

Analysis of Cognitive Diagnostic Assessment (CDA) in Differentiated Learning on English Subject Phase D

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ABSTRACT

This article presents a meticulous examination of Cognitive Diagnostic Assessment (CDA) in the context of Phase D differentiated learning, with a specific emphasis on English subjects. The study investigates the practice of diagnostic assessment in differentiated learning in Phase D English diagnostic courses and evaluate the challenges teachers face in implementing cognitive diagnostic assessment in differentiated learning. Through a qualitative inquiry, the research administered questioner and an interview by involving 3 (three) English teacher at the seventh-grade students as the techniques of collecting data, and further analyzed the data by conducting data coding, interpretation, and triangulation. The study concluded that the practice of CDA was based on their prior knowledge of the assessment, and their believe that cognitive diagnostic assessment needs to be conducted in the differentiated learning on English subject phase D. Further, the assessment is distributed by using rubrics and checklist diagnostic tools, and rely on observation method. The respondent believed that CDA strongly informs their differentiated instructional practice and see moderate impact on their instructional practice in conducting it, and they need support from the institution to strengthen their capability in conducting CDA. Related to the challenging of CDA, the most challenges aspects are in struggling with time limitations in implementing CDA, dealing with student reluctance or opposition, interpreting assessment outcomes, and training on cognitive diagnostic tools.

KEYWORDS

Cognitive Diagnostic Assessment; Differentiated Learning; English Learning; Phase D English Learning

INTRODUCTION

Education is one of the main elements in individual and societal development. The importance of quality education has received great attention from educational practitioners, researchers and policy makers. English has become one of the main focuses in the education curriculum in various countries, including Indonesia, as an international language that has a significant impact on global communication.

In an effort to improve the effectiveness of English language learning, the differentiated approach has emerged as an attractive alternative. This approach allows teachers to accommodate individual differences in the classroom, so that each student has an equal opportunity to learn in a way that suits their needs. Tomlinson, C.A (2000) explains the basic concept of the differentiated approach in education and how it can help address individual differences in the classroom. However, to effectively implement the differentiated approach, cognitive diagnostic assessment plays an important role. Teachers can identify students'

needs by conducting assessments in learning and the results can illustrate how cognitive diagnostic assessments can assist teachers in making such identification. (Popham, 2009).

Previous research has highlighted that cognitive diagnostic assessments have a positive impact on learning. Tare, M., & Strobel, J. (2013) in their research explored the influence of cognitive diagnostic assessments in mathematics learning and provided relevant insights related to diagnostic assessments, while Guskey, T. R. (2015) successfully outlined successful teacher practices in implementing cognitive diagnostic assessments and differentiated approaches to learning. Darling-Hammond, L. (2020) in her book "The Flat World and Education: How America's Commitment to Equity Will Determine Our Future" describes the importance of equity-focused education and how cognitive diagnostic assessments can help achieve this goal.

Moreover, in the pursuit of fostering individualized and effective learning experiences, the realm of differentiated instruction has emerged as a cornerstone of contemporary education. Within this pedagogical framework, Phase D represents a critical juncture where the complexity of student needs and instructional tailoring reaches its zenith. This article endeavors to scrutinize the landscape of diagnostic assessment in the context of differentiated learning, with a specific focus on Phase D English courses. The primary objectives are to investigate the practices of CDA within the Phase D English curriculum and to identify the challenges encountered by educators in implementing these assessments.

The exploration is driven by the recognition that understanding and addressing individual cognitive needs is paramount in optimizing differentiated learning experiences. By delving into the practicalities and impediments faced by educators in implementing cognitive diagnostic assessments, it aims to shed light on the efficacy of these assessments in tailoring instructional strategies. This investigation not only seeks to contribute valuable insights to the academic community but also holds practical implications for educators navigating the complexities of Phase D differentiated instruction in the domain of English education.

Based on existing research and literature, it appears that cognitive diagnostic assessments can help improve the effectiveness of differentiated learning in English language subjects in Phase D. Therefore, further research on the analysis of cognitive diagnostic assessments in this context is highly relevant and necessary to understand the role, benefits and challenges associated with them.

RESEARCH METHODS

Research Design

This study employed a descriptive qualitative approach. The essence of this methodology is to comprehensively depict and narrate the practices of CDA within the Phase D English curriculum and to identify the challenges encountered by educators in implementing CDA. Moreover, the descriptive qualitative design is best suited to explore and detail the practice and challenges faced by teachers in a differentiated learning.

Research Participants

The participants of this study are English teachers from Junior High School at Kisaran City, Kab. Asahan. They are teachers from Sekolah Penggerak which already have implemented the Merdeka Curriculum at the school, and conducted CDA at their class. The number of participants is three (3) persons, and already being administrated in an CDA workshop during the program of Sekolah Penggerak.

Research Instruments

This study used a set of questionnaires containing 10 questions which are aimed to investigate the practice of CDA in differentiated English learning in Phase D, and to identify the challenges that the teachers face in implementing CDA in differentiated learning. The questionnaire was used by utilizing the online google form facility, and had been constructed and prepared based on the constructs to be measured, so they have been developed and are valid. In addition to questionnaires, interview technique was also used to collect data to support this study which conducted by virtual meeting as the triangulation data. In addition, data collection was also carried out by reviewing documentation related to curriculum studies like lesson plans, syllabus, and learning outcomes of English subject at phase D (seventh-grade), and also the strategy used by teachers in conducting CDA.

RESULTS AND DISCUSSION

In this study, data analysis was carried out by a questionnaire containing 10 questions which are aimed to investigate the practice of CDA in differentiated English learning in Phase D, and to identify the challenges that the teachers face in implementing cognitive diagnostic assessment in differentiated learning. The questionnaire was used by utilizing the online google form facility. In addition to questionnaires, interview techniques were also used to collect data to support this research which conducted by virtual meeting.

In addition to using data obtained through respondents, data collection is also carried out by reviewing documentation related to curriculum studies related to lesson plans, syllabus, and learning outcomes. From the acquisition of this documentary data, it can be found the number of credits for the diagnostic assessment, types of the assessment materials arranged by English teachers, the learning outcome for English subject at phase D (seventh-grade), and also the strategy used by teachers in conducting the CDA.

The data collected to be used as the basis information about the practice of cognitive diagnostic assessment conducted by the respondents begins with the conforming to them related to their prior knowledge of the assessment and also their opinion about the important of this kind of assessment to be conducted in their class. As the collected, all respondents give respond that they all know about cognitive diagnostic assessment and think that it is necessary to be conducted in a differentiated English learning subject.

According to the data collected, all respondents' responds can be seen in the following table:

Table 1. Respondents' Perspective on CDA

Questions	Responses		Frequency
	Yes	No	
Do you know about cognitive diagnostic assessment?	3	-	3
In your opinion, is cognitive diagnostic is necessary to be conducted in a differentiated English learning subject?	3	0	3

The next questions relate to the topic of the frequency of the assessment being conducted, the purpose of the assessment, how do they plan the assessment, how do they measure the assessment to get the score, how do they use the score in arranging their teaching and learning activities, what media they use (if any), and how do they provide feedbacks of their assessment. These points are necessary in order to confirm that respondents realize that

cognitive diagnostic assessment can help teachers in arranging their teaching and learning activities in the class with the focus is on the students' need (student-centered learning) (Reeve, J., (2002)).

The detail information related to the above topics can be seen in the following figure.

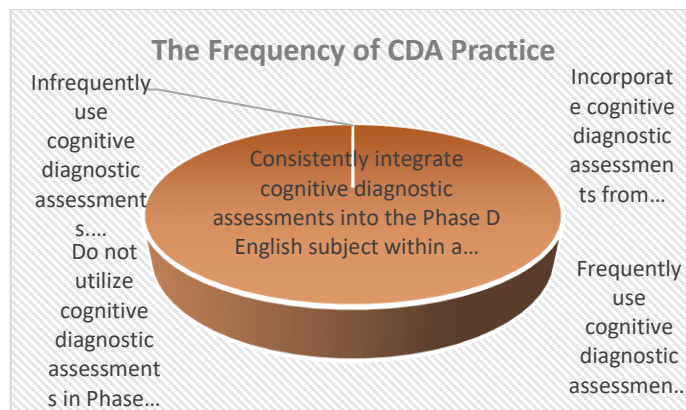


Figure 1. The Frequency of Cognitive Diagnostic Assessment Practice

From figure 1, it can be seen that major respondents indicate that they consistently integrate cognitive diagnostic assessments into the Phase D English subject within a differentiated learning, and no one of them never conducted cognitive diagnostic assessment in teaching English in the class.

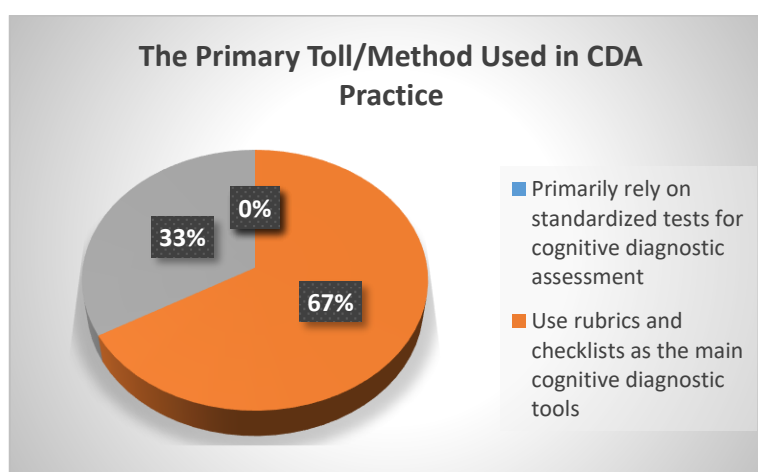


Figure 2. The Primary Toll/Method Used in Cognitive Diagnostic Assessment Practice

Further, related to the toll/method used in the cognitive diagnostic assessment practice, 67% of the respondents use rubrics and checklists as the main cognitive diagnostic tools, while 33% of the respondent rely on observational methods for cognitive diagnosis. This fact also shows that there is still no respondent rely on standardized tests for cognitive diagnostic assessment.

Related to the effectiveness of the informing instruction in CDA practice, 2 (two) respondents (67%) believe that cognitive diagnostic assessments strongly inform their differentiated instructional practices, while there is one respondent (33%) sees it as a moderate impact on instructional practices from cognitive diagnostic assessments, and no one of the respondents express a neutral stance on the impact of cognitive diagnostic assessments, believe cognitive diagnostic assessments have a minor impact, and perceive

little to no impact on instructional practices.

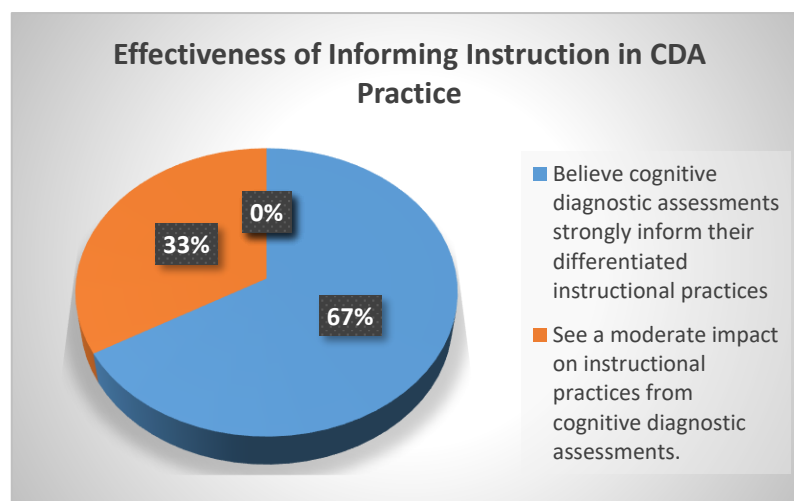


Figure 3. Effectiveness of Informing Instruction in CDA Practice

The practice of CDA is really needed to be supported by the institution, in this case, the school board or management. This is in order to take a guaranty that the implementation of this practice will be a life-longing activity. The respondents believe that the support can be in various form. The data related to this item is illustrated in the following figure.

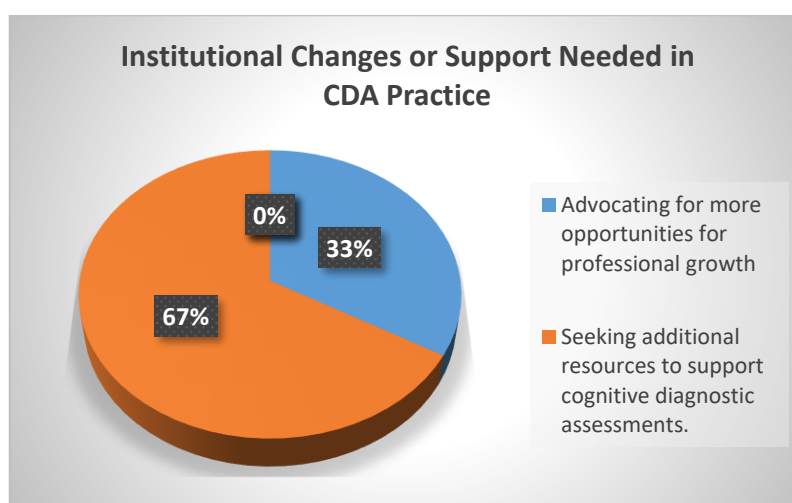


Figure 4. Institutional Changes or Support Needed in CDA Practice

Based on the above figure, it can be seen that the respondents perform a personal awareness in cognitive diagnostic assessment practice by seeking additional resources to support cognitive diagnostic assessments (2 respondents (67%) indicate this point), while other respondent (1 respondent (33%)) thought that it is the institution that have to advocate for more opportunities for professional growth.

Next, the data collected illustrated the challenges that the respondents faced during the implementation of CDA in a differentiated English learning class at phase D. based from the data collected, it describes that the challenges in implemented CDA in a differentiated English learning at phase D arranged from 1 – 5 criteria ad being described in the following table.

Tabel 2. Challenges in Implementation CDA in Differentiated Learning

Respondents	Challenges Categories				
	Facing challenges due to resource constraints.	Struggling with time limitations in implementing cognitive diagnostic assessments.	Dealing with student reluctance or opposition.	Facing challenges due to insufficient training on cognitive diagnostic tools.	Finding it challenging to interpret assessment outcomes.
R1	-	√	√	-	√
R2	-	√	√	√	√
R3	-	√	√	-	√

From table 2 above, it can be seen that according to the majority of respondents, the most challenges aspects in practicing cognitive diagnostic assessment in differentiated English learning subject is struggling with time limitations in implementing cognitive diagnostic assessments, dealing with student reluctance or opposition, then finding it challenging to interpret assessment outcomes. Then, another challenge aspects are that facing challenges due to insufficient training on cognitive diagnostic tools, and no respondents face challenging due to resource constraints.

The Practice of CDA in Differentiated English Learning Phase D

In the dynamic landscape of educational methodologies, the implementation of cognitive diagnostic assessment within differentiated learning environments has emerged as a pivotal area of investigation, particularly in the realm of Phase D English subject. Recent literature underscores the importance of cognitive diagnostic assessments in informing differentiated instructional practices (Von Davier et al., 2021; Yang et al., 2020). Phase D English courses, positioned at an advanced stage of education, demand a nuanced understanding of students' cognitive processes and learning needs. The adoption of differentiated learning approaches, tailored to individual students' strengths and weaknesses, becomes imperative for effective pedagogical outcomes. Within this framework, cognitive diagnostic assessments serve as valuable tools, offering insights into students' cognitive abilities, skill acquisition, and areas for improvement. The new era of Merdeka curriculum recently becomes most popular topic to be discussed among educators. The Merdeka Curriculum, with its emphasis on fostering independent and critical thinking, places Phase D English courses at the forefront of advanced education. Within this curriculum, the integration of cognitive diagnostic assessment becomes integral to tailoring instructional strategies to individual students' needs, aligning with the overarching goal of nurturing well-rounded and autonomous learners

Based on data in this study, the practice of the cognitive diagnostic assessment of English subject at phase D in the differentiated learning are presented from the teachers' perspective of cognitive diagnostic assessment. Then, the data was collected to give an insight of how the practice of cognitive diagnostic assessment in differentiated learning. Based on the data, respondents are all already have prior knowledge about the cognitive diagnostic assessment and consider that it is necessary to be conducted in a differentiated English learning subject. It is in accordance to the point that in transformative assessment, cognitive diagnostic assessment plays a key role in advancing student learning. Popham, W. J., (2008). Furthermore, Black, P., & Wiliam, D. (2009) in their research states that cognitive diagnostic assessment can serve as a formative tool that helps students and teachers

in understanding students' level of understanding in depth. So far, the cognitive diagnostic assessment had been integrated the Phase D English subject within a differentiated learning.

In the practice activity of the cognitive diagnostic assessment, tool or method is used. The tool or method that is used is rubrics and checklist as the main cognitive diagnostic tools, and it also rely on the observation method. Teachers, indeed, should provide practical strategies, method, or even tool that suit the needs of the students, such as the use of differentiated tasks, appropriate assessment, and flexible groupings. (Tomlinson, C. A., (2017)). Besides the tool or method used in administrated cognitive diagnostic assessment, another important aspect of it is that the effectiveness of Informing Instruction in cognitive diagnostic assessment practice. Based on the collected data, believing cognitive diagnostic assessments strongly inform respondents differentiated instructional practices, and they also see a moderate impact on instructional practices from cognitive diagnostic assessments. This fact also gives another insight that an effective assessment will lead to a fair assessment. Fair assessment is characterized by considering students' need, abilities and interest carried out with concrete strategies on how to conduct relevant and meaningful assessments in the context of differentiated learning. Grading that carries the meaning of fairness can create inclusive learning as a practical solution to achieve more relevant and fair assessment in differentiated learning. (Wormeli, R. (2017)),

As a professional, in conducting a readable cognitive diagnostic assessment, respondent show an awareness to advocate themselves for more opportunities for professional growth, and seeking additional resources to support the practice of the cognitive diagnostic assessment.

Teachers' Challenges in Implementing CDA in Differentiated English Learning Phase D

The next research problem relates to the teachers' challenges in implementing cognitive diagnostic assessment in differentiated learning based on the data obtained is illustrated in five categories, they are: 1) Facing challenges due to resource constraints, 2) Struggling with time limitations in implementing cognitive diagnostic assessments, 3) Dealing with student reluctance or opposition, 4) Facing challenges due to insufficient training on cognitive diagnostic tools, and 5) Finding it challenging to interpret assessment outcomes. Based on these categories, respondents do not face challenging due to resource constrain, and only one respondent face challenging due to insufficient training on cognitive diagnostic tools. Most respondents agree that they face challenges in term to time limitation in implementing cognitive diagnostic assessment, students' reluctance or opposition, and to interpret assessment outcomes.

In time limitation, teachers often find themselves navigating a delicate balance between adhering to curriculum requirements and dedicating sufficient time to comprehensive cognitive diagnostic assessments. Further, related to Merdeka Curriculum, time limitations within the structured Phase D English curriculum pose a substantial challenge (Wang et al., 2020). The element of time constraint in the implementation of cognitive diagnostic assessment within differentiated learning for Phase D English subject is a crucial aspect that necessitates a nuanced exploration. As teachers strive to integrate these assessments seamlessly into their teaching practices, various temporal challenges emerge, influencing the effectiveness and depth of the assessment process. Some point affects the time limitation can be related to:

a. Balancing Curriculum Requirements:

One of the primary time-related challenges revolves around the delicate balance between meeting the requirements of the structured Phase D English curriculum and dedicating ample time to comprehensive cognitive diagnostic assessments. Educators often find themselves in a conundrum, needing to cover mandated content while ensuring sufficient time for personalized assessments (Wang et al., 2020).

b. **Comprehensive Assessment Protocols:**

The depth and comprehensiveness of cognitive diagnostic assessments demand a substantial investment of time. Teachers need to administer, analyze, and interpret assessments thoroughly to derive meaningful insights into students' cognitive processes. This process-oriented approach requires a careful allocation of time resources, which can be constrained within the constraints of a standard academic calendar (Chen et al., 2022).

c. **Integration with Instructional Time:**

The actual integration of cognitive diagnostic assessments into the instructional time poses a logistical challenge. Educators must navigate how these assessments fit into the broader curriculum without causing disruptions or encroaching upon precious instructional hours. This challenge is accentuated in Phase D English, where the curriculum demands a balance between theoretical concepts and practical language application (Brown & Lee, 2021).

d. **Feedback and Follow-Up:**

The time required for providing timely and constructive feedback to students based on cognitive diagnostic assessments is another critical consideration. Effective feedback is pivotal for the success of differentiated learning, but educators may face challenges in delivering timely responses given the constraints of a packed academic schedule (Yang et al., 2020).

e. **Professional Development Time:**

Teachers often express the need for ongoing professional development to enhance their skills in implementing cognitive diagnostic assessments. However, carving out time for training sessions, workshops, or collaborative learning opportunities within the academic calendar can be challenging (Li & Ni, 2021).

Another challenge face by the respondents is students' reluctance or opposition. The resistance encountered from students constitutes a noteworthy dimension in the data analysis of challenges faced by respondents when implementing cognitive diagnostic assessments within differentiated learning for Phase D English courses. This aspect delves into the attitudes, perceptions, and apprehensions exhibited by students, which can significantly impact the effectiveness of the assessment process. The other most challenging aspect is to interpret assessment outcomes. The interpretation of assessment outcomes constitutes a pivotal aspect in the data analysis of challenges faced by the respondents when implementing cognitive diagnostic assessments within differentiated learning for Phase D English subject. Some of them are:

a. **Navigating Cognitive Domains:**

Teachers often grapple with the intricate task of interpreting assessment outcomes across various cognitive domains. This includes understanding the interplay of skills such as critical thinking, language proficiency, and analytical reasoning. Navigating these diverse cognitive areas and deriving cohesive insights represents a challenge in cognitive diagnostic assessment (Von Davier et al., 2021).

b. **Personalized Learning Profiles:**

The challenge lies in creating personalized learning profiles for each student based on assessment outcomes. Teachers must discern the individual strengths and weaknesses

within the cognitive landscape, tailoring instructional strategies to address specific needs while capitalizing on existing competencies (Yang et al., 2020).

c. Alignment with Differentiated Strategies:

Effective alignment of assessment outcomes with differentiated instructional strategies is a nuanced challenge. Educators must discern how the identified cognitive needs correspond with available teaching methodologies. This requires a thoughtful approach to ensure that interventions are not only personalized but also practical within the classroom setting (Chen et al., 2022).

d. Integration with Merdeka Curriculum Goals:

Ensuring seamless integration of cognitive diagnostic outcomes with the broader goals of the Merdeka Curriculum presents a complex task. Teachers need to identify synergies between individual learning needs and the overarching curriculum objectives, crafting instructional plans that simultaneously address both personalized and collective educational aims (Brown & Jones, 2021).

e. Communicating Results Effectively:

Communicating assessment results to students in an understandable and motivating manner is a nuanced challenge. Teachers must strike a balance between transparency and encouragement, avoiding potential demotivation stemming from overly detailed feedback on areas of weakness (Smith et al., 2022).

CONCLUSION

Based on the results of the discussion conducted from the data been collected, it can be concluded that the practice of cognitive diagnostic assessment in differentiated learning on English subject phase D indicated that the practice conducted by the respondents are depend on their prior knowledge of the assessment, and their believe that cognitive diagnostic assessment needs to be conducted in the differentiated learning on English subject phase D. Further, the assessment is distributed by using rubrics and checklist diagnostic tools, and rely on observation method. The respondent believe that this assessment strongly informs their differentiated instructional practice and see moderate impact on their instructional practice in conducting the assessment, and they need support from the institution (their school boar and committee) to strengthen their capability in conducting the test.

Related to the challenging situation faced by the respondents, the most challenges aspects in practicing cognitive diagnostic assessment in differentiated English learning subject are in struggling with time limitations in implementing cognitive diagnostic assessments, dealing with student reluctance or opposition, then finding it challenging to interpret assessment outcomes. Then, another challenge aspects are that facing challenges due to insufficient training on cognitive diagnostic tools, and no respondents face challenging due to resource constraints.

Furthermore, based on the finding that have been obtained, it showed that the need of cognitive diagnostic assessment will be much greater in the future time. Challenging during the activities should try to be solved to find out the sustainable formula in conducting cognitive diagnostic assessment, particularly in the differentiated learning on English subject in phase D.

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