each student receives the instruction, remediation, and enrichment he or she needs to successfully demonstrate competency (GRREC, 2012). In fact, Kid•FRIENDLy’s CBI can offer this kind of instructional paradigm. A CBI-paradigm is most likely to take root with instructors based on the how the outcomes differ from traditional instruction.

Competencies, as previously stated, serve as indicators of the level to which a student has learned to synthesize related knowledge and skills. In addition, an outcome of CBI is that students evaluate their own performance and reflect on their efforts to learn with the help of the instructor (Buntat, et al., 2013); as opposed to instructors holding evaluation as separate from the student. To

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achieve this level of student effort, assessment takes place during performance of authentic tasks specific to the content field with the intent to improve through critical feedback from the instructor. The paradigm of refinement through performance assessment targets the academic and behavioral needs of the students and promotes achievement in weaker students (Damavandi & Kashani, 2010; Schnakenberg & Sullivan, 2000). Instructors could expect to see students taking an interest in task performance and knowledge/skill development; this engagement differs from traditional student involvement in activities while disconnecting from assessments.

An additional outcome of CBI is fluid and flexible instruction instead of rigidly designed and paced instruction. In a review of the use of CBI in physician-preparation programs, Leung (2002) states that CBI allows the students to work at their own pace with flexible instructional methods. CBI also promotes transparency in the classroom between colleagues and the public, which leads to professional accountability. However, Leung also cautions that CBI needs a professionally standardized definition in order to establish appropriate competencies that do prepare students for future fields. Instructors could expect to observe students working at their own pace and perhaps be emboldened by their success. The lackadaisical air of waiting for others to catch up or frustration of being left behind would be extinct in CBI classrooms.

Kid•FRIENDLY seeks to increase student engagement and perceptions of self-efficacy through CBI. In an experimental study, students that received some sort of reward contingent on their performance on an assessment task improved achievement ( $F(2, 32) = 16.45, p < 0.001$ ) and improved their self-perception of their ability ( $F(2, 32) = 13.34, p < 0.010$ ), even when the reward was not tangible—bonus points, re-taking the assessment, and such (Schunk, 1983). Such findings can imply that students can develop increases achievement and task-performance when they have a reasonable expectation of a tangible or intangible reward for their efforts in classwork and assessment. CBI can provide individualized instruction and an increased self-perception of ability

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in the students. Ultimately, instructions would see engaged students that believe in themselves and in their classmates. This positive climate would serve to facilitate risk-taking and meaning-making in student activities; each of which could contribute to increased student achievement.

### **Historical Progression to Competency-Based Instruction**

Like many ideas in education, CBI has evolved from the fusion of mastery learning and personalized learning. The proposed framework for CBI is the next step in a progression that includes learning for mastery (Bloom, 1968), personalized systems of instruction (Keller, 1968), and standards-based grading/learning (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005). Through review and analysis, some components of earlier frameworks are evident within Kid•FRIENDLy's model of CBI, other components have been adapted to different needs, and still other components are vague and/or absent.

### **Learning for Mastery**

Bloom (1968) argues that providing uniform instruction to students does not promote the achievement of all students; rather, uniform instruction progress each student uniformly. In other words, high achieving students will remain high achieving while lower achieving students remain, relatively, lower achieving. Bloom (1968) attributes this behavior to instruction moving too slow for higher achieving students and too fast for lower achieving students. Bloom suggests that demonstrating mastery should moderate what instruction a student receives. Through mastery, according to Bloom, all students are capable of high achievement. In practice, learning for mastery resembles traditional instruction since students receive whole-class instruction until some sort of assessment. Once assessment has occurred, the instructor divides students into groups that have attained the pre-defined level of mastery and those groups of students that have not. Those students that have attained mastery focus on enrichment activities, while those students that have not attained mastery work on remediation activities until they meet mastery. Once, all students

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attain mastery, the class progresses to the next curricular topic.

In his first work on learning by mastery, Bloom (1968) does not explicitly state what should constitute mastery; definition is the sole discretion of the instructor, unlike practical competencies that reflect the demands of the content field. The individualized nature of learning for mastery may indicate that mastery is different for every student in a given program, but this is not clear in practice. To address this nebulous concept of mastery, a review of learning by mastery indicates that criterion-referenced standards should dictate both the level of mastery and how students should demonstrate mastery (Guskey, 1987). Guskey (1987) posits that standardized assessments favor coverage over mastery and would not portray the effect of mastery learning accurately. Ultimately, using criterion-reference standards should be a vehicle for designing and assessing student learning for mastery.

Another fundamental component of learning for mastery (Bloom, 1968) is demonstration of mastery through assessment. Since students could be at different points in the curriculum, frequent assessment is necessary. The frequency of such assessments is dependent on the content and the instructional pathway designed by the teacher. In a meta-analysis of 35 studies on testing frequency, results indicated that frequent testing was beneficial to student achievement with an average effect size of 0.23 that was significant (Bangert-Drowns, Kulik, & Kulik, 1991a). One should avoid obsessive amounts of assessment since it then becomes a case of diminishing returns as the number of tests increased (Bangert-Drowns, et al., 1991a, p. 95).

In addition to criterion-based standards and regular assessment, learning by mastery requires instructional flexibility to provide remediation or enrichment to students based on their assessed progress towards mastery (Bloom, 1968). Students can achieve flexible remediation and/or enrichment using monitored, cooperative learning groups. In one study (Mevarech, 1991), students were placed in cooperative groups based on whether or not they achieved a pre-

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determined level of mastery; these cooperative groups—whether for remediation or enrichment—correlated to high overall achievement when compared to non-cooperative mastery learning groups or individuals. Cooperative learning groups provide students the time, flexibility, and mutual accountability to affect authentic and meaningful learning, and thereby achieve mastery.

Kid•FRIENDLy’s proposed foundation for CBI clearly has roots in learning for mastery (Bloom, 1968). Kid•FRIENDLy’s Race to the Top proposal advocates that students’ progress through a curriculum follows demonstration of mastery. According to Bloom (1968), students can demonstrate mastery when teachers provide criterion-referenced standards for mastery, regular assessment of mastery, and instructional flexibility to participate in cooperative remediation and/or enrichment.

### **Personalized System of Instruction**

While learning by mastery reflects flexibility and accommodation on the part of the teacher, Keller (1968) proposes the personalized system of instruction (PSI) to provide flexibility for instruction on the part of the student. Within PSI, the instructor provides all necessary materials to the student at the beginning of the unit or course, and then the student works to learn the material at his or her own pace and style. If the students would rather read than listen to a pre-recorded lecture, they are free to do so. However, all students would take regular, proctored exams with either the instructor or a qualified assistant. Using a pre-determined level of mastery, progression to the next unit or topic would depend on student assessment results. In a sense, Keller’s PSI model is an evolutionary step of Bloom’s learning for mastery. Bloom (1986) proposes that students move to the next curricular topic when they demonstrate mastery, but the whole class would still move as one by providing remediation or enrichment as needed to students. Keller’s model allows a single student to advance through the curriculum upon mastery while remediation is available to another student that demonstrates a need for it.



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Yielding instructional control to students seems counterintuitive to the role of the teacher, but when instructional guidance is available in support of student choice, students are capable of greater achievement. In an experimental study, students that had full control over their instruction via computer programs demonstrated higher post-test achievement (Schnakenberg & Sullivan, 2000). Schnakenberg and Sullivan (2000) attribute higher achievement to students selecting additional instructional material on topics that they had assessed poorly on initially. While remediation was individual, student choice of instructional material provides flexibility that is indicative of a PSI (Keller, 1968).

In his original proposal, Keller (1968) states the need for regular, proctored assessment to guide student choices in instruction. Proctored assessments allowed descriptive and timely feedback at the student level. In a meta-analysis of 40 reports, Bangert-Drowns, Kulik, Kulik, and Morgan (1991b) found assessment feedback to have a significant effect on student achievement. In the same study, Bangert-Drowns et al. discuss that guiding students to the correct answer as a means of assessment feedback can provide an average effect size of +0.31 standard deviations (p. 228). In addition, this study (Bangert-Drowns, Kulik, Kulik, & Morgan, 1991b) posits that delayed feedback provides an increase in average effect size of student achievement, while immediate feedback actually decreases the average effect size of student achievement (p. 227). While the majority of the reports analyzed focused on post-secondary situations, one can reasonably extrapolate that providing corrective feedback is an essential component of PSI at any level.

The term PSI implies that instruction is effective when designed at the individual level. While individualization is the foundation of Keller's (1968) model, Keller also suggests using student groups as an effective instructional strategy. Instructors may be tempted to put students into groups for a variety of reasons, such as personality or ability, but that may violate the core idea of PSI. In a study of fifth- and sixth-grade students across various ethnicities, students' self-

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perception of ability increased when students had freedom to self-select groups and complete a variety of tasks associated with instruction (Rosenholtz & Rosenholtz, 1981). Increased self-perception of ability may support student-driven instruction.

**Core components of personalized system of instruction.** In a PSI-based classroom, the role of the teacher changes from lecturer to facilitator; that is highly consistent with the goals of the Kid•FRIENDLy project (GRREC, 2012). While there is some empirical evidence to the causal efficacy of PSI, multiple reviews explore the components of PSI and reflect upon the trials and tribulations of its implementation (Buerkel-Rothfuss, Gray, & Yerby, 1993; Hambleton, Foster, & Richardson, 1998; Simpson, 1981).

Given the revised role of the teacher, instructional materials must be available to students in a variety of formats. A review of implemented PSI by Buerkel-Rothfuss, Gray, and Yerby (1993) posit that instructors should place a strong emphasis on written materials for instructional materials in conjunction with structured self-pacing. Buerkel-Rothfuss et al. implemented a model of PSI in a college-level communication course, which differed slightly from Keller's (1968) model. Following course evaluations and personal reflections, Buerkel-Rothfuss et al. discuss the need for uniform instructional materials that have a consistent style from unit to unit. This allows students to form a reliable study plan that is consistent with the goals of the course. In addition, students had deadlines to "overcome a perceived procrastination problem" (Buerkel-Rothfuss, et al., 1993, p. 24). Deadlines are not consistent with the original vision of PSI, but were felt to be an essential adaptation for real students and instructors.

Given that PSI is highly individualized, the role of lecture must adapt to the needs of the students. Ergo, instructors that implement a PSI would use lecture to motivate and engage students while relying on alternative methods to deliver content. In an experimental study, Hambleton, Foster, and Richardson (1998) statistically compared mathematics and computer science students

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in two separate courses: one conventional and lecture-based, the other modeled after Keller's (1968) model using lecture to address practical needs of students and technology to aid in content delivery and practice. Using a survey scale to measure the degree to which students make meaning from the course, Hambleton et al. noted that students in the PSI-style course showed a significant increase in scores ( $F_{\text{Mathematics}}(1,138) = 5.28, p < 0.025$ ). Hambleton et al. posit the multimedia variation afforded through PSI is useful in eliciting student engagement and meaning making (p. 199).

A final component of any PSI is the students' perceived ability to succeed within the caveats of the model. The consensus among educators is that differentiating instructional methods increases student engagement and retention because it addresses the students' perception of their ability. Studies suggest that when instructional methods are varied, student perception of ability increases, which, in turn, could support increased student achievement and reduce the gaps in achievement (Simpson, 1981; Rosenholtz & Rosenholtz, 1981). This increased student perception is possible through the individualized level of instruction afforded through PSI.

Kid•FRIENDLY proposes that students feel empowered and move through a curriculum at their own pace (GRREC, 2012) through CBI. PSI (Keller, 1968) contributes to Kid•FRIENDLY's goals by revising the role of the teacher from content delivery to learning facilitator. The teacher provides multiple platforms for content delivery while maintaining an encouraging and supportive role through lecture and student freedom to choose learning experiences.

### **Standards-based Grading and Learning**

A relatively recent manifestation of learning for mastery (Bloom, 1968) and PSI (Keller, 1968) is the curriculum design called standards-based grading (SBG) or standards-based learning (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005). In this form, student evaluation takes on a formative role, in place of the traditional summative role with behavioral

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components. In addition, SBG suggests that student not progress forward with new material until they have had the opportunity to demonstrate mastery of a given standard. Teachers may work with a whole class for remediation or enrichment, like Bloom (1968), or they may allow individuals to move on to the next topic, like Keller (1968). Regardless of form, the central component of SBG is that students receive grades that reflect only their level of mastery of specific standards instead of non-standards work, like homework or participation. The foundational concept of grades for performance only and progression by mastery is at the heart of the Kid•FRIENDLy initiative with CBI (GRREC, 2012).

As the name suggests, the heart of SBG is standards; these standards must be clear and explicit to students and stakeholders. In a review of the literature on student evaluation, Natiello (1987) reports that the use of standards as a basis for evaluation is “evidence of struggle to accommodate both universalism and individualism in a single system” (p. 159). Natiello goes on to state that linking student evaluation to specified criteria is essential for determining the extent to which the student has met the larger goal of the course. This specification provides both students and teachers with effective guidance towards achieving mastery; this is evidenced through “high[er] levels of skill, self-efficacy, and rapid problem solving” (Natiello, 1987, p. 162). In support, student achievement declines when teachers—and subsequent instructional goals—provide vague guidance (Smith, 1984). By defining mastery through content standards, students are able to learn by mastery while having the freedom to remediate or enrich their learning through teacher intervention. In other words, SBG acts as an adaptable hybrid of learning by mastery (Bloom, 1968) and PSI (Keller, 1968), in accordance to student needs and instructor preference.

Once clear and explicit standards have been deconstructed from the larger set, the instructor or professional learning community should develop assessments that directly measure the content and the level of intent innate to the original standard (Marzano, 2010; Wiggins &

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McTighe, 2005). Regular assessments serve as formative guideposts for both students and instructors. In this sense, formative assessments may take any form—item selection, free response, discussion, etc.—but do not affect a student’s end of course evaluation or grade. Students have shown increased achievement when the use of frequent assessments is formative in nature rather than summative (Bangert-Drowns, et al., 1991b). In addition, using assessment results to influence the level and pace of instruction are an essential component of student evaluation (Natiello, 1987). Regular formative assessment is the principal vehicle for encouraging student learning versus simple compliance, as proposed by Kid•FRIENDLy (GRREC, 2012).

SBG strongly advocates the use of cooperative groups for learning (Marzano, 2010; Marzano, Pickering, & Pollock, 2001), though there is no indication as to the benefit of self-selected groups versus teacher-selected groups. SBG suggests using groups in response to student assessment performance rather than as a primary instructional tool. While Bloom (1968) suggests that instructors selected cooperative groups for remediation and Keller (1968) proposes students self-select groups for instruction, neither provides empirical evidence for teacher-selected groups versus student-selected groups. However, studies support that any type of monitored, cooperative group can have a significant effect on student achievement and self-perception of ability (Mevarech, 1991; Rosenholtz & Rosenholtz, 1981). In other words, cooperative learning is essential to the efficacy of encouraging students to learn content and skill instead of merely complying with instructor assignments.

Kid•FRIENDLy proposes to synthesize components of SBG into their for CBI. Most notably, Kid•FRIENDLy builds upon the need to alter the grading paradigm (GRREC, 2012; Reeves, 2004) by focusing only on student mastery. They also seek to tie assessments to specific performance standards.

### **Definition and Components of Competency-Based Instruction**

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The current evolutionary step in competency-based instruction proposed by Kid•FRIENDLy (GRREC, 2012) is one that synthesizes the previous models of individualized learning (Bloom, 1968; Guskey & Bailey, 2010; Keller, 1968; Marzano, 2010; Wiggins & McTighe, 2005). Our operational definition of CBI is instruction in which students utilize differentiated instruction tailored to specific standards and individualized feedback, and students may only progress through the curriculum through demonstration of mastery of core competencies—which consist of standards-based performance assessments (GRREC, 2012, p. 68-70; Sturgis & Patrick, 2010; Wolf, 2010).

### **Feedback in Competency-based Instruction**

A previously mentioned component of individualized and student-driven instruction is instructor feedback, which is admittedly underdeveloped by Kid FRIENDLy. During the course of a unit or lesson, instructors provide feedback, even tacitly; clear and descriptive is an effective way to address student comprehension following assessments. Trade texts posit that instructors should provide and encourage student use of descriptive feedback *as* an instructional tool (Marzano, 2010; Marzano, et al., 2001). Given the value of instructional and assessment feedback, several studies suggest an alternative, qualified instructor, such as an instructional or graduate assistant assisting in assessing and providing feedback to students (Buerkel-Rothfuss, et al., 1993; Keller, 1968). Assistants may be beneficial to the larger class sizes common in post-secondary courses, but the schools serviced by Kid•FRIENDLy (GRREC, 2012) may be small enough for a single teacher to provide adequate feedback regularly. CBI proposes that instructors and students then use descriptive feedback as a tool for guiding future enrichment or remediation.

### **Assessment of Competencies**

Since CBI has evolved over decades, the practical manifestation of assessments has varied; therefore, it is necessary to define competencies within the definitions of the Kid•FRIENDLy

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proposal (GRREC, 2012). Competencies are standards-based performance assessments (Sturgis & Patrick, 2010; Wolf, 2010); however, a single competency may consist of multiple assessment components that include knowledge- and skills-based components (Buntat et al., 2013, p. 1537).

Competencies are inherently standards-based and practical; as such, they should represent authentic tasks and assessment environments. In a survey of students and teachers, Gulikers, Bastianes, and Kirschner (2004) defined authentic assessments as “an assessment requiring students to use the same competencies, or combination of knowledge, skills, and attitudes, that they need to apply in criterion situation in professional life” (p. 69). Analysis of survey results show that teachers have a firm grasp of authentic assessment, but that younger students—college sophomore compared to college seniors—do not. Gulikers et al. suggest that teachers should include students in the assessment process of design, execution, and reflection. While the role of assessment does feature prominently in the role of CBI, instructors must be vigilant to avoid placing high stakes on assessments similar to the current political paradigm (NCLB, 2001; SB 1, 2009). When instructors placed heavy emphasis on assessments during the course of instruction—teaching to the test—students demonstrate a lack of engagement and general indifference about the content and learning process (Ketter & Pool, 2001). Student nonchalance also increases as the number of grades taken by the instructor increases in preparation for assessment (Simpson, 1981). Each study supports the Kid•FRIENDLY’s call to alter the paradigm and role that grades play in the instructional process (GRREC, 2012). Altering the role of grades and assessments away from the high-stakes evaluation, whether for students or teachers, may increase student engagement and, subsequently, student achievement (Danielson, 2007; Sturgis & Patrick, 2010).

CBI is another step in a theoretical framework that shifts from traditional teacher-driven instructor towards student-driven instruction that authentically prepares students for college and careers. The literature suggests that learning by mastery (Bloom, 1968), PSI (Keller, 1968), SBG

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(Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005), and CBI are related through shared components. This theoretical framework is summarized in Table 1.

Table 1

Theory	Characteristics	Strategies
Mastery learning (Bloom, 1968)	Students study content until they demonstrate mastery then progress through the curricula as a class.	<ul style="list-style-type: none"> <li>• Frequent assessment (Bangert-Drowns, Kulik, &amp; Kulik, 1991)</li> </ul>
Personalized System of Instruction (PSI) (Keller, 1968)	Students receive differentiated instruction in response to assessment results; generally, remediation or enrichment. Students progress as a class.	Mastery Learning in addition to... <ul style="list-style-type: none"> <li>• Provide feedback on assessments (Bangert-Drowns, Kulik, Kulik, &amp; Morgan, 1991)</li> <li>• Allow students to self-select groupings (Keller, 1968, (Rosenholtz &amp; Rosenholtz, 1981)</li> <li>• Focus on written materials (Buerkel-Rothfuss, Gray, &amp; Yerby, 1993)</li> <li>• Self-pacing (Buerkel-Rothfuss et al., 1993)</li> <li>• Motivate through lecture and discussion rather than deliver content (Keller, 1968)</li> </ul>
Standards-Based Learning/Grading (SBG/L) (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005)	Students receive instruction tailored to deconstructed standards and then assessed on individual standards and offered opportunity for remediation. May move as individuals or as a class.	PSI in addition to... <ul style="list-style-type: none"> <li>• Assessments are used formatively (Bangert-Drowns, Kulik, &amp; Kulik, 1991)</li> <li>• Group students by varying ability (Mevarech, 1991)</li> <li>• Supports weak students (Damavandi &amp; Shekari Kashani, 2010)</li> </ul>
Competency-based Instruction (CBI) (Sturgis & Patrick, 2010)	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... <ul style="list-style-type: none"> <li>• Feedback should guide students to correct responses (Bangert-Drowns, Kulik, Kulik, et al., 1991)</li> <li>• Do not focus on high-stakes test prep (Ketter &amp; Pool, 2001)</li> <li>• Qualified teaching assistants should be available to deliver and monitor instruction (Buerkel-Rothfuss et al., 1993)</li> </ul>

### Theoretical Framework of Competency-Based Instruction

While there is little empirical work to define what one would observe in a classroom

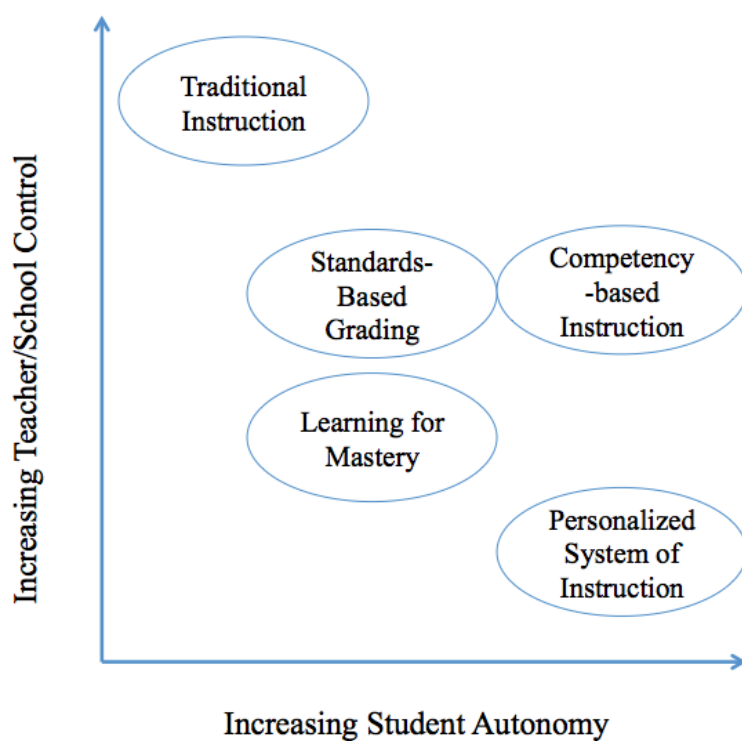


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driven by CBI, our review of the literature has exposed potential indicators of effective CBI. The development of CBI as an evolutionary process implies that the components of effective learning by mastery (Bloom, 1968), PSI (Keller, 1968), SBG (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005) are present in CBI. While there is a chronological progression to our review, we propose that three defining constructs distinguish the instructional methods: student autonomy, teacher/school control, and the role of assessments. Figure 1 qualitatively summarizes these constructs.

Figure 1

*Summary Framework of Competency-Based Instruction*



### **Student Autonomy**

The traditional teaching paradigms emphasize the teacher as the center of instructional decision-making and as a professor of content and expertise. CBI encourages instruction to become a juxtaposition of teacher and student input. Learning by mastery (Bloom, 1968)

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encourages teachers to provide instruction tailored to the needs of students as determined by assessment, but still puts instructional decisions on the part of the teacher. PSI (Keller, 1968) provides the student with complete autonomy for instructional decisions with little input from the teacher, other than assessment results. SBG (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005) provides some balance between teacher input and student autonomy, but still relies heavily on using graded work to make instructional decisions – thus increasing the level of teacher control. We propose that CBI provides freedom for students make their own instructional decisions with moderate input from the teacher or school. The teacher must allow students to make instructional decisions, while schools allow students the opportunity to break the normal program progression, if warranted.

**Indicators of Student Autonomy within Competency-Based Instruction.** In a classroom that promotes student autonomy through CBI we would expect to observe several student-based factors. Instruction could take on multiple forms, depending on the level of implementation in the classroom, but the primary indicator of student autonomy would be self-pacing and student engagement.

Self-pacing is described by Keller (1968) and referred to by Beurkel-Rothfuss et al. (1993) as students working at their own pace independent of the instructor. This may mean that each student is at a different stage of the curriculum, or that groups of students are at different stages. Evidence of self-pacing would be observing students or small groups of student working at different stages of the lesson, unit, and/or curriculum depending on assessment results. This is not to say that *all* students would or should be in different places in the curriculum, only that they have the freedom to do so. Within a single classroom, self-pacing may be evidenced through differentiated instruction (i.e., one group doing an independent science lab while another works with the teacher on remedial work); while, within a school, self-pacing may mean taking classes

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that would be designed for older students (i.e., a 3rd grade student taking 5th grade math).

We posit that student engagement is a result of student autonomy with several possible sub-indicators. Student choice in instruction correlates to an increase the level of personalization and student achievement (Schnakenberg & Sullivan, 2000) and fosters a positive perception of learning ability (Hambleton, Foster, & Richardson, 1998). In a classroom high in student autonomy, one would expect to see high levels of student engagement and meaning making. This may take the form of discussion, student-generated questions, student-designed activities, and such. High levels of student engagement are the mark of student-driven instruction (Danielson, 2007; Sturgis & Patrick, 2010) that is indicative of CBI.

### **Teacher/School Control**

All of the models reviewed thus far depict shifted the source of instructional decision making from the teacher to the student. PSI (Keller, 1968) suggests that the teachers' role in instruction be limited to providing educational materials and analyzing assessment results for students' self-paced instructional decisions. Learning by mastery (Bloom, 1968) proposes that the teacher make instructional decisions based on student assessment results. These instructional decisions would be either enrichment or remediation depending on the students needs, but students would not progress until the class had reached mastery. SBG (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005) encourages teachers and students to make instructional decisions on using explicit assessments. Students have the same level of input in SBG as they do with learning by mastery, but may lack the autonomy for self-pacing afforded by PSI. From these strategies, we posit that successful implementation of CBI would result when teacher/school control was flexible enough to allow student autonomy while meeting the needs of local, state, and national standards. With CBI, teachers would provide guidance and instruction, while the school provides resources to allow students to explore instructional options.

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### **Indicators of Teacher/School Control within Competency-Based Instruction.**

Traditionally, teachers act semi-autonomously within their classrooms and within local, state, and national educational policy. In Kentucky, schools act autonomously within regulations of the state and local educational agencies. We propose that effective implementation of CBI occurs when teachers yield some control to the students in making educational decisions in the classroom and schools provide a structure that allows students to enrich desired academic areas once competency has been demonstrated. Indicators of this level of control would be clearly defined mastery and differentiated curricula.

As stated earlier, mastery can be a very ambiguous term. Literature suggests that teachers and schools work to clearly define standards for demonstrating mastery (Natiello, 1987; Smith, 1984). In a classroom and school that is implementing CBI effectively, one would expect to observe explicitly define standards for performance. These standards would reflect the needs of the content field while addressing local, state, and national standards. For example, one may observe:

Standard: *The learner will be able to create a research-based proposal for reducing the school's impact on the local ecosystem.*

instead of

Standard: *“evaluate or refine a technological solution that reduces impacts of human activities on natural systems”* (Next Generation Science Standards Lead States, 2013).

Because of clearly defined standards, one could expect to see that instruction would depend on the instructors' assessment of the students needs. There may be smaller content-specific assessments like observation or quizzes of content, but the student and the instructor would use these assessment results to design an instructional pathway for the student to meet the over arching standard (Guskey, 1987; Natiello, 1987).

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CBI differs from other frameworks in that students and teacher's collaborate to use authentic assessment results to design differentiated curricula. Differentiated curricula can mean that students utilize instructional methods in the classroom that are relevant to their academic strengths, but it also means that schools shift from a one-size-fits-all program model. At the classroom level, differentiated instruction could take forms of kinesthetic, auditory, or visual lessons/activities. At the school level, students may be able to bypass subjects in which they have already demonstrated competency. Most importantly, with CBI, a classroom or school curriculum affords students the opportunities to explore a subject beyond basic competency.

### **Role of Assessment in Competency-Based Instruction**

Assessment has become the norm in schools in light of high-stakes accountability (NCLB, 2001). Each model reviewed discusses the significance of assessment. Learning by mastery (Bloom, 1968) relies on teacher-made assessments to determine whether students receive enrichment or remediation. In PSI (Keller, 1968), assessments are used to point students in the appropriate instructional direction, either forward or backward in the curriculum. Assessment is the central feature of SBG (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005) in that students receive grade for demonstrating learning on specific standards instead of completion of non-standards-based work, like seat time or homework. Within CBI, the assessment serves as a goal, information tool, and the structural feature that distinguishes it from other models.

We consider the most significant characteristic that distinguishes CBI-based assessment from traditional models is that the former models focus 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

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each individual student to reach the common standards. These competencies can take on multiple forms in and outside of instructional settings, such as prior learning assessments, portfolios, or even job-experience (Anderson, n. d.; Newmann, King, & Carmichael, 2007; Center for Adult and Experiential Learning [CAEL], 2013).

**Indicators of Assessment in Competency-Based Instruction.** In this sense, competency assessments are ones that reflect realistic and authentic practices in order to provide the student with information to guide their learning. These may be formative or summative as determined by how the results are used by the student and instructor. One can expect to see assessments in any classroom. However, when CBI utilizes authentic, competency assessments, one can expect to observe several key components such as: performance assessments, multiple measure assessments, assessment feedback.

Performance assessments are tasks that authentically represent how content knowledge, skill, and applications converge to address a complex problem or need (Newman et al., 2007). Authentic performance assessments also allow for feedback and consultation while encouraging innovation (Wiggins, 1998). Performance assessment may be traditional pencil-paper tests, but would require that student apply content knowledge and skills in novel and complex situations. Common performance assessments may include—but are certainly not limited to—writing research paper on a student-choice issue or designing, conducting, and analyzing a scientific experiment.

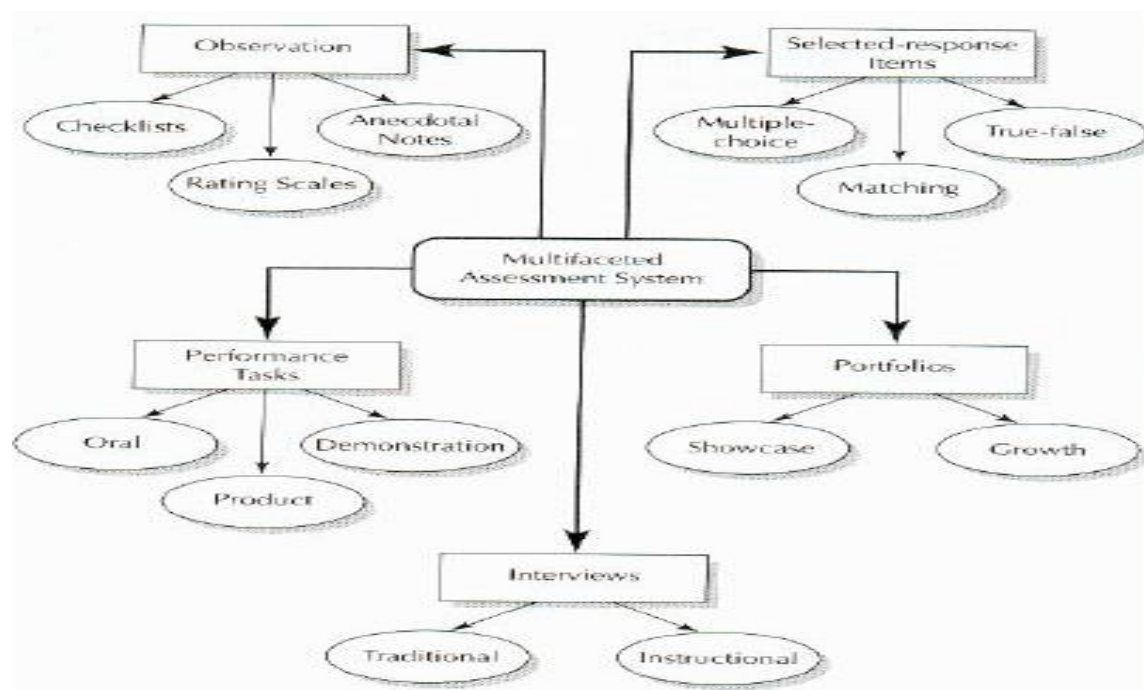
Multiple sources of evidence are encouraged in evaluating and supervising professional educators with aim of helping them demonstrate competency (Danielson, 2007; Marzano et al., 2011). CBI encourages the same use of multiple measures in helping students reach and demonstrate competency. One would expect to observe assessment that is a reflective, rather than summative, tool for students and teachers to evaluate progress (Gulikers, Basitanes, & Kirschner,

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2004; Guskey & Bailey, 2010; Marzano, 2010; Marzano et al., 2001; Sampson, 2004; Sturgis & Patrick, 2010). Various assessments *of* and *for* learning would be present in multiple forms. Figure 2 summarizes a multi-faceted system of assessments to ascertain competency (Kuhns, Johnson, Agruso, & Monrad, 2001, p. 157:

Figure 2

### *Multifaceted Assessment System*



Feedback and its use are critical to CBI. Feedback on assessments can be *of*, *for*, and *as* learning for the student and the teacher (Scarborough, 2007). Figure 3 summarizes these types of assessment:

Table 1

*Features of Assessments of, for, and as learning* (Scarborough, 2007, p. 219)

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

One would expect to observe students and teachers giving and receiving feedback on assessments in CBI. This may be represented as teachers discussing assessment results with students or students analyzing their own assessment results to focus their learning efforts purposefully.

### **Implication and Future Direction**

Kid•FRIENDLy (GRREC, 2012) proposes to address the instructional needs of student using CBI. Kid•FRIENDLy's framework for CBI has roots in learning by mastery (Bloom, 1968), PSI (Keller, 1968), and SBG (Guskey & Bailey, 2010; Marzano, 2010; Wiggins & McTighe, 2005). Each root provides structure for implementing, understanding, and indicating CBI. Table 2 summarizes these indicators.



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Table 2

### *Indicators of Competency-Based Instruction*

Contributing Theory	Indicators
Mastery learning	<ul style="list-style-type: none"> <li>• Criterion-referenced standards and additional time for students (Guskey, 1987)</li> </ul>
Personalized System of Instruction (PSI)	<ul style="list-style-type: none"> <li>• Differentiated curricula based on assessment results (Simpson, 1981)</li> <li>• Student choice in assignments (Schnackenberg &amp; Sullivan, 2000)</li> <li>• Positive student perception of learning (Hambleton, Foster, &amp; Richardson, 1998)</li> <li>• Student engagement and meaning making (Hambleton, Foster, and Richardson 1998)</li> </ul>
Standards-Based Learning/Grading (SBG/L)	<ul style="list-style-type: none"> <li>• Assessments influence instruction (Natiello, 1987)</li> <li>• Less variation in student achievement (Rosenholtz &amp; Rosenholtz, 1981)</li> <li>• Clearly defined standards (Natiello, 1987; Smith, 1984)</li> </ul>
Competency-based Instruction (CBI)	<ul style="list-style-type: none"> <li>• Do not grade all student work (Simpson, 1981)</li> <li>• Assessments are authentic to competency (Gulikers, Bastianes, &amp; Kirschner, 2004; Leung, 2002)</li> <li>• High levels of student engagement (Danielson, 2007; Sturgis &amp; Patrick, 2010)</li> <li>• Competency is determined by successful completion of multiple components (Buntat et al., 2013)</li> </ul>

CBI encourages instructors to look to the needs of each student and guide them to mastery. CBI also encourages that each student have the freedom to choose instructional methods suited to their needs and understanding, while being accountable through assessment. CBI also suggests that evaluation change from a summative number or letter grade into a meaningful and useable instructional tool. Discussion to this point has addressed the viable components of each evolutionary step towards CBI while providing an initial framework for evaluation of Kid•FRIENDLY's implementation of this paradigm-altering instructional strategy. One limitation that warrants further investigation is that there is not universally accepted definition of CBI. Our

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future efforts with Kid•FRIENDLy's conceptualization of CBI include design, implementation, and analysis of observational protocols, fidelity of implementation surveys, and analysis of student achievement in CBI classrooms.

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