Saudi Arabian Science Teachers and Formative Assessment in the Gender Segregated Male School System

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SAUDI ARABIAN SCIENCE TEACHERS AND FORMATIVE ASSESSMENT IN THE GENDER SEGREGATED MALE SCHOOL SYSTEM

by

Khalid Abdullah Kariri

A dissertation submitted to the Graduate College in partial fulfillment of the requirements for the degree of Doctor of Philosophy
Mallinson Institute for Science Education
Western Michigan University
April 2020

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SAUDI ARABIAN SCIENCE TEACHERS AND FORMATIVE ASSESSMENT 
IN THE GENDER SEGREGATED MALE SCHOOL SYSTEM

Khalid Abdullah Kariri, Ph.D.
Western Michigan University, 2020

Formative assessment is a key pedagogical tool that allows teachers to make instructional assessments in real time for the improvement of student learning. It gives students the opportunity to provide evidence of their learning thus giving teachers assurances that their hard work is not in vain. Formative assessment is commonly practiced in Western schools, while most Saudi science classroom teachers rely on end-of-unit summative assessment. A review of the literature reveals that very little research has been done related to Saudi teachers’ use of formative assessment in science classrooms. The goal of this dissertation was to address this absence of research by investigating Saudi Arabian science teachers’ thoughts about using formative assessment, and thus to better assess the readiness of Saudi science teachers to adopt formative assessment practices. The research methodology involved onsite interviews using a convenience sample of Saudi high school science teachers. Vignettes of classroom teachers using formative assessment methods were shown to the teachers, and they were asked as to whether they had or would use these methods in their own classrooms. Results showed that only three of eleven teachers had applied these methods in their classrooms. The conclusion was that much more needs to be done to prepare teachers to use formative assessment methodology.
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Khalid Abdullah Kariri
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CHAPTER 1

INTRODUCTION

Formative assessment is a pedagogical process that can occur throughout a class or course. Hattie (2012) speaks of formative evaluation as an activity that is used as an assessment of learning progress before or during the learning process itself. It is an instructional approach that supports specific student needs with the goal of improving student learning objectives (Theall & Franklin, 2010).

The concept of formative assessment hinges on the term “assessment” and its place in instruction. Assessment is a tool that links teaching and learning. While assessment can take many forms, many educators consider assessment to be the tool that is used to evaluate what has been learned in a lesson or a series of lessons. Wiliam (2010) insists that assessment “is a central and perhaps even a defining feature of effective instruction: Assessment is the only way that we can know whether what has been taught has been learned” (p. 18). This type of assessment is often called summative assessment or evaluative assessment to differentiate it from formative assessment, which refers to assessment that occurs during the process of education.

Theall and Franklin (2010) and Hattie (2012) use the term formative assessment to consider the type of assessment they are discussing, while other authors use the term “assessment for learning” instead of formative assessment because they feel the term “formative” is open to interpretation (Broadfoot et al., 1999). Black, Harrison, Lee, Marshall, and Wiliam (2004) distinguish between the differing forms of assessment thus:
Assessment for learning is any assessment for which the first priority in its design and practice is to serve the purpose of promoting students' learning. It thus differs from assessment designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence. An assessment activity can help learning if it provides information that teachers and their students can use as feedback in assessing themselves and one another and in modifying the teaching and learning activities in which they are engaged. Such assessment becomes "formative assessment" when the evidence is actually used to adapt the teaching work to meet learning needs. (p. 10)

For Black and Wiliam (2009), the goal of formative assessment is for students to be engaged in their own learning to the extent that there is a learning discourse between peers. What makes an assessment “formative” is not the design of a test, technique, or self-evaluation, per se, but the way it is used—i.e., to inform in-process teaching and learning modifications. Black and Wiliam (1998b) believe that the key word in the understanding of assessment is feedback.

Wiliam (2010) provides statistics regarding the effect sizes of learning gains in classrooms that use formative assessment. However, he is quick to add that the closer the assessment is to the “enactment of the curriculum” (p. 22), the greater the impact and the effect size. Wiliam also asserts that the use of formative assessment may be more cost effective and have a greater effect than other forms of assessment.

1.1 Problem Statement

As an educator from Saudi Arabia, I found many differences between the way the same science topic is taught in Saudi Arabia and in the United States. Saudi Arabian science educators, for the most part, stick completely with the written curriculum, which includes little time or opportunity for anything other than lecture, laboratories, and exams. A Saudi teacher spends little or no time seeking an insight into what the students understood prior to the day’s lesson, no chance to ask questions or to engage in discussions of the potential impact of the lesson, and little chance to help lagging students be brought up to speed on what the lesson, or indeed the
course, is about through individual or class interaction. Contrast that with the interactive nature of most American science classrooms with their lively discussions, quick clicker pre-and-post quizzes, and teacher-led formative collaborations to help students understand what they already know and what they want to know. My personal desire to use formative assessment as a classroom teaching technique led me to explore the topic further, use it as the theme of my dissertation study, and prepare to integrate it into the classrooms of Saudi Arabia.

While some Saudi Arabian education diploma programs include instruction on formative assessment, formative assessment is not part of a uniform teacher education curriculum. Moreover, there is little research into Saudi science teachers’ use of formative assessment or even their knowledge and understanding of formative assessment and its benefits. Seeking to redress this research gap, this dissertation explores Saudi Arabian science teachers’ attitudes toward formative assessment, their use of formative assessment, and their self-reported challenges when attempting to integrate formative assessment into their science classrooms.

1.2 Theoretical Framework

The primary theoretical framework for this study comes from Black and Wiliam’s work on formative assessment. According to Black and Wiliam (2009), formative assessment has five major components: "to clarify and share learning intentions and criteria for success; to engineer effective classroom discussions and other learning tasks that elicit evidence of student understanding; to provide feedback that moves learners forward; to activate students as instructional resources for one another; and activate students as the owners of their own learning" (p. 8). Black and Wiliam developed a theoretical framework for formative assessment
based on these concepts. Their framework serves to clarify the complexity of the educational practice of formative assessment.

1.3 Significance

Findings from this study can potentially help teacher educators improve their work with both preservice and inservice science teachers and inform future research efforts for improving teacher use of formative assessment in science classrooms throughout Saudi Arabia. Furthermore, these results may be applicable to countries of the Gulf Cooperation Council: Saudi Arabia, Kuwait, Bahrain, Oman, Qatar, and the United Arab Emirates. These countries share the same language, environment, culture, and faith and have similar science curricula.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This literature review is driven by the interest in formative assessment in science education in high schools in Saudi Arabia. Formative assessment is an educational process that links teaching and learning. It is the tool that allows students to provide evidence of their learning while assuring teachers that their hard work is not in vain (Wiliam, 2014). Formative assessment helps students and teachers by providing feedback on how to improve student performance with respect to instructional goals; that is, to close the gap between what the learner already knows and the instructional objectives. Formative assessment can be distinguished from summative assessment, as defined by Hattie (2012). Often associated with final exams or standardized testing, summative assessment refers to what has been learned at the end of a class. Thus, in order to investigate issues in formative assessment in science education in Saudi Arabia, there are three relevant literature domains to explore: the literature on formative assessment; teacher development; and Saudi Arabian policy about teaching and assessment.
2.2 First Domain: The Literature on Formative Assessment

Formative assessment is a pedagogical process that occurs *throughout* a class or course (Theall & Franklin, 2010). It refers to tools that identify misconceptions, struggles, and learning gaps. It seeks to close those learning gaps through steps taken by teachers in classroom instruction. Popham (2008) offers this definition:

> Formative assessment is a planned process in which assessment-elicited evidence of students’ status is used by teachers to adjust their ongoing instructional procedures or by students to adjust their current learning tactics. (Popham, 2008, p. 6)

Hattie (2012) speaks of formative evaluation as an activity that is used as an assessment of learning progress before or during the learning process itself. In other words, formative assessment, or formative “evaluation” in Hattie’s terminology, is not an activity that is used in isolation, but it is an ongoing activity during the coursework. “The general goal of formative assessment is to collect detailed information that can be used to improve instruction and student learning while it’s happening” (Great Schools Partnership, 2014, para. 2). It can involve an entire range of strategies that can be used *in-process* to evaluate student comprehension, learning
needs, and academic progress during a lesson, unit, or course. Formative assessment can occur when teaching the simplest concept to teaching the most complex.

Because of the complexity of the subject, it will serve the best interests of this project to offer definition of two other terms, assessment and summative assessment, both of which will be used throughout the paper in addition to the term formative assessment, which has just been defined.

2.2.1 Definition: Assessment

Scriven (1966) used the term “evaluation” and assessment to mean the same thing—the judgment of students’ work. Judgement can be justified “according to specific weighted set goals, yielding either comparative or numerical ratings” (Taras, 2005, p. 467). Two of the main assessment processes are summative assessment and formative assessment. As a side note, summative assessment and evaluation are often used to describe the same process. The process that is chosen determines what the goals, standards, and criteria will be related to its function (Scriven, 1966; Taras, 2005).

2.2.2 Definition: Summative Assessment

Hattie (2012) identifies summative assessment as the evaluation of what students know or have learned at the end of teaching. Garrison and Erlinghaus (2013) acknowledge that the term “summative assessment” is often associated with standardized tests, such as state assessments. They define summative assessment as an “accountability measure that is generally used as part of the grading process” (p. 1). It is a way to gage where a student is at a particular point in time in relationship to content standards.
2.2.3 Comparing Formative and Summative Assessment

Garrison and Erlinghaus (2013) believe that summative assessments happen “too far down the learning path” (p. 1) for teachers to make adjustments in instruction and learning process interventions. The key difference between formative and summative assessment has to do with the term “in-process.” Formative assessment happens before or during the lesson. Summative assessment is a culminating activity. Summative assessment, in the form of standardized tests, for example, cannot be used to modify lessons or teaching in ways that can better prepare students or better understand their needs. The Glossary of Educational Reform (Great Schools Partnership, 2014) emphasizes that formative assessment can be as simple as a few questions about student understanding, or it can be as complex as journal entries, essays, or worksheets. Summative assessment, on the other hand, is almost always formally graded and often “heavily weighted.”

The Yale Center for Teaching and Learning (n.d.) offers several examples that illustrate the difference between formative and summative assessment to help practitioners distinguish between the two concepts. Examples of formative assessment strategies include in-class discussions, clicker questions, group work with low stakes, weekly quizzes, one-minute reflection writing assignments, homework assignments, and surveys. Summative assessment strategies include instructor-created exams, standardized tests, final projects, final essays, final presentations, and final reports, all of which are followed by a final grade.

Harlen and James (1997) outline the differences between formative and summative assessment. Formative assessment characteristics include:

- Positive in intent
- Directed toward promoting learning
- Takes into account the progress of the individual
- Not purely criterion-referenced
- Seeks diagnostic information
- Validity and usefulness are paramount
- Pupils play a central role.

They contrast formative assessment with summative assessment thus:

- Takes place at intervals when achievement has to be reported.
- Relates to progression of learning against public criteria.
- Results for different pupils may be combined for various purposes because they are based on the same criteria.
- Requires methods that are reliable as possible without endangering validity.
- Involves quality assurance procedures.
- Based on evidence from a full range of performance relevant to the criteria being used (pp. 372-373).

Popham (2011) explains the rationale for using formative assessment in conjunction with the preparation for summative assessment.

In the waning hours of a planned instructional sequence, when a teacher wants to discover whether students have mastered the target curricular aim they have been working toward, that teacher may apply formative assessment for the purpose of last-chance instructional adjustments. Instructional time still remains, and if the assessment evidence suggests that students are not at mastery or close to it, the teacher can provide additional or different instruction designed to get students back on track before the unit’s scheduled conclusion—and before the unit’s summative assessment. (p. 18)

In the same way that formative assessment is used to prepare for summative assessment, the reverse is also true. Summative assessment can give teachers clues for the need for formative
assessment among students who had problems with parts of standardized exams or teacher-created quizzes or tests (Popham, 2011). Garrison and Erlinghaus (2013) assert that in a “balanced assessment system,” both summative and formative assessments are part of gathering information, and it is important to balance the use of both to understand student achievement (p. 1). Unfortunately, summative assessment happens at the end of the lesson or study or class, and most teachers are not afforded the luxury nor the time to go back and reteach what might not have gotten accomplished. Consequently, summative is more often a critique of the teacher’s teaching rather than the student’s learning.

Yin et al. (2008) looked specifically at the impact of summative and formative assessment on student achievement, motivation, and conceptual change. They suggest that summative assessment looks at a students’ rank in comparison with others as well as differentiates performance standards and relationships. They found in their research that when students look at their achievement in summative ways, they develop goal orientations that are ego based and often discouraging, choosing not to seek help because they are afraid that their questions will expose their ignorance. The summative assessments, themselves, engaged in superficial information, such as rote learning and the recall of isolated facts and details.

Formative assessment, on the other hand, is intended to improve student performance by improving motivation and closing the gap between where the students know now and what they are expected to grow to understand. Formative assessment concentrates on student learning, increasing confidence, and shaping self-efficacy so that students interest in learning improves (Yin et al., 2008).

The following section takes what has been learned about the types of assessment and looks at the research on formative assessment efficacy in particular, the focus of this dissertation.
2.2.4 Research on Effectiveness of Formative Assessment

According to Black and Wiliam (2009), formative assessment has five major components:

- to clarify and share learning intentions and criteria for success;
- to engineer effective classroom discussions and other learning tasks that elicit evidence of student understanding;
- to provide feedback that moves learners forward;
- to activate students as instructional resources for one another;
- and activate students as the owners of their own learning (p. 8).

Black and Wiliam developed a theoretical framework for formative assessment based on these concepts. Their research explored the past research on the topic, observed teachers using formative assessment, and made assumptions about the value of formative assessment as it creates a wide range of effective changes in the classroom. The authors speak of "moments of contingency" (p. 10). By this they mean the moments of learning, of clarity. Another aspect of that would be the "aha" moments, when instructional design, curriculum, and learning meet.

Hattie (2009) asserts that teaching involves deliberate interventions “to ensure that there is cognitive change in the student” (p. 23). He calls this “visible learning.” It is not enough that the teacher know that the subject has been covered, but that the student understands that he/she has learned something that can be carried on to the next lesson, thus maximizing future success. He concludes his discussion by asserting that visible learning, i.e. formative assessment, requires passion and innovation on the part of the teacher, and desire to learn on the part of the student.

Cauley and McMillan (2010) believe that formative assessment has a powerful impact on student motivation when the amount of performance-based evaluations and comparisons of student abilities are reduced. When teachers promote performance goals, they tend to make student evaluations public, compare achievement between students, and reward students who outperform others. With formative assessment, on the other hand, teachers who look for mastery
and goal orientation give students opportunities to improve, treat mistakes as part of the learning, vary their evaluation patterns, and make grading a private matter. Cauley and McMillan believe that when formative assessment is used appropriately, students become empowered to work toward individual goals, actively participate in their own education, and are provided with positive feedback that encourages growth and learning. Stiggins (2006) agrees with their analysis: “If assessments are to support improvements in student learning, their results must inform students how to do better next time” (p. 4).

All these aspects of formative assessment are summarized by Yin et al. (2008).

In sum, formative assessment is expected to encourage the motivational beliefs hypothesized to promote conceptual change, such as task goal orientation, incremental intelligence beliefs, self-efficacy, and interest. Meanwhile, formative assessment discourages the motivational beliefs hypothesized to prevent conceptual change, such as ego goal orientation and fixed intelligence beliefs. . . . the former motivational beliefs are called positive motivation and the latter are called negative motivation. (p. 340).

2.2.5 Results of Empirical Research

Black and Wiliam (1998a) reviewed more than 250 studies concerning formative assessment and reported gains of a half to a full standard deviation (Stiggins, 2006, p. 15). They also asserted that classroom formative assessment techniques, when appropriately used, found major gains for low achievers. These findings were affirmed by Rodriguez (2004) with reported gains of .5 to 1.8 standard deviation. Stiggins (2006) also reported similar results in their study of classroom assessment and reported gains in student test performance of one to two standard deviations. Results of Meisels et al. (2003) saw gains of .7 to 1.5 standard deviation.

Bennett (2011) asserts that many of these empirical studies used small samples and overstated the results. He references studies by Slavin (1987), and who believed that the mean effect size of formative assessment was .51, and 38 percent of the effects were negative. According to
Bennett, empirical research in formative assessment requires two arguments to prove its effectiveness. The first is a validity argument to support the quality of inferences about students and the adjustments to their instruction. Also needed is an efficacy argument which supports the impact of the inferences and adjustments. Bennett concludes that if the inferences about students resulting from formative assessment are wrong, the basis for adjusting instruction is wrong. If, on the other hand, the inferences are correct but instruction is adjusted inappropriately, learning is less likely to occur. (Bennett, 2011)

2.2.6 Gauging the Effectiveness of Formative Assessment

Stiggins (2006) suggests that the assessors, from the student to the district superintendent, need to have a clear sense of the information needs of the users in order to know what type of assessment should be conducted in order to gauge its effectiveness, whether it be to support the learning or to verify it. It is essential that the assessment show what decisions need to be made and by whom, as well as to discern what information will help all the stakeholders. When the decision making includes everyone, from the classroom to the program level, everyone benefits. At the classroom level, assessment is aimed toward success in the mastery of standards. It involves the individual learner and what he/she needs to do to perform better.

Stiggins outlines the process to be used for students, teachers, parents, building-level leaders as well district-level policy-makers. The process first asks the questions that each group needs to think about as they are gauging the effectiveness of their portion of the educational program. Stiggins is seeking a comprehensive analysis of the assessment—from its users to its uses. He divides his search into three categories: the important questions to be answered by the
assessment; the information needed to answer the questions; and the implications for the assessment system.

For example, students need to be able to answer the question, “What am I supposed to learn?” while their parents also want to know what their child is supposed to learn. Teachers are concerned about whether their students are progressing on important achievement standards, which of course is a question that the instructional support personnel and the district’s policy makers are concerned with as well. Building and district level personnel are concerned about the number of students meeting the standards, while the parents are primarily concerned about if their child is progressing adequately.

Stiggins (2006) and others, including Rodriguez (2004), Meisels et al. (2003) and Bennett (2010), believe that students and their teachers working as a team can provide the information necessary to move forward. As Stiggins (2006) notes, “the student’s role in an assessment for learning environment is to strive to understand what success looks like and to use each assessment to determine how to do better the next time” (p. 15).

2.2.7 Formative Assessment in the Science Classroom

Banilower, Pasley, and Weiss (2008) discuss the features of effective science instruction and suggested that in order for instruction to be effective, the teacher must elicit the student’s prior knowledge so that they can compare their ideas to those presented in class. The effectiveness of the instruction is directly correlated to the amount of time spent assessing student thinking and adjusting the instruction accordingly, which, of course, is the purpose of formative assessment. Adey and Shayer (1990) suggest that an important use of formative assessment strategies is to help students develop their conceptual understanding of science,
rather than the details of science. This concept will be explored further when looking at formative assessment in the Saudi Arabian science classroom.

Bell and Cowie (2001) researched formative assessment in science classrooms in New Zealand. Their interest was more detailed and specific than the theoretical approach of Black and Wiliam (2009). Bell and Cowie deal specifically with the process of formative assessment. They begin with Black and Wiliam’s assertion that their research “shows conclusively that formative assessment does improve learning. The gains in achievement appear to be quite considerable, and as noted earlier, amongst the largest ever reported for educational interventions” (Black and Wiliam, 1998b, p. 61). They then ask how the value of formative assessment shows up in a science classroom, specifically in science classrooms for students in grades 7-10, primarily with teachers who were already using forms of formative assessment in their classrooms, particularly those forms in which the teachers took into account student thinking.

The authors use this definition of formative assessment: “the process used by teachers and students to recognize and respond to student learning in order to enhance that learning, during the learning” (Cowie & Bell, 1996, p. 28). The authors were careful to separate the concept of formative assessment from the concept of “continuous summative assessment,” which some teachers took to mean formative assessment. With their definition in mind, the research had four key aims:

1. To investigate the nature and purpose of the assessment activities in some science classrooms.

2. To investigate the use of the assessment information by the teacher and the students to improve the students’ learning in science.
3. To investigate the teacher development of teachers with respect to classroom-based assessment, including formative assessment.

4. To develop a model to describe and explain the nature of the formative assessment process in science education.

The research took place in the classrooms of ten teachers (nine science teachers and one technology teacher). The methodology consisted of interviews with the teachers and select students at the beginning of the study. Then the classroom assessment activities—primarily the formative assessment activities—were documented in eight case studies through participant observation, field notes, documentary data, student books, wall displays, teacher plans, and teacher record books. Finally, teacher development activities were undertaken following the observations to reflect on the observation data and learn from it. These findings were collected by audio tape, surveys, and field notes.

At the beginning of the study, the teachers were unable to describe what they did in the classroom that could be called formative assessment. Thus, one of the researchers’ major findings was that there were two types of formative assessment used in classrooms: planned and interactive. For planned formative assessment, the teacher sets up the questions as a prepared oral test to be delivered prior to the lesson with student responses and discussion arising. Interactive formative assessment comes in the student interactions during the course of the lessons. One of the major strengths of the paper comes as teachers describe these interactions with students and how they handled them.

The main thrust of the paper lies in the nine characteristics of formative assessment that teachers developed as part of their teacher development activities following their science classroom observations. They included; responsiveness, the sources of evidence, the tacit
process, using professional knowledge and experiences, an integral part of teaching and learning, done by both teachers and students, the purposes for formative assessment, the contextualized nature of the process, and the dilemmas (p. 544). Each of these characteristics is discussed at length with examples and teacher comments helping to illustrate the characteristic. Any teacher reading these characteristics and examples can find a relationship to his/her own teaching as well as the strength for using the methodology in their classroom teaching. The authors closing remarks assert that formative assessment is a largely “tacit process made more visible and explicit for teachers wanting to improve their practice” (p. 552). This study is extremely valuable for classroom teachers as they seek to improve their classroom practices.

Treagust, Jacobowitz, Gallagher & Parker (2001) observed and examined the work of a middle school teacher over the period of three weeks. The topic was sound and the students were in grade 8. In their research, they use the term “embedded assessment” rather than formative assessment and define it thus:

   Embedded assessment is defined as an ongoing cyclical process which teachers can use to gather information about their students’ understanding and reasoning about any particular knowledge in science; make sense of that information; and use it to guide instructional decisions including making adjustments to teaching plans in response to the character of students’ conceptual understanding. (p. 139)

They particularly emphasize that the process is informal at the same time that it is well organized.

Using a case study method, the researchers observed and documented the work of one middle school teacher and how she used embedded assessment in her teaching about sound. The researchers used video to record the class sessions, and following the lessons, the teacher was interviewed regarding the methods she used to teach, how the assessment strategies were used in
the lessons, and how they contributed to, or distracted from, the learning of the science concepts. They discovered that

- the teacher provided a wide variety of activities, most of which had an assessment component integrated within them;
- the teacher used pretests to guide her teaching and instructional decisions;
- a wide range of writing tasks were integrated into each lesson as well as in a summative strategy;
- the teacher used oral questioning as an on-the-spot assessment tool;
- and the variety of techniques helped individual students respond to and benefit from different techniques in different ways. (p. 153)

The implications from the study are that it is possible to develop a culture in the school that allows for embedded assessment as a way to guide both the design and delivery of instruction. The teacher observed in this case study used a variety of techniques to assess her students. She said,

I assign grades based on the responses to the variety of activities we have in class, usually in written form after discussions, experiments, or other minds-on activities. Often, I will have students write responses to one or two questions twice per week. This allows me to mark them quickly for rapid feedback to students and to adjust my plans if misconceptions are evident (p. 155).

The final implication is that the development of students’ scientific understanding grows when the teacher is attuned to the student’s ideas and reasonings.

Another study with similar-aged students yielded different results. Yin et al. (2009) studied the effect of formative assessment in the science classrooms of twelve middle-school teachers. Their students were randomly assigned either to an experimental group (N=6) or a control group (N=6). The researchers hypothesized that formative assessment would have a beneficial impact on students’ science achievement and conceptual change through enhanced motivation. The experimental group were provided with embedded formative assessment, but what could not be controlled was the teacher impact on student motivation, achievement, and
conceptual change. The researchers found that the outcomes were not statistically significant, based in part on teacher classroom management styles and the degree to which the teachers used informal formative assessment.

In working with pre-service teachers, Buck, Trauth-Nare, and Kaftan (2009) found that their education courses did not prepare them to successfully utilize assessment to improve teaching and learning. These new teachers were entering classrooms unprepared to understand the pedagogical implications of their lack of preparedness. The researchers wondered if they conceptualized an elementary science methods course, would the pre-service teachers have a more informed understanding of formative assessment.

Pre-service teachers, in their field assignments, often struggle with what they have learned in class with their actual teaching assignments. The researchers hypothesized that cycles of planning, teaching, and reflection for these young teachers would help them improve both understanding and competence. The researchers devised an action research study involving elementary pre-service science education students who chose to take a course where the research team guided the entire methods course with formative assessment. Four days of lessons explicitly covered the use of formative assessment, but the entire course dealt with the five phases of student inquiry: engagement, exploration, explanation, elaboration, and evaluation (p. 407). Practically, all students in this course taught in an afterschool science program at a local school where they attempted to practice formative assessment in a non-threatening setting.

Post-course questionnaires showed that the young teachers’ ideas about teaching science had changed dramatically and many had a much better understanding of formative assessment as a process of gaining understanding. However more than half of the students still expressed the concept of formative assessment in terms of student content mastery—or ongoing summative
assessment. The researchers found that many of the pre-service teachers were unable to transfer the formative strategies of their coursework into their teaching strategies.

Formative assessment strategies that were most commonly used by these young teachers included student questioning, whole class and small group discussions, and observations of students. They did include journaling and graphic organizers in their teaching. What they did not do was to alter their established instructional plans when student misconceptions appeared. They might re-explain or lecture and assume that they had solved the misconception.

Buck, et al. found at the end of the course that most of the young teachers were able to understand and verbalize the need for formative assessment, but, in practice, many were unable to provide their students with ongoing feedback to actively involve the students in the learning process. The researchers found that while the field-based experience was a powerful approach to help new teachers develop practical procedures for their teaching, these experiences alone could not solve the problems of developing formative assessment skill. They recommend that teachers be given many more opportunities to work in the field, and allow them to reflect on their practice. This will enhance pre-service teachers’ capacity to learn from their own experience and the experiences of their fellow classmates.

2.2.8 Conclusions and Synthesis of the First Domain

The ways in which the concept of formative assessment has been defined have demonstrated that if formative assessment, as defined, is used in the classroom appropriately, several things can happen: student learning improves (Black & Wiliam, 2009; Popham, 2011); teachers have greater understanding of their students’ needs (Bell & Cowie, 2001); teachers can keep better track of the learning as it evolves (Hattie, 2012); and teachers and students can
embark on a personal journey of discovery and learning together (Hattie, 2009). Cauley and McMillan (2010) believe that formative assessment can have a powerful impact on student motivation when the barriers of performance-based assessments and the comparisons of student abilities are reduced. The authors also suggest that teachers can unknowingly reduce student motivation by communicating a lack of belief in their abilities when they say things that express pity or scorn after a failure or offer too much praise for a success. Teachers can also destroy the impact of formative assessment by offering unnecessary help to high-achieving students.

Stiggins (2006) and others sought to clarify the roles of all the parties in the assessment process, including students, teachers, and administrators. His tables regarding users and uses moved assessment from the abstract to the concrete. The role of the student to understand the learning and his/her role in the learning becomes much clearer through this research. Although much of the research in formative assessment is theoretical, anecdotal and observational in nature, Black and Wiliam (1998) reviewed many previous studies about formative assessment before making their own assertions about its effectiveness. Bennett (2010) believed that more empirical evidence is needed and emphasized that study size needed to be expanded as the practice of formative assessment is implemented further in the classroom.

The two major studies of formative assessment in science classrooms (Bell & Cowie (2001); Yin et al., (2009)) studied middle school students but found different results. The major results of both studies showed that individual teacher understandings, teacher training, and classroom management techniques make the greatest difference in the effectiveness of formative assessment in science classrooms. In other words, to ask teachers to use formative assessment in their classrooms will not, in itself, create the kind of change in student behavior the researchers seek.
Hattie (2009) speaks to the importance of teacher skill to understand the student and where he/she is in their learning and understanding. Teachers must have a grasp of student thinking beyond right or wrong answers, and develop a creative, flexible mind that is able to look beyond curriculum, lesson plans, and test preparation (Bell & Cowie, 2011). Nilsson (2013) found that teachers feel awkward using formative assessment and formative interaction in their classrooms. They become so involved in their own teaching that they forget to emphasize the learning of the students, their misunderstandings, and their prior knowledge. As noted by Bramwell-Lawlor and Rainford (2016), the challenge is that many teachers who would like to use formative assessment find themselves constrained by time management issues, standardized testing, and the vagaries of instructional theory influencing how they utilize formative assessment—or even if they use formative—assessment in their classrooms.

The major synthesis, then, of these studies is that formative assessment, in theory, is exactly what is missing in classrooms where summative assessment is the prevailing methodology of assessment. However, it may take more teacher training and teacher skill than simply looking for the “right” answer. What may be lacking from the above studies is definitive, statistical evidence of the effectiveness of assessment by moving instruction from summative to formative assessment in the classroom.

2.2.9 Limitations

There are two major limitations to the studies outlined in this section of the literature review. First, not many of the studies focus specifically on the use of formative assessment in science classrooms. Additionally, there were no studies available to be analyzed in Saudi Arabian classrooms, where summative assessment techniques prevail. With these understandings
in mind, the next section of the literature review will look at the practical ways in which formative assessment can and should be used in the classroom. It will also explore ways in which teachers can be trained to use formative assessment.

2.3 Second Domain: Teacher Development

This domain focuses on studies that introduce formative assessment through teacher development. The domain is primarily concerned with improving science teachers’ performance in general but especially in formative assessment. Also, I will look at studies that include teachers workshops or what makes for successes in teacher development. This domain would include any study that includes teachers development in formative assessment. This domain will exclude any study that is more than fifty years old, unless it has been cited more than a hundred times.

2.3.1 Introduction to Teacher Development

Hewson (2007) begins his article about teacher development in science by acknowledging that most teachers are going to be professionally involved across the span of an entire career and they need continual professional development as they refine their curriculum, instruction and assessment. Ultimately the goal is not just teacher expertise but student learning, and the connection between these activities should be foremost in the minds of teachers as they take responsibility for their own learning and the learning of their students.

In *Handbook of Research on Science Education*, Hewson (2007) references a three-year research project, the Learning in Science Project (Teacher Development) done by Bell and Gilbert (1996) in New Zealand in which the researchers interacted with 48 science teachers of both elementary and secondary schools. The teachers shared their experiences of implementing
new teaching activities that clearly understood students’ thinking. While the teachers soon realized that some of their practices were problematic, it became a long process to see how those practices could be modified or changed. Bell and Gilbert acknowledged that this crucial step had to happen before more productive teaching could occur. During the second phase of the study, teacher concerns arose regarding fear of losing control, covering the curriculum in anticipation of meeting assessments, and meeting the needs of administration and parents. As the teachers moved beyond these concerns, they found that their practice became more responsive and flexible. Finally, the study showed that as teachers grew to trust their own empowerment, they found they were able to communicate better with colleagues and contribute to other development opportunities as well as feel more confident in their classroom experiences.

Teacher’s practical knowledge in science was studied by Van Driel, Beijaard, and Verloop (2001). Practical knowledge, it was discovered, is essential to integrate experiential knowledge, formal knowledge and personal beliefs. The authors outline several studies in science education that affirm that a teacher’s practical knowledge may interfere with the implementation of innovations, such as new curriculum. Teachers may speak well of the innovation, but when back in their classrooms, they revert to their old ways of teaching. Teachers will need to restructure their knowledge and beliefs in ways that they can integrate the new information into their practical knowledge.

As the curriculum changes, intense professional development programs necessarily must include the investigation of the teachers’ practical knowledge and the teachers’ expertise. This can help to shift the focus of the reform and changes to make it more readily accepted and implemented.
Davis (2003) reaffirmed the results of Van Driel, Beijaard, and Verloop’s study with interviews and observations in a middle school. The study looked at how these teachers learned new practices related to an innovative science curriculum and how their implementation was impeded by antiquated structures, policies, and practices. These old structures restricted the development of teacher knowledge, but with regular and frequent opportunities for interactions with colleagues and an acknowledgement of the teacher’s practical knowledge, visible change could occur.

Even though teachers may have practical knowledge, Rosebury and Puttick (1998) looked at the way classroom teachers struggle to understand their individual student’s way of thinking and of putting their thinking into the context of whatever topic is being studied.

Teaching in the moment often has the feel of improvised, spontaneous action as the teacher takes immediate stock of the particular circumstances, including her understanding of the discipline under study, students’ utterances and actions, and her own emerging questions, confusion, and understandings. (p. 650)

In their case study, teachers were videotaped in their pre-teaching science education classes and then taped again in their experience teaching these same topics in their own classrooms. As they pondered out their own questions while learning the topic, teachers were gaining the sense-making skills to approach the topic in their classrooms. As the teachers gained confidence in their own understanding of science, they also were gaining confidence into ways to help their students understand science.

The results of Rosebury and Puttick’s (1998) study suggests that it is important for teachers to have opportunities to learn science by deeply engaging in science as a “sociocultural practice” (p. 674). Additionally, the study suggests that teachers need access to tools that help them think about their practice in light of the uncertainties of teaching. This would include deep
analysis of the classroom activity to understand student learning and their own teaching. Finally, when teachers have the opportunity to both learn and teach, everyone benefits.

Nilsson (2013) found that teacher education students feel awkward using formative assessment and formative interaction in their classrooms. As she observed intern teachers, Nilsson found that her students became so involved in their own teaching that they forget to emphasize student learning. Nilsson realized that in order for new teachers to understand how to use formative assessment in their classrooms, they needed to have experienced instruction where formative assessment was used. Therefore, she added obvious formative assessment techniques in her own classroom teaching. As they observed these formative assessment techniques, the prospective teachers looked critically at what they knew about science, about children, and about their own understanding about teaching. Nilsson (2013) sought to answer the research question: "How does formative assessment support teachers' professional learning of teaching science?" (p. 189).

Nilsson developed a template to help the students develop formative assessment skills. As the student teachers asked themselves these questions, they were formulating the formative assessment strategies they would use in the classroom.

- What do you intend students to learn about this idea?
- Why is it important for students to know this?
- What else do you know about this idea (that you do not intend students to know yet)?
- What difficulties/limitations are connected with teaching this idea?
- What is your knowledge about students' thinking of this idea?
- What other factors influence your teaching of this idea?
What teaching procedures will you use and what are the particular reasons for using those strategies to engage with this idea?

What specific ways do you have for ascertaining students' understanding or confusion?

When the students developed their lessons, they kept in mind the pedagogical content but they also kept in mind the formative assessment goals as well. By keeping formative assessment in the forefront of their minds, they were able to create complete lesson plans.

Recently, the Consortium for Policy Research in Education issued a report following a 2-year study in the School District of Philadelphia and Upper Darby, Pennsylvania. The study, by Supovitz, Ebby, Remilard, and Nathenson (2018) rigorously studied the impact of the Ongoing Assessment Project (OGAP) on teacher and student learning in third- through fifth-grade classrooms in Philadelphia-area classrooms. Sixty-one schools were involved in the project, which combined teacher formative assessment practices with understandings about student development and progression to build deeper student understanding of mathematical content. OGAP included teacher professional development, the creation of classroom resources, school-based routines for regular practice as well as school-based support. Thirty-one classrooms were randomly assigned to the OGAP regime while the other thirty classrooms served as the control sites.

The OGAP process included a summer teacher institute with follow-up education and visits throughout the school year. The training focused on developing teacher knowledge of specific mathematical topics. It also dealt with the current research about student thinking processes. The teachers were taught to measure two dimensions of student learning: accuracy, including whether the student answered the question correctly, and sophistication, which
assessed how advanced the approach was that the student used to solve the problem. Of course, the accuracy component was the summative assessment component while the sophistication was the formative assessment component. The researchers indicated that sophistication is an important indicator of the students’ conceptual understanding and preparation for more advanced mathematics.

The results of the two-year study showed “statistically significant impacts of OGAP on both teacher knowledge and student performance” (p. 8). The teachers in the study classrooms showed significantly higher capability to analyze their students’ thinking. They used student work samples and responses and thus were able to make better instructional decisions in their classroom teaching. Students in the study classrooms also significantly outperformed students in a set of comparison schools on both accuracy and sophistication. Consequently students in the study classrooms outperformed the control students significantly. The conclusion is that OGAP produced “statistically significant and educationally meaningful impacts on both teacher knowledge and student learning” (p. 8).

Briscoe (1991) offered a case study in classroom practice. She focused on a high school chemistry teacher who wished to move his practice from a teacher-centered one to a more student-centered practice. He found that he understood student work more as task completion than learning with understanding, which may be why his students did not perform well on formal assessments. Ultimately, the teacher discovered that his understandings of classroom management were inhibiting the students’ ability to get involved in the process of learning. He began to change his ideas about teaching science to include three concepts: teaching science is a process rather than a body of knowledge; curriculum needs to be relevant to the students; interaction with students does not include the teacher as the giver of knowledge.
2.3.2 Conclusions and Synthesis of the Second Domain

The literature in teacher development regarding the use of formative assessment continually emphasizes that the goal of all professional development—whether for preservice teachers or for teachers with many years of experience—should be two-fold: teacher expertise and student learning. Hewson (2007) acknowledges that it is essential that teachers learn to understand the way that students think; it is also essential that they change their practice to incorporate student thinking. Hewson also acknowledges that, for the teacher, this is a long process over the span of a career. Chief among his discoveries was that teachers fear losing control of the subject matter and the empirical knowledge they felt was necessary for their curriculum to be successful. Van Driel et al. (2001) concurred with these findings and added that curriculum changes causes significant anxiety on the part of the teachers. They assert that teachers must restructure knowledge and beliefs about teaching to accommodate to curriculum demands.

For teachers who know and understand the practical knowledge of the science curriculum, one of the major struggles is to reconcile the curriculum with the way their students think. This was explored by Rosebury and Puttick (1998) through case studies of teachers in various stages of their careers. They found that, in order to be effective in the science classroom, teachers needed to be continually learning. Their findings were affirmed by Nilsson (2013) as she used formative assessment in her own preservice teacher classroom as a way of introducing teachers to the practice.

The major takeaway from the studies emphasized in this domain is that for formative assessment to be an essential component in a science classroom, the teacher must move the focus of the classroom from a teacher-centered space to a student-centered space. Classroom
management (Briscoe, 1991) often inhibits students from being involved in their own learning. Major changes in classroom procedures can move student learning forward. As we move to look at the use of formative assessment in Saudi Arabian science classrooms, we must keep in mind the teacher-centered, curriculum-heavy nature of education in the Kingdom. Teacher education and teacher change will be important components of any use of formative assessment in Saudi classrooms.

### 2.3.3 Limitations

The major limitations of the second domain hinge on teacher practice more than the theory that surrounds effective classroom teaching and learning. Many teachers love to hear their own voices; they love knowledge and they love imparting knowledge. Their understanding of classroom management is as important as the knowledge they are imparting. The studies described in the second domain acknowledge that teachers struggle to make the changes they know are essential if they are to develop skill in making classrooms student centered. Implementation becomes a key factor, and the research described in domain two is lacking in techniques for implementation.

### 2.4 The Third Domain: Saudi Arabian Policy About Teaching and Assessment

This domain includes what Saudi Arabian policy says about teaching and assessment. I will review Saudi Arabia Ministry of Education documents about teaching and assessment. This domain would include any documents that focus on teaching and assessment. I will exclude the previous policies that have been amended or abolished by the Ministry of Education.
2.4.1 Reviewing of Ministry of Education Documents

2.4.1.1 Professional Standards for Teachers in Kingdom of Saudi Arabia (2016)

Teachers are the most important foundation for the development of the educational system in Saudi Arabia. They are the ones who are able to excel and build a world-class education system for Saudi Arabia. The following information comes from the Ministry of Education.

The quality of learning depends on the quality of teaching by sincere professional teachers, so joining the teaching profession requires high levels of specialized knowledge and skills, a high degree of commitment, passion and dedication to the profession. Success is defined as giving the confidence that the practitioner of the profession—the result of education and practical experience—possesses the unique knowledge and skills that can be employed to solve problems of practice. Evidence-based professional standards are used to denote the professionalism of teachers and to create a common language for teaching and professional activity.

Among the most important specifications upon which the professional standards of teachers in Saudi Arabia are based are the following:

a. Student Improvement: Focus on teachers' knowledge and practices that have the greatest impact on student outcomes.

b. High quality: inspirational and achievable professional standards.

c. Credibility: Standards accurately describe the work of teachers in Saudi Arabia.

d. Focus on development: Supporting development for all teachers.

e. Inclusiveness: Standards cover all phases of a teacher's career.
f. Focus on practice: Standards are built from profession, to profession.

Teachers are able to play this important role and achieve an ambitious vision to lead this nation through:

- Show respect, honesty and commitment to students.
- Ensure active involvement of students in the learning process.
- Respond to the needs of all students, and take into account their diverse backgrounds.
- Self-reflect on teaching practices, and commitment to continuing professional growth.
- Adhere to the ethics of the teaching profession, and positive professional behaviors.
- Enjoy self-motivation, and to contribute to the development of the educational process.

The commitment of teachers to apply professional standards in their various aspects of work will improve the educational outcomes of students; it also supports the ambitious vision to elevate the educational profession in Saudi Arabia to the ranks of developed countries in the field of education.

### 2.4.1.2 Professional Values and Responsibilities of Teachers

Teachers apply professional knowledge and scientific research on how students learn to improve learning and meet the needs of diverse students. Teachers also have a comprehensive knowledge of the physical, mental and emotional development of students, as well as knowledge of the social and economic backgrounds of students, and the impact of these characteristics and factors in learning. Teachers build their teaching based on their knowledge of previous students, and they use that experience to develop further educational experiences. Teachers also apply their knowledge of teaching and learning to organizing lesson content to support student
interaction in the learning process. They also demonstrate knowledge and understanding of the
content of the specialization they are studying, its practical applications, and employ their
understanding of effective teaching methods in the field of specialization to improve learning.
Teachers have knowledge of the curriculum, how to plan and organize lessons and units. They
demonstrate an understanding of how to evaluate and report on learning. They develop students' literacy and numeracy skills within the disciplines they teach.

2.4.1.3 Professional Practice of Teachers

Teachers have the ability to make education attractive, interactive and meaningful. They plan in a way that is appropriate to how students learn, based on curriculum requirements. Teachers also employ a range of effective teaching strategies and use learning resources to enhance education. They apply a range of differentiated teaching strategies to meet the individual needs of students. Teachers have high expectations for all learners using strategies that develop problem-solving skills and critical and creative thinking skills among students. They have the ability to innovate and maintain learning environments that are motivational, safe and manage the behavior of students with respect. Teachers also use communication skills and interact effectively with others to build and maintain positive relationships with students, parents, and colleagues. Teachers regularly evaluate their practice to ensure that they meet the students' educational needs. In addition to evaluating learners, interpreting student assessment data and using them to identify strengths and opportunities for improvement, guide future planning, and motivate students to improve their performance. Teachers provide regular, accurate and constructive feedback on student achievement and progress to improve their learning in the
future. They prepare clear reports for students and parents about student outcomes, accurate and reliable records staff.

2.4.2 How Science is Taught in Saudi Arabia

The following material comes from the teacher’s guidebook for first level physics instruction. This material comes from the Saudi Ministry of Education and addresses both the standards and the processes of teaching. It is provided to offer an understanding of where formative assessment might play a role in secondary science teaching in Saudi Arabia.

The science curriculum has been organized at the secondary level to cover the most basic concepts in science and to take care of the gradient in content delivery. The language of the book is easy and enjoyable, arousing the love of exploring students for more research and inquiry. The organization of the content was based on specific and comprehensive criteria supported by the results of a large number of educational research and studies. The most important characteristic of the content of science is the interest in scientific inquiry in learning, which is based on problem solving, which stems from the questions and queries it raises with the emphasis of cooperative learning strategy.

The teaching process is organized through an effective learning cycle that includes steps that focus, teach and evaluate. The teacher will find the instructions necessary to implement these steps effectively. This course includes activities that take into account achievement levels of high school levels. These activities are divided into steps of the education cycle. In the focus step, the teacher will find activities that relate to the students' previous knowledge about the subject of science. The teaching step includes guidelines for presenting concepts in content, including modeling, quick presentations, experiments, modeling, discussion and critical thinking,
and understanding common misconceptions, conceptual development, composite
comprehension, descriptive examples, and background theory about the content. In the
evaluation step, the teacher will find suggestions to investigate students understanding.

The teacher guidebook also proposes strategies and methods of teaching that help
teachers to diversify the learning according to the needs of different students, including helping
students with learning difficulties and provide answers to all questions and queries presented in
the student's book. This guidebook also includes the contents of the student's book arranged in a
way that makes it easy for the teacher to deal with each unit. There are a large number of
margins and guidance for the teacher that explains how the content is presented to students.

2.4.2.1 National Center for Assessment in Higher Education. (QIYAS). Science Teachers Test
Guide for applicants to QIYAS science teachers test:

The purpose of this guide: This guide is designed to help applicants to test teachers by
providing useful information about the content of the test, the aspects it covers, and how words
are treated in objective multiple choice questions.

Test content

The test covers the main areas of specialization of the science teacher, including:

1. The history and nature of science and the integration of science.
2. Experimentation, mathematical skills and data representation in science
3. Physics
4. Chemistry
5. Biology
7. Teaching Science

2.4.2.2 *Science Standards and Indicators*

Standard: 3. 5. 1: The teacher knows the nature of the science and the history of its development.

1. Know the most important scientific and scientific historical events that contributed to the development of science, and be able to analyze these events and clarify their impact.

2. Know the most prominent scientists who contributed to the development of science and the most important scientific and technical contributions they have made.

3. Explains the role of Islamic civilization - and other previous and subsequent civilizations - in the development of science, and provides examples of the most important contributions.

4. Explains the nature of science and explains its basic features, such as its adaptability, and its reliance on sensory evidence.

5. Explains the goals and characteristics of science and distinguishes between scientific and non-scientific questions.

6. Explains the relationship between science, society and technology, and provides examples illustrating the interrelations between them.

7. Differentiates between hypothesis, theory, law, truth and concept. Scientifically model and can provide examples to illustrate.

Standard: 3.5.2: The teacher is familiar with the concept of the scientific method, its principles, characteristics, methods, applications and ethics.
1. Understand the concept of the scientific method and the concepts associated with it and show the importance of its practice in gaining access to scientific knowledge.

2. Define a set of experimental and non-experimental scientific research methods practiced by scientists and determine their suitability for testing scientific hypothesis.

3. Apply experimental and non-experimental scientific research methods, and be able to identify, control and observe variables.

4. Use a variety of methods, tools and techniques appropriate for accessing, collecting, analyzing, reporting and communicating with others.

5. Uses measurement skills, and estimates the level of accuracy, control and error and its sources in the collection and recording of data.

6. Multiple sources are used to access scientific knowledge such as: books, specialized scientific journals, reliable websites, specialized scientific institutions and societies.

7. Know the ethics of scientific and research practices in science, and understand its regulations as issued in the Kingdom of Saudi Arabia.

Standard: 3. 5. 3 The teacher conducts practical experiments taking into account safety in the laboratory.

1. Lists the components of the laboratory and the rules of safety procedures and safety codes.

2. Assess the risks of the materials used in teaching and know how to use and store them.

3. Demonstrates first-aid procedures for injuries that may occur inside or outside the laboratory.
4. Identify the main materials, tools and devices used in the laboratory and how to use them safely.

Standard: 3.5.4: The teacher is familiar with mathematical skills and data representation.
1. Prepares and reads graphs and represents data.
2. Identify the units, their different systems, their uses and the conversion between them.

Standard: 3.5.5: The teacher knows the importance of the integration of science and its applications in life.
1. Explains the importance of integration between science.
2. The role of chemistry in the pharmaceutical, food and other industries.
3. Physical relationships are defined by medical, engineering and space research applications.
4. Demonstrates vital applications in various fields, such as agriculture, medicine and industry.

Standard: 3.5-6: The teacher explains the characteristics of the living creatures and their structural structure.
1. Understand the distinctive characteristics of living creatures.
2. Explain the main concepts of cellular structure: cell, protoplasm, tissue, etc.
3. Explain cellular theory, compare cell types, and show the functions of cell organelles.
4. Know the biological processes that take place in the cell, and explain the cellular division, its types and stages.
5. Identify living tissue, compare its types, determine its functions, and distinguish between their respective structures and the function they perform.
6. Understand the structural structure of the living creature's body and the mechanism of integration between its components.

Standard: 3: 5. 7: The teacher shows the basics and principles of biodiversity and classification of living creatures.

1. Understand the principles on which living creatures are categorized and classify them using the modern classification system.

2. Know the main kingdoms of living creatures, and determine their characteristics, and provides examples.

3. Describe the life cycles of some animals and plants.

4. Demonstrate the types of behavior in living creatures and provide examples of patterns of behavior of living creatures.

5. Demonstrates the concept of behavior in living creatures, mentions its types, and provides examples.

Standard: 3. 5. 8: The teacher describes the vital processes in living creatures.

1. Explains the composition of the various organs in the body of the living creature: - the human body, breathing, and periodic ...) and its importance, and the differences between, and mechanism of action

2. The coordination and coordination mechanism shall be established during the occurrence of the biological processes and shall explain the suitability of the structure and function in the organs and organs of the organism.

3. Describe the mechanism of adaptation, defining its importance in living creatures.

Standard: 3. 5. 9: The teacher explains the concept of the environment, its components, resources and systems, and the most prominent environmental problems.
1. Explains the basic concepts of ecology and defines the types of environments and ecosystems and their components.

2. Explain the most prominent relationships between living and non-living components and explain the types of relationships between living organisms in ecosystems.

3. Describe how natural cycles occur and provide examples of these courses.

4. Explain the most prominent contemporary environmental problems and describe their effects on living organisms (ozone layer hole, global warming ...).

5. Shows different types of pollution (antenna, food, water, radiation, noise ...) and how to treat them.

Standard: 3. 5.10: The teacher is able to master the basic skills of teaching science, and modern trends in scientific education.

1. A science teacher knows the most important modern trends in scientific education, such as: the use of standards in guiding scientific education, integration in science teaching, (Science for all), linking science, society and technology, science, technology, engineering and mathematics, and teaching them in science.

2. Learn about the methods of employing the environment and its components in teaching science.

3. Recalls the most important technical applications of scientific concepts and theories.

4. Know a scientific culture relevant to what you teach.

5. Suggest and design models to simplify and clarify ideas, concepts and scientific phenomena.
6. Explain the concept and importance of knowledge of the misconceptions in science, methods of detection, and mentions some examples, and shows the impact in the learning process.

7. Know the types of thinking and skills such as scientific and creative thinking and critical decision-making and how to employ and develop in scientific education.

8. Understand the most prominent international and local development projects in the field of scientific education and international tests in this field.

2.4.3 Understanding of Formative Assessment in Saudi Arabia

Formative assessment is a term that is discussed frequently in teacher education courses in the United States and other Western countries. Formative assessment strategies are often included in the teacher education curriculum. In Saudi Arabia, on the other hand, the strategy is neither taught nor discussed. It is therefore not surprising that there is a lack of Saudi Arabian literature related to formative assessment and its use in Saudi Arabian school settings. At least two doctoral dissertations (Al-Sadaawi, 2007 and Qassim, 2008) and two articles (Al-Sadan, 2000 and Al-Alhareth & Al Dighrir, 2014) have mentioned formative assessment. However, all four of these studies deal primarily with assessment processes in general and do not deal specifically with formative assessment. A Saudi Arabian study by Al-Wassia, Hamed, Al-Wassia, Alafari, and Jamuoom (2015) specifically addresses formative assessment. These researchers are professors of the Faculty of Medicine at King Abdulaziz University in Jeddah, Saudi Arabia. Their study on formative assessment in classroom instruction is one of the first based in a Saudi Arabian classroom, albeit a medical school classroom. However, the implications of their study can be applied in most educational settings in Saudi Arabia. Using a
mixed-method, cross-sectional, exploratory study, these researchers worked in both quantitative and qualitative ways to assess both student and teacher understandings of formative assessment.

The goal of the Al-Wassia et al. (2015) study was to assess how formative assessment was perceived by faculty and students and identify the cultural challenges as well as general challenges that have kept formative assessment from being adopted in the "clinical phase of the undergraduate medical curriculum in King Abdulaziz University" (p. S10). This study search used terms such as formative assessment or assessment for learning and Saudi Arabia, but the search showed no results. These authors claimed that this result means not that formative assessment was not being used but rather that there had been little research into its use. As they probed deeper, they found that the primary strategy for university faculty members was summative assessment. The authors suggested several reasons why faculty members frequently do not use formative assessment. They spoke of time constraints, the need to "teach to the test" (p. S10), and the need to meet performance goals rather than learning goals. Unique, perhaps, to Middle Eastern universities, and more specifically to Saudi Arabian universities, are challenges resulting from very large classes, a lack of interactivity, and students’ fear of speaking up. There are also sociocultural challenges specific to the Saudi culture, including the hierarchy of power, in which the teacher is omnipotent, students are afraid to debate with their teachers, and teachers resent questioning and debate.

Al-Wassia et al. (2015) concluded that there was a fundamental lack of understanding in the concept of formative assessment and the role that it plays in enhancing learning. Of more importance, however, were the cultural values at play in Saudi society. The researchers noticed what they called "four challenges categories" (p. S14): political стратегический, economical/resources, social/religious, and technical/developmental. Because these challenges are interrelated, the
researchers believed that there needed to be a holistic approach to implementing formative assessment in both the medical school and in other academic settings.

The impact of the study by Al-Wassia et al. (2015) is significant because although there is a crucial need to train faculty in formative assessment, there is a general lack of understanding of its necessity or usefulness. The authors say that both students and teachers "sense the inadequate pedagogical content knowledge of the teachers who are unable to know how students learn" (p. S13).

The researchers also spoke of establishing an atmosphere of trust because formative assessment and other interactive teaching and learning strategies do necessitate a measure of trust. This researcher’s own interviews concur that trust is often lacking in the Saudi classroom. However, interactive trust needs to be established long before students appear in the university classroom; it needs to begin in elementary school. One of the results of this study was that mental anxiety was one of the students’ major concerns reported both in the focus groups and on the questionnaire. This anxiety is likely due to the extreme pressure to score high grades without the ability to interact with the professor in a way by which true learning can occur.

2.5 What I Have Learned From Kariri, Cobern & Bentz (2018): Investigating the Use of Formative Assessment Among Male Saudi Arabian High School Science Teachers

Here are the conclusions I learned from Kariri et al. (2018), which guided the dissertation research. Through a literature review and interviews with current Saudi Arabian science teachers, I found that there was a lack of interactive teaching and learning strategies used by Saudi science teachers that could create the type of trust that allowed students to truly interact with their teachers. For example, if a teacher asks a question and a student does not give the teacher the
correct answer, the instructor calls on another student who could give the answer the teacher was seeking. This type of question-and-answer assessment does not allow the student to grow in understanding and development; it only allows right or wrong answers or whatever the teacher is seeking. Generally, Saudi teachers reported their assessment practices to include preassessment, assessment during the lesson and post-assessment, and included discussions, handouts, verbal questions, and tests. The major understanding gained from the interviews was that high school science teachers generally depended on the lesson goals that were prepared by the Saudi Ministry of Education and provided through a teacher guide book. And while the interviewed teachers spoke well of formative assessment, in practice they fell far short of using the practice in their classrooms. None of the interviewees mentioned that they retaught lessons or changed methods to make sure that students had learned what they needed to learn. It was apparent that the teachers involved in these preliminary interviews felt a great deal of pressure because of a new curriculum, large class sizes, and time constraints. In other words, there was little recognition that formative assessment should lead to the adjustment of instruction to address the gaps in understanding.

2.6 Conclusion

As a background for investigating formative assessment in science education issues in Saudi Arabia, three relevant literature domains were explored: the literature on formative assessment; teachers development; and Saudi Arabian policy about teaching and assessment. Literature was analyzed in all three areas, with the primary objective to see how the literature could inform the potential for development of formative assessment practices in Saudi Arabia.

Among the points learned:
• The research literature provides evidence that the application of formative assessment improves student learning.

• Formative assessment is not an easy skill to learn, and teachers need substantial help in developing these skills, including teacher-training, workshops, and professional development.

• There has been little research on formative assessment involving Saudi Arabian education.

• The Saudi Ministry of Education has no specific policy to address formative assessment.

Consequently, there are a number of research topics that can be developed concerning formative assessment and its use in Saudi Arabian secondary science classrooms. The research of Al-Wassia, Hamed, Al-Wassia, Alafari, and Jamuoom (2015) has shown that there is a lack of interactive teaching and learning strategies practiced in Saudi classrooms that create the type of trust that allows students to truly interact with their teachers. Research by Black and Wiliam (2009) showed that one of teacher’s main concerns is their need to feel in control, and Al-Wassia et al (2015) found that teachers are concerned that formative assessment is an unknown quantity, and control and time could get lost as teachers go back to re-teach concepts that may not have been understood by the students.

2.7 Research Questions

Based on findings from Kariri et al. (2018) and the information learned from the Literature Review, my goal was to investigate Saudi Arabian secondary science teachers
readiness to implement formative assessment practices. I did this by investigating four research
questions related to readiness:

- What do Saudi Arabian science teachers think about using formative assessment
  when presented with authentic formative assessment examples?
- What do they see as the advantages to be gained by implementing formative
  assessment?
- What do they say would hinder their implementation of formative assessment?
- What support do they say they would need in order to implement formative
  assessment?
CHAPTER 3
METHODOLOGY

3.1 Introduction to the Methodology Chapter

3.1.1 Description of the Research Design

The study used a qualitative, phenomenological research design. According to Creswell and Poth (2016), phenomenology is “an emphasis on a phenomenon to be explained, phrased in terms of a single concept or idea, such as the educational idea of ‘professional growth’” (p. 78). For this study, the phenomenon was formative assessment, specifically Saudi Arabian secondary science teachers’ readiness to implement formative assessment practices. Data were collected using a convenience sample and interviews with volunteer participants.

3.1.2 Subject/Sampling Methods

3.1.2.1 Description of Science Education in the Saudi Education System

The Saudi education system is centralized so that the Ministry of Education provides a standardized curriculum for all schools in the country. The student ages in high school are from 15 to 18 years old. The schools are gender segregated. High school in Saudi Arabia is three years. The second and third years divide students along two paths: literary and scientific.

Discipline-specific science courses include biology, physics, chemistry, and geology. In the first year of high school, two hours a week is spent in biology, physics, and chemistry. In the second and the third year for those in the science path, students are taught four hours a week for each course in biology, physics, and chemistry. Geology is taught one hour a week for all levels
of high school. Teachers can find everything necessary for the course in the comprehensive curriculum provided by the Ministry of Education, including teacher manuals, student materials, and pre-and-post assessments. Regional representatives of the Ministry of Education are available to offer assistance when necessary.

3.1.2.2 Description of Subjects

Thirty male high school science teachers in the Eastern Region of Saudi Arabia were contacted using social media (i.e., email, WhatsApp or similar messaging media), to request their participation in this study for the purpose of recruiting fifteen participants. Some of the contacts were convenience recruits because they were friends or family to the researcher. Because of cultural norms in Saudi Arabia, this male researcher could only recruit male participants. Women teachers would have been included if there were a woman researcher, but unfortunately, there was not. The contact was in Arabic because it is the native language of the subjects. Based on researches with a similarly homogenous group it seemed that about ten participants would be sufficient to cover all reasonable responses I might get. There were eleven participants in my study.

The researcher reached out to potential subjects when he returned to Saudi Arabia in the spring of 2019. Most of the contacts were in the Eastern Region of the country, where the researcher was known and had contacts. Prospective subjects were invited to meet with the researcher for approximately 40-60 minutes for a personal interview. Subjects remained anonymous with pseudonyms used throughout the research documents.
3.2 Interview Protocol

Based on Kariri et al. (2018) and the literature review, I learned that many Saudi science teachers do not understand formative assessment very well. Therefore, it would not be helpful to simply ask teachers what they thought about formative assessment. Instead, I showed teachers examples of authentic formative assessment in the form of vignettes. Because the teachers teach different science subjects, physics, chemistry, and biology, I showed them an example from their field. The vignettes were based on formative assessment instruction ideas from the book by Keeley, Eberle, and Farrin (2005). The vignettes were in Arabic and adapted to Saudi school culture.

The literature review provided evidence that the application of formative assessment improves student learning, so my assertion was that Saudi science teachers should implement formative assessment in their classrooms. On the other hand, the assertion that Saudi science teachers should implement formative assessment would accomplish nothing without first determining whether teachers were ready to apply it. I define the readiness for applying formative assessment as the teachers understanding the practice of formative assessment; teachers knowing the value of applying formative assessment; teachers knowing what could hinder their implementation of formative assessment; and what they need in order to adopt formative assessment. If teachers show signs of understanding these four points, they are ready to apply the process of formative assessment in their classrooms. Holt et al., (2007) says,

Readiness for change is a comprehensive attitude that is influenced simultaneously by the content (i.e., what is being changed), the process (i.e., how the change is being implemented), the context (i.e., circumstances under which the change is occurring), and the individuals (i.e., characteristics of those being asked to change) involved and collectively reflects the extent to which an individual or a collection of individuals is
cognitively and emotionally inclined to accept, embrace, and adopt a particular plan to purposefully alter the status quo. (Page 326).

Inserting vignettes while using the interview method is a convenient way for showing science teachers formative assessment. When asking the science teachers about a vignette, they could have a lot of different responses. Also, I preferred to use the interview method because I would like to talk with teachers and hear what they are thinking about this idea by using follow up questions to go in-depth with their responses. The interview questions are followed up with secondary or clarifying questions for more information such as “please explain” and “please give an example.”

Based on findings from Kariri et al. (2018) and the information I learned from my literature review, my goal was to investigate Saudi Arabian secondary, science teachers readiness to implement formative assessment practices. I did this by investigating four research questions related to readiness:

- What do Saudi Arabian science teachers think about using formative assessment when presented with authentic formative assessment examples?
- What do they see as the advantages to be gained by implementing formative assessment?
- What do they say would hinder their implementation of formative assessment?
- What support do they say they would need in order to implement formative assessment?

3.3 Vignettes and Interview Questions

Formative assessment is a cyclical process. First, teachers provide students with an opportunity to demonstrate their understanding during the learning process; this is called
Assessment for Learning. A teacher then analyzes the student data to determine if further work on conceptual understanding is needed. When gaps in understanding are discovered, a teacher will then modify instruction. An additional planned assessment may then be provided to determine student growth in understanding. This process is called formative assessment.

In order to collect data in response to my research questions during the interviews, I had the Saudi teachers respond to formative assessment vignettes. I created three vignettes that were based on formative assessment strategies from the book by Keeley et al. (2005). These three vignettes were in the teachers’ subject areas of physics, chemistry, and biology. The vignettes provided structure for the interviews. All the vignettes were translated from English to Arabic for use in Saudi Arabia and were appropriately adapted for Saudi schools.

All vignettes followed the formative assessment model in Table 1. The model has two parts: background context of instruction and the practice of formative assessment. Background context of instruction has two subparts: an initial description of instruction and an assessment for learning based on the initial instruction. Also, the practice of formative assessment has two subparts that are the response to formative assessment and re-assessment. (Interview Protocol: (Vignettes and interview questions in Arabic Appendix H; in English Appendix I).

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<th>1</th>
<th>Background context of instruction</th>
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<tr>
<td></td>
<td>A Initial Instruction</td>
<td>B Assessment for learning</td>
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<tr>
<td>2</td>
<td>Practice of formative assessment</td>
<td>A Response to formative assessment</td>
<td>B Re-assessment</td>
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All three vignettes were based on this model. Using the model as the basis for all three vignettes contributes to content validity. The vignettes were adaptations of formative assessment
activities developed by Keeley et al. (2005) using the formative assessment model in Table 1. The interview protocol was based on this Keeley formative assessment model. For clarification, the vignette involved a typical Saudi teacher name. What follows is a description of vignette-based interview protocols.

3.4 Data Analysis

The interviews were recorded and then transcribed. Pseudonyms for each participant were used throughout the study. To avoid changed meaning during translation from Arabic to English of the interview scripts and to maintain credibility and validity, the researcher analyzed the interview script in Arabic to create codes and themes. Two Arabic-speaking colleagues assisted with the analysis of the interview scripts. Finally, the results were translated to English.

- The transcripts were coded using a set of etic and emic codes related to the research areas of interest.
- To insure the appropriateness of coding, two other persons independently coded a sample of transcripts, and the results were be compared for inter-rater reliability. Coding adjustments were made as needed.
- The codes were associated with the research goal and questions.
- The codes were used to inform summary statements.
- MaxQDA computer software was used for qualitative data analysis. MaxQDA helps analyze the interview scripts by organizing the codes to determine the results.
- Finally, summary statements were used for constructing responses to the research goal and questions.
3.5 Conclusion

The findings from my research were written up in standard dissertation format. It is my hope that the findings from my research will help to inform Saudi Arabian science teacher education and development by providing information on teacher readiness for adopting formative assessment practices. One of the limitations of the study, as it is currently designed is the lack of a female researcher to interview female science teachers in action. Gender segregation is the rule in Saudi schools and a future study will need to address this issue.
CHAPTER 4
RESULTS AND DISCUSSION

4.1 Introduction

I traveled from Michigan to my home in the Kingdom of Saudi Arabia to interview a variety of Saudi science teachers focusing on what they had to say about their own instruction and formative assessment. The interview protocol was designed for gathering information in response to four research questions in the study. The goal of the interviews was to investigate Saudi Arabian secondary science teachers and their readiness to implement formative assessment practices. I utilized four research questions related to readiness:

- What do Saudi Arabian science teachers think about using formative assessment when presented with authentic formative assessment examples?
- What do they see as the advantages to be gained by implementing formative assessment?
- What do they say would hinder their implementation of formative assessment?
- What support do they say they would need in order to implement formative assessment?

4.2 Part One: Background Context of Instruction: Initial Instruction

At the beginning of the interviews, I asked teachers about initial instruction that in the vignettes the teachers use lecture method in his class.
I showed teachers examples of authentic formative assessment in the form of vignettes. Because the teachers teach different science subjects, physics, chemistry, and biology, I showed them an example from their field. The vignettes are based on formative assessment instruction ideas from the book by Keeley, Eberle, and Farrin (2005). The vignettes are in Arabic and adapted to Saudi school culture. In each interview, the teacher looked at the vignette below, and I asked him the interview questions.

Vignettes:

i. Vignette 1 “Is It An Animal?”

This vignette had shared with a biology teacher.

- Part one: Background context of instruction
- Initial instruction

Mr. Ahmed is a biology teacher for first year of high school students. He taught a lesson on Animal Characteristics. The learning objectives for this lesson are: 1) the students will identify the characteristics of animals that make them different from other biological kingdoms, 2) and the student will able to identify if a given picture of an organism, with a written description, is an animal, based on its characteristics.

Mr. Ahmed chose to lecture on the characteristics of animals and the differences between animals and other organisms. He used pictures and verbal explanations of animals and other organisms to show his students the differences between them.

ii. Vignette 2 “Lemonade”

This vignette had shared with a chemistry teacher.

- Part one: Background context of instruction
- Initial instruction
Mr. Ali is a chemistry teacher for second year of high school students. He taught a lesson called States of Matter. The learning objectives of this lesson are: 1) the students will use their own words to define the three main states of matter: solid, liquid, or gas, and be able to give examples for each. 2) The students will use their own words to define the conservation of matter after the solid matter dissolves, and be able to give an example related to state of matter.

Mr. Ali chose to lecture on the states of matter, discussing how there can be a change from a solid matter to a liquid matter. He mentioned the concept of conservation of matter by focusing on how some solids can dissolve.

iii. Vignette 3 “Can It Reflect Light?”

This vignette had shared with a physics teacher.

• Initial instruction

Mr. Faisal is a physics teacher for second-year high school students. He taught a lesson, Light. The learning objectives of this lesson are: 1) students will identify the characteristics of light. 2) The students will able to draw a picture showing the reflection of light. 3) The students will define in their own words how the reflection of light helps sight.

Mr. Faisal chose to lecture on a lesson called light, which included the concept of the reflection of light. His intent was to teach students how light reflects from an object to our eyes. He explained how if you can see something, it must have been reflecting light.

• Interview questions

Q1: Is this method of teaching something you used in your teaching?
   - IF YES, why? Do you think this is best method? Explain.
   - IF NO, why not? Please, explain to me what method you could use?
Q2: Based on how Mr. Ahmed introduced the material, what do you think he should do next?

4.2.1 Summary Statement

After the teachers read the initial instruction of the vignette and then asked about their own instruction, four of the eleven teachers preferred to apply the lecture method in their teaching, or thought it was a good method for their classes. On the other hand, seven of eleven teachers did not prefer to apply the lecture method, or thought it was not a good method for their classes.

The interviewees were then asked about what they felt should happen after the initial instructional step. Every teacher had an explanation for what they did, and there were as many explanations as there were teachers. All the teachers used an assessment after initial instruction part in which teachers asked students about the lesson and learning objectives.

4.2.2 Example Quotations

i. Examples of teachers who prefer to apply the lecture method:

1. Abdullah says, “Yes, I apply this method as an introduction to the lesson. It takes 5 to 10 minutes. Then I ask questions about the subject of the basic lesson and possibly introduce pictures.” (Line 48-49)

2. Ahmed says, “Sure, this method is essential to me and I always use it.” (Line 42)

3. Omar says, “I use this teaching method, especially since the curriculum is a lot, or time is limited, so I use it to shorten the time. But in general there are many types of methods can be used such as classroom discussion or cooperative learning or learning through a certain scientific story or learning by research.” (Line 35-37)
4. Faris says, “It is very practical. We use it a lot in this way or borrow it with a video clip if the tools are available.” (Line 34-35).

ii. Examples of teachers who do not prefer to apply the lecture method:

1. Mohammed says, “Of course, the method of lecture and the delivery is good, but there are better ways. For example, I use a scientific experiment or activity that shows the student a lesson in a way that makes it easier to understand the lesson deeper, and learning becomes more stable in students. The use of a scientific activity or experiment is better than the abstract explanation of the concept.” (Line 51-53)

2. Salem says, “The method of teaching used is the lecture, which I do not like, and there are better ways like using a picture or video to raise the attention of students and then ask questions and hear from the students instead of starting the teaching directly in the explanation of the manner of the lecture.” (Line 37-41)

3. Ibrahim says, “As for the way the teacher [in the vignette] used the lecture method, I do not use it in my teaching. I use the method of reasoning. I ask the student to research and then start discussing with them. I do not like to use the method of the interview at the beginning of the lesson because the student is often attentive with me for 6 minutes or 7 minutes and then not focused. I prefer to keep the students in the lesson. I used the method of discussion and conclusion. I let the student look for information and then start to discuss with him.” (Line 35-39)

4. Amer says, “But the method used to explain the lesson is wrong in my view because it is not thought provoking. It is supposed to display a mirror on the students and ask them as if the picture appears as an input to the lesson. The explanation method is the lecture method, not very suitable. There are many ways to teach, for example, if you have a
picture or a mirror. These are simple and available methods that can be used for the lesson and then begin to discuss the students and use the discussion method better than the lecture method.” (Line 36- 40)

5. Hamad says, “The lecture method is the traditional method. It is clear that the teacher [in the vignette] is fully controlled in the learning process. I did not notice students participation in the class but only the listener. It became clear to me from this method that teacher teach and student just listen, that means the teacher is the master of the educational process and the student the listener.......regardless of the distribution of students in the classroom imposed at the beginning of any new part or even if students have an idea about the lesson is expected from teachers to ask questions, for example, or show a picture or video and ask students and take answers directly.” (Line 34-44)

6. Fahad says, “This method is negative because it depends on the teacher, as well as education, depends on the teacher. The teacher [in the vignette] used the method of the lecture, and this is wrong on his part. But the learning should depend on the student more than the teacher. It is special that it is possible for the student to be the one who deduces the information and gets it. I do not use lecture because I want learning to depend on the student to get the information by himself.” (Line 47- 51)

7. Bader says, “The method does not achieve the goals because the student must discover the information, but the teacher [in the vignette] here gave him the information, and this is contrary to active learning, the method now used in Saudi Arabia; active learning, that is, the student looking and learning and explore, the teacher used the method of indoctrination is primitive and old.” (Line 32-34)

iii. Examples about what they felt should happen after the initial instructional step:
1. Mohammed says, “The first step the teacher [in the vignette] explains the lesson that is light and reflection. After the explanation, the teacher must ask the students some questions, and through the questions [the teacher in the vignette] knows if the scientific concept is reached.” (Line 57-58)

2. Abdullah says, “After explaining the lesson, I start by making sure that the information has reached the students with so-called feedback, so make sure that the information has reached the students. Sometimes I ask students questions. Sometimes, students in each group are given the opportunity to ask questions to another group and so on.” (Line 53-55)

3. Ahmed says, “It is assumed that after each point, there is an assessment, and then the teacher [in the vignette] assess the students in general on the whole lesson.” (Line 45-46)

4. Salem says, “After the explanation, the final assessment of the lesson can be done by means of oral questions or questions in the book, which are directly answered by students individually or by groups.” (Line 47-48)

5. Omar says, “After explanation, go back to what has been explained and be specific to the objectives of the lesson until I know whether they were understood or not.” (Line 41)

6. Ibrahim says, “So as to make sure the student's understanding gives them questions or discussion and can be distributed in the form of groups” (Line 42-43)

7. Amer says, “Assessment of the lesson. After I have finished explaining, I ask about the main points which are the main goals that I want to reach the students.” (Line 43)

8. Faris says, “The next step asks students to give examples of the same solubility issue and how solids dissolve in liquid. Often after the explanation, I use a worksheet about the terms or vocabulary or concept.” (Line 37-40)
9. Hamed says, “Teacher [in the vignette] make sure that students understand the points [the teacher in the vignette] explained by, for example, giving them questions which is post assessment for the point that is explained to make sure that information is delivered perfectly to students.” (Line 46-47)

10. Fahad says, “I always use an image and example or worksheet that is distributed to them…. make sure that [the teacher in the vignette] achieved the goals…..A stage of assessment. In each goal, make sure that the goal is achieved or not. And then it is possible at each stage of the lesson to make sure of all the goals at the end of the lesson, and for example, in the whole chapter. I have to make sure that the goals are completely achieved.” (Line 55-66)

11. Bader says, “Feedback method. I give them homework, a way that differs from teacher to teacher. It is possible to ask a question that raises curiosity, which benefit from this lesson by solving this question.” (Line 39-40).

4.2.3 Summary of Part One: Background Context of Instruction: Initial Instruction

Eleven male teachers participated in the interviews. The teachers were asked whether they used the lecture method in their classroom teaching. They also were eager to explain to the interviewer their reasoning for the teaching methods they were currently using, and expressed their reasoning for why they used that method.

For instance, when asked about the way the teacher in the vignette conducted the initial instruction, four teachers expressed their preference for the lecture method and felt that the efficiency of the method made it a practical tool when there were many students, a lot of curriculum material to cover, and significant time constraints. Seven teachers told of other
methods that they preferred to the lecture method. They included videos, pictures, demonstrations, interviews, and discussions. Hamad felt that when using the lecture method, the teacher remained in control of the entire educational process, without any interaction with the students. Fahad suggested that learning should depend more on the student than on the teacher; the teacher should be the facilitator rather than the controller of the learning.

The interviewees were then asked about what they felt should happen after the initial instructional step. Every teacher had an explanation for what they did, and there were as many explanations as there were teachers. Abdullah used teacher questions and students group work. Ahmed believed that there should be an assessment after each step in the lesson, perhaps formative in nature, but also summative. Salem mentioned that after the lecture there would be a “final” assessment, by which he meant a time of questions and answers to see if the students understood the lesson. For example, Faris mentioned that he uses a worksheet as an assessment for terms, vocabulary, and concepts. With a different outlook, Bader suggested that it is possible to help students explore “a question that raises curiosity” to continue the assessment.

Summarizing all the participants’ methods.

4.3 Part One: Background Context of Instruction: Assessment for Learning

4.3.1 Vignette

i. Vignette 1 “Is It an Animal?”

After his lecture, Mr. Ahmed decided to give each of his students a handout that included pictures and descriptions of organisms and the question, “Is it an Animal?” The handout also required the students to state why they decided on their answer. Students handed the worksheet in when they finished.
ii. Vignette 2 “Lemonade”

After his lecture, Mr. Ali decided to give each of his students a handout that included pictures and a mathematical problem regarding the dissolving of sugar in unsweetened lemonade, as well as to decide if the lemonade changes the weight. The handout also required the students to describe their thinking about the answer they chose. Students handed in their work.

iii. Vignette 3 “Can It Reflect Light?”

After his lecture, Mr. Faisal decided to give each of his students a handout that included a list of items with the question, “Can it reflect light?” Students circled the items that they thought reflected light. Students handed in their work.

- **Interview questions**
  
  Q3: How does what Mr. Ahmed did compare to your idea?

  Q4: In your opinion, what is the purpose of what Mr. Ahmed did? Please explain.

  Q5: What do you think Mr. Ahmed should do next?

4.3.2 Summary Statement

Question 3: Ten of the eleven teachers thought what the teacher did in this part of the vignette (Assessment for learning) is the same or similar to their ideas, which had been suggested before they read this part of the vignette. There was one teacher who thought that there is a little difference between what the teacher did in this part of the vignette and his idea. (Abdullah).

Question 4: After the teachers read this part of vignette, there were nine of eleven of the teachers who thought that the purpose of this part was to assess students’ understanding of the lesson and achieving the learning goals because that would help to move into the following lesson or goals. There was one teacher who thought the purpose was brainstorming to know the
students’ information about the lesson. Finally, there was one teacher who thought that this part is supposed to be at the beginning of the lesson—the entrance to the lesson.

Question 5: When the teachers were asked about their opinion of the step after assessment for learning, ten of the eleven teachers emphasized that they review and analyze the assessment result. There was only one teacher who did not mention reviewing and analyzing the assessment results after assessment for learning step.

4.3.3 Example Quotations

Q3:

i. Examples of teachers who thought what the teacher did in this part of the vignette (Assessment for learning) is the same or similar to their ideas:

1. Mohammed says, “The teacher [in the vignette] used a worksheet to measure students’ understanding. It is a good method which is similar to what I suggested.” (Line 69-70)

2. Omar says, “The example method is close to what I said. It is an assessment of student understanding.” (Line 50-51)

ii. Examples of teachers who thought that there is a little difference between what the teacher did in this part of the vignette and his idea:

1. Abdullah says, “This is one of the successful methods that can be used so that making sure that the students have understood the lesson, but there is little difference between our methods.” (Line 65-67)

Q4:

i. Examples of teachers who thought that the purpose of this part is to assess students' understanding of the lesson and their achievement of learning goals:
1. Abdullah says, “My first goal is to make sure that all students are assessed and therefore make sure that the majority of the students understand the lesson and that the lesson points are clear to them. This is one of my main goals for the lesson to be clear and that the students have understood the lesson.” (Lines 71-72)

2. Salem says, “Through the assessment the teacher knows whether the information arrived to students or not through their answers and interaction. If there is little or no interaction with students, there is a problem with students' understanding. A teacher who does not evaluate students during the lesson or after the lesson will face a great problem because some lessons are based on past lessons.” (Lines 63-66)

3. Fahad says, “Sometimes the goals are cumulative. For example, the second goal depends on the first, and the third on the second, so before moving from goal to goal, you must be sure to achieve the first goal. At each stage, you must make sure to achieve the goals and then move to the next stage. I always say that even if you are tired in achieving the goal, even if you are late, it is better that you move to a second goal and the previous goal is not achieved. The assessment phase is very important and verified to achieve the objectives.” (Lines 82-85)

ii. Examples of teachers who thought that the purpose of this part is brainstorming:

1. Faris says, “I always love using this brainstorming method. It has many advantages, the most important of which is the discovery of the information stored in the students, which is the background of the student. You will be shocked by some of the students that [the teacher in the vignette] has more information than his age and this is very important. Also, I use this method a lot in the consolidation of concepts, and I suffer a lot of times
the student white page does not have any information or any background on the subject or some students has a lot of information that has more than his age.” (Lines 53-59)

iii. Examples of teachers who thought that the purpose of this part is the entrance to the lesson:

1. Bader says, “These are supposed to be at the beginning of the lesson as an entrance to the lesson. The teacher [in the vignette] prepares unsweetened juices and when added to sugar and weight gain and then begins the lesson, and then the teacher explains more deeply” (Lines 59-60)

iv. Example of teachers who say they review and analyze assessment result:

1. Mohammed says, “[The teacher in the vignette] reads the assessment results for the students and measures the students' knowledge of the lesson and the concepts that are explained in the lesson. [The teacher in the vignette] then determines whether to move to a later point in the lesson. Or emphasize and clarify the most points that the students did not understand by providing the students with the correct answers as well as clarifying more by re-explaining to students who failed to resolve the assessment.” (Line 78-80)

2. Ahmed says, “I collect the handouts, and make sure of the students' answers. Also, I review with students the right answers.” (Line 62).

3. Salem says, “I conduct a phased assessment of each point or goal, and at the end of the lesson, I see students' understanding.” (Line 69).

4. Omar says, “[The teacher in the vignette] is supposed to correct errors in the worksheet to give them the correct answer. If the error rate is too large, [the teacher in the vignette] must return to the first method in order to reach the largest possible set of correct
answers. But if the wrong answers are few and limited, [the teacher in the vignette]
corrects them at the same moment and goes to other lessons.” (Line 64-67).

5. Ibrahim says, “Students answers are now assessed and students' understanding is
determined to ascertain the proportion of students who understand and how much they do not understand. I focus on identifying students' erroneous ideas, for example, “The Law of Preservation of the Block,” for example, giving an extra grade to the students who understand. And I correct the students who understand them. I am correcting the idea they have. Start evaluating students’ answers to make sure the point or goal is understood.” (Line 67-69)

6. Amer says, “Certainly, [the teacher in the vignette] assesses the answers. After collecting the papers, the teacher in the vignette is evaluating the answers if they are wrong or correct” (Line 69).

7. Fahad says, “After the working paper modification phase, the teacher [in the vignette] shows the answers; the students sometimes have mistakes. In concepts, for example, in cases of matter, or the transformation of a material from a state to a state, solubility, or mass conservation. So he can explain it again.” (Line 67-69)

8. Hamed says, “If I notice that the students have a high level of understanding, I move to the second points in the lesson. After the lesson, I go back to the simple part that is not understood; I apply the feedback at the end of class. But if the proportion of students understood very little, I try not to move to the next point, unless the percentage of understanding of the students is higher. For example, I explain the point in a second way because it is possible that the explanation method I used was not accepted by the student.
So repeat it a second or display it in a different way until the concept is better.” (Line 77-81).

9. Fahad says, “Students need to be followed up to help them achieve their goals. Then leaving the student to reach the goal himself is better.” (Line 90).

10. Bader says, “Identify those who do not understand. For example, four students, I take them to the side of class and give them an activity and let them discover on their own or in groups. And because the groups are discussing the information, they can understand from a peer more than a teacher.” (Line 65-67).

v. Example of teacher who gave no indication that he reviewed and analyzed the assessment result:

1. Abdullah says, “I can give students an extra homework. I ask them to specify additional information. For example, mention extra animals from your environment, especially with this lesson, write the reasons to classify them as animals.” (Line 75-76). However, he gave no indication that he reviewed and analyzed the assessment result.

### 4.3.4 Summary of Part One: Background Context of Instruction: Assessment for Learning

Question 3: Teachers were generally agreed that the purpose of the assessment that the instructor in the vignette used would be similar to what they would do if they were to teach the lesson. The teachers felt that the worksheet was an “assessment of student understanding” (Omar). There was one teacher who thought that there is a little difference between what the teacher did in this part of the vignette and his idea. (Abdullah)

Question 4: After the teachers read this part of the vignette, most agreed that the purpose of this part of the lesson was to assess the student understanding before the teacher moved on to
the next part of the lesson or the next goal. One teacher felt that brainstorming might be a worthy way to assess student understanding while another would have moved the worksheet to the beginning of the lesson as an introductory step. (Faris).

The comments indicated that if the teacher didn’t stop and see where the students were, there would be trouble later in the lesson. “If there is little or no interaction with students, there is a problem with students’ understanding” (Salem).

Question 5: Ten of the eleven teachers said that they reviewed and analyzed the assessment results after conducting an assessment of learning. There was only one teacher who gave no indication that he reviewed and analyzed the assessment result as would be a formative assessment practice. (Abdullah).

4.4 Part Two: Practice of Formative Assessment: Response to Formative Assessment

4.4.1 Vignette

i. Vignette 1 “Is It an Animal?”

• Part two: Practice of formative assessment

• Response to formative assessment

Once the above interview questions had been answered, the interview proceeded to the first part of practice of formative assessment, which is response to formative assessment. The subjects read the following text:

After class Mr. Ahmed checked his students’ answers to the assessment and discovered that students had trouble identifying corals as animals, even though the descriptions listed several characteristics that made it clear that corals are animals. He realized that students were relying only on what corals in the pictures looked like, not on
the given characteristics of animals. So, Mr. Ahmed decided to focus on this trouble that students were having.

For the next day’s class, Mr. Ahmed divided students into groups and gave them handouts that included only descriptions of corals’ characteristics to look at, with no pictures. He asked the student groups to discuss if corals are animals or not based on their characteristics with an explanation of the answer.

Mr. Ahmed walks around the classroom, listening to the groups' justifications. Mr. Ahmed uses guided questioning to determine any incorrect ideas or misconceptions. When Mr. Ahmed identified that each group of students had completed the discussion, he lead a whole class discussion. At this point, he allows the students to use the animal characteristics to justify their discussion about identifying corals as animals, using guidance question to address any confusions.

ii. Vignette 2 “Lemonade”

- **Part two: Practice of formative assessment**
- **Response to formative assessment**

Once the above interview questions had been answered, the interview proceeded to the first part of the practice of formative assessment, which is the response to formative assessment. The subjects read the following text:

After class Mr. Ali checked his students’ answers in the assessment and discovered that students were confused about one point; they thought the mass of a solution dissolves when a solute seemingly “disappears” in a solvent, so this is incompatible with the conservation of matter. He realized that he would have to adapt his teaching methods if
he were to help the students identify the conservation of matter in the context of dissolving, which is the point that students were having trouble with.

So, for the next day’s class, Mr. Ali decided to ask student to implement a class activity about the conservation of matter in the context of dissolving. He brought enough unsweetened lemonade, sugar, and cups for the entire class. He pulled out the scales for each student, passed out the cups and had the students weigh the cups and write the weight on their paper.

Then he went around the class, filling each cup with unsweetened lemonade and gave the students a small amount of sugar. The students weighed the lemonade without sugar, note the weight, note the weight of the sugar and then combined the sugar and lemonade, which they then weighed. Then, he let the students discuss the changes in weight of unsweetened lemonade and sweetened lemonade, engaging in a whole class discussion, in order to answer the students’ questions and challenge any incorrect conceptions.

iii. Vignette 3 “Can It Reflect Light?”

- **Response to formative assessment**

Once the above interview questions had been answered, the interview proceeded to the first part of the practice of formative assessment, which is response to formative assessment. The subjects read the following text:

After class Mr. Faisal checked over the answers. Mr. Faisal realized that his students understand that the reflection of light helps sight, but many of them thought that some of the visible objects did not reflect the light. He realized that he would have to adapt his teaching methods to help the students identify that all visible objects reflect light, thus making them visible. This will enable the class to move on to the next lesson.
So, for the next day’s class, he divided students into groups, and he appointed the students, who reach the lesson objectives as leaders of the group discussion to help other students who have misunderstandings. Then, Mr. Faisal held up two pictures. In the first picture, he included all objects that were in the worksheet. They discuss the reflection of light. In the second picture, he included the same objects, but this time everything is dark because the lights are off and windows closed. He again lets students discuss why they could not see the objects in the second picture, and he engaged in the discussion, if necessary, answering the students questions and correcting their mistakes and misconceptions.

### 4.4.2 Interview Questions Regarding Response to Formative Assessment

**Q6:** How does what Mr. Ahmed did in his lesson compare to what you were thinking?

**Q7:** Would this be something you could see yourself doing in a classroom?

- IF YES,
  - How often?
  - Please briefly describe for me how you have done it.
- IF NOT, move to next question.

**Q8:** Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did?

**Q9:** What are the pros and cons of taking such an approach? Please explain.

**Q10:** What do you think Mr. Ahmed should do next?
4.4.3 Summary Statement

**Q6:** Nine of the eleven teachers thought what the teacher did in this part of the vignette (Response to formative assessment) is the same or similar to their ideas, which they suggested before they read this part of the vignette. There are two teachers who thought that there is a difference between what the teacher did in this part of the vignette and their ideas. (Abdullah and Bader).

**Q7:** Although they do not use the term formative assessment, six of the eleven teachers said they always, or most times, adopted practices that are forms of formative assessment in their classrooms in ways similar to those shown in the vignette. Also, five of the eleven teachers said they sometimes use practices that are forms of formative assessment for certain circumstances and reasons. For example, some teachers worried that there might not be enough time to present the material again or spoke about the large number of students in the classroom. There was no teacher of the sample who said he did not adopt practices that are forms of formative assessment like the response to formative assessment section of the vignette.

**Q8:** When the teachers were asked about what they thought about the approach Mr. Ahmed took in re-teaching the point that students had trouble with, six of eleven teachers think that the reason is the students did not understand the point, so he re-taught that point. However, two teachers thought that the teacher in the vignette needed to re-teach because he had not used an effective method to start with. There were three teachers who think that this method will give students the opportunity to infer and reach to their own understanding.
Q9: Nine of eleven teachers thought that the advantage of this method is to help to improve the students’ understanding and help with achieving learning goals, and one teacher thought that this method helps to ensure the use of an effective teaching method.

Five of eleven teachers thought that the time is the biggest disadvantage of this method. There are other disadvantages, such as: one teacher thought that this method could be a boring method (Omar); one teacher thought the number of students as a disadvantage (Abdullah); one teacher thought that there is difficulty of moving from method to method (Fahad); and one teacher said the lack of an appropriate place to apply this method could be a disadvantage (Bader). Finally, there were two of eleven teachers who thought that this method had no disadvantages. (Salem and Ibrahim).

Q10: When the teachers were asked their opinion about what the teacher should do after the response to the formative assessment component of the vignette, ten of eleven teachers say the teacher in the vignette should reassess his students and make sure of the students’ understanding. On the other hand, only one teacher of the sample said he should move on to the next lesson after the response to formative assessment part, and he did not indicate that he would reassess to determine whether or not learning has improved. (Salem).

4.4.4 Example Quotations

Q6:

i. Examples of teachers who thought what the teacher did in this part of the vignette (Response to formative assessment) is the same or similar to their ideas:
1. Ahmed says, “Almost similar to what I told you. [The teacher in the vignette] checks the answers of the students and then goes on to explain again to the points that the students do not understand” (Lines 72-73)

2. Amer says, “Yes, same as I suggested or close to it” (Lines 78)

3. Hamad says, “It is clear to me that this method is almost same as the method that I mentioned to you in the previous step. However, it became clear to me from the example that the feedback was not in the same class, but the feedback in the next class, and thus this made a long period between explaining the concept and correcting the concept as well as feedback” (Lines 90-94)

ii. Examples of teachers who thought that there is a difference between what the teacher did in this part of the vignette and his idea:

1. Abdullah says, “The example suggested by me is homework. In the homework there is possibility that students propose organisms from their environment and their answers may be correct, but it is possible their answers include unclear organisms. I note this problem in the classification of insects and arthropods. Here in the example you gave me, the teacher’s way was so good that [the teacher in the vignette] discovered the problems faced by students, and therefore I see this way better from my point of view in terms of identifying the problem. There are many students who fall into the problem of object classification so that they are interested in shape and not characteristics. Thus, [the teacher in the vignette] was able to identify the problem. The students were then asked a question so that they would answer the question in terms of the characteristics they studied and not the shape. And [the teacher in the vignette] gave the opportunity for students to discuss is important way of teaching because the student sometimes
understand from classmate more than from the teacher. The way the teacher used here is good.” (Line 86-94)

2. Bader says, “This way is wrong. [The teacher in the vignette] should give handouts to the students who do not understand the lesson. Also, [the teacher in the vignette] should give those students who understand the lesson additional enrichment information. Therefore, these handouts help students to go deeper into the law of conservation of mass. If I were a teacher I would divide the class into three sections: First, students who did not understand the minimum limit of the lesson. I give them the handouts. And for those who understand, I give them additional enrichment information. And for those who are superior, I give them more difficult things related to the lesson.” (Line 84-86)

Q7:

iii. Examples of the teachers who always or most times use formative assessment:

1. Mohammed says, “Yes, always use it in my teaching.” (Line 98)

2. Fahad says, “Always use it in every lesson and every time and give students freedom so that I make sure that the goal is achieved or not achieved.” (Line 113-114)

3. Faris says, “Yes, apply it and try to let the student get the information. And I do not give him the information so that [the teacher in the vignette] concludes the information such as using brainstorming.” (Line 85-86)

iv. Examples of the teachers who sometimes use formative assessment in certain circumstances and reasons:

1. Ahmed says, “Yes I apply this method in my teaching if time is allowed. This method needs a long time.” (Line 78)

2. Amer says, “I will apply it if there is enough time.” (Line 87)
3. Salem says, “If the lesson helps me to apply it. Most of the time, I apply it in short lessons.” (Line 88-89)

4. Omar says, “Of course, I apply it, but the percentage of my application of this method depends on the proportion of students who do not understand. For example, if the proportion of students is very low, for example 20%, I do not apply it because of the time. But if the ratio is high, I can apply it in another way.” (Line 91-93)

5. Ibrahim says, “I apply it if there is a deficiency in the teaching method that I used. I do not use it always because sometimes the method of teaching is appropriate and students understand the lesson and their answers are correct and evaluate them well. I used it if the teaching method was wrong at first and the students did not understand. I use it in a different way. I do not always use it because I have a curriculum that I have to finish.” (Line 87-90)

Q8:

i. **Example of the teachers who rethink their teaching because of the students who did not understand:**

1. Ahmed says, “The teacher [in the vignette] explains in a different way to help students understand and also focuses on weaknesses and improves students' understanding.”
   (Lines 82-83)

2. Omar says, “The teacher [in the vignette] corrects the mistakes of the students and helps students who did not understand from the first time.” (Lines 93)

ii. **Example of the teachers who think that the teacher re-taught because he found that the teaching method was inappropriate:**
1. Mohammed says, “Teaching may not be appropriate, such as using traditional methods. This means that students do not understand the lesson and therefore it is best to re-explain using better methods such as classroom activity or a video showing the lesson. Re-explanation often leads to better access to information.” (Line 107-108)

2. Ibrahim says, “The teacher [in the vignette] found that the method of explaining at first time that is the lecture was good. Here the teacher discovered through the answers of students that the teaching method is not good, so [the teacher in the vignette] used a second method is learning by experience.” (Line 96-98)

iii. **Example of teachers who think this method gives students the opportunity to infer and reach to understand by themselves.**

1. Faris says, “The features of this point, for example, the student devises information and the student is running his mind and does not forget the information by moving to the second level or a high level of Bloom's Taxonomy, which are remembering, understanding and comprehension ... etc. So, moving to higher levels that prove the information, so the student will not forget it. As well as linking the lesson and the student's daily life such as adding sugar to lemon juice.” (Lines 94-97)

2. Fahad says, “Not moving to the next lesson until students understand the point and through the practical side in the next class. The student concludes and knows his mistakes by himself.” (Lines 109-110)

**Q9:**

i. **Example of teachers who think that the advantage of this method is to help to improve the students’ understanding and help with achieving learning goals:**
1. Omar says, “Of course the advantages that you are constantly assessing all students and trying to correct their mistakes and help them to understand. The second point, for example, some students who understood from the first time can help them to remember and memorize information.” (Lines 99-101)

2. Ahmed says, “This way these are excellent. So, [the teacher in the vignette] uses another method and explains another way to help students to understand. From the advantages the teacher focuses on weaknesses and improves students' understanding more as well as taking into account individual differences.” (Lines 83-84)

3. Abdullah says, “One of the advantages of this method is to get the student to know and understand and overcome the problems they face.” (Line 113)

4. Fahad says, “Making sure to achieve the goals. That means the goal is not necessary to be achieved at the same time but it possible in the next class. It is good to use multiple methods.” (Lines 123-124)

ii. Example of teachers who think that this method helps to use an effective teaching method:

1. Ibrahim says, “There are many advantages. It is the benefits of this assessment is that after each point shows that the method of teaching is not appropriate or will not suit the students, so I have to change the way of teaching and explain to them.” (Line 106-107)

iii. Example of teachers who think the time is the biggest disadvantage of this method:

1. Ahmed says, “But negative thing is time. This method needs time and because of the large number of students it is difficult to deal with them and distribute them into groups, time is the only negative. Except this method is excellent.” (Lines 83-84)

2. Faris says, “My biggest con in the way this is the time problem.” (Lines 105-109)
iv. Example of teachers who think there are other disadvantages such as one teacher thinks that this method could be a boring method; one teacher thought the number of students is a disadvantage; one teacher thought that there is difficulty of moving from method to method; and one teacher said that the lack of an appropriate place to apply this method could be a disadvantage:

1. Omar says, “One disadvantage of this method maybe become boring to the students who understood the information from the first time, so when we return to teach the same point, it will be boring to them.” (Lines 103)

2. Abdullah says, “As well as the large number of students creates a problem in the application of such a way so that there is difficulty in their assessment and return the points they face. Where the problem of the number of students cause a problem.” (Lines 118-119)

3. Fahad (126-127) difficulty of move from method to method.

4. Bader (106-107) lack of appropriate place to apply this method.

Q10:

v. Example of the teachers who say the teacher in the vignette should reassess his students and make sure of the students’ understanding after the response to formative assessment part:

1. Abdullah says, “In my point of view, the teacher [in the vignette] gives students different questions again and makes sure that the problem is overtaken by students.” (Line 125)

2. Amer says, “[The teacher in the vignette] may not move to the next lesson, but he reviews with students and give them questions to make sure the information is reached. Then he moves to next lesson.” (Line 107)
vi. Example of the teachers who say should move on to the next lesson after the response to formative assessment part:

1. Salem says, “If this step is applied in a good way, I expect the information to reach the student, and the students understand the lesson. No other steps are needed. [The teacher in the vignette] goes to the next lesson.” (Line104-105)

4.4.5 Summary Part Two: Practice of Formative Assessment: Response to Formative Assessment

Q6: The majority of the teachers appreciated the way the teacher in this part of the vignette handled the situation. They felt that they would have responded to the students’ lack of understanding in the same way. There are two teachers who thought that there is a difference between what the teacher did in this part of the vignette and their ideas. (Abdullah and Bader).

Q7: Although they do not use the term formative assessment, six of the eleven teachers said they always, or most times, adopted practices that are forms of formative assessment in their classrooms in ways similar to those shown in the vignette. Also, five of the eleven teachers said they sometimes use practices that are forms of formative assessment for certain circumstances and reasons. There was no teacher of the sample who said he did not adopt practices that are forms of formative assessment like the response to formative assessment section of the vignette.

Q8: When the teachers are asked about what they thought about the approach Mr. Ahmed took in re-teaching the point that students had trouble with, six of eleven teachers thought that the reason is the students did not understand the point, so the teacher in the vignette
re-taught that point. However, two teachers thought that the teacher in the vignette needed to re-teach because he did not use an effective method to start with. There were three teachers who think this method gives students the opportunity to infer and reach an understanding by themselves.

Q9: Nine of eleven teachers thought that the advantage of this method is to help to improve the students’ understanding and help with achieving learning goals, and one teacher thought that this method helps to ensure the use of an effective teaching method (Ibrahim).

Five of eleven teachers thought that the time is the biggest disadvantage of this method. There are other disadvantages, such as: one teacher thought that this method could be a boring method (Omar); one teacher thought the number of students as a disadvantage (Abdullah); one teacher thought that there is difficulty of moving from method to method (Fahad); and one teacher said the lack of an appropriate place to apply this method could be a disadvantage (Bader). Finally, there were two of eleven teachers who thought that this method had no disadvantages. (Salem and Ibrahim)

Q10: Ten of the eleven teachers felt that the teacher in the vignette should review the lesson and reassess his students, while one teacher suggested that the vignette teacher should move on to the next lesson following the response section, and he does not indicate that he would reassess to determine whether or not learning has improved. (Salem).

4.5 Part Two: Practice of Formative Assessment: B. Re-Assessment

4.5.1 Vignette

i. Vignette 1 “Is It an Animal?”
• Re-assessment

Once the above interview questions had been answered, the interview proceeded to the second part of practice of formative assessment, which is re-assessment. The subjects read the following text:

Mr. Ahmed handed out a worksheet similar to the one he had used the day before, but this one included more pictures and descriptions of confusing animals as corals. The student had to individually do the work again, and then hand it in.

ii. Vignette 2 “Lemonade”

• Re-assessment

Once the above interview questions had been answered, the interview proceeded to the second part of the practice of formative assessment, which is re-assessment. The subjects read the following text:

Mr. Ali hands out a worksheet similar to the one he had used the day before and focused on the point that students had misunderstood regarding the conservation of matter in the context of dissolving. The students individually did the work again and handed it in.

iii. Vignette 3 “Can It Reflect Light?”

• Re-assessment

Once the above interview questions had been answered, the interview proceeded to the second part of practice of formative assessment, which is re-assessment. The subjects read the following text:
Mr. Faisal hands out a worksheet similar to the one he had used the day before and focuses on the point that students had misunderstand. The students individually did the work again and handed it in.

4.5.2 Interview Questions Regarding Response to Re-Assessment

Q11: How does what Mr. Ahmed did in this part of the lesson compare to what you were thinking?

Q12: If Mr. Ahmed had determined that the students still did not understand the material, what do you think he should do next?

4.5.3 Summary Statement

Q11: Six of the eleven teachers thought that their ideas were the same or similar to the teacher in the vignette. However, there were five teachers who thought their ideas were different from the teacher in the vignette. For example, there are two teachers who suggested that the teacher could use homework for this part (Ahmed and Ibrahim); one other teacher thought that in this part, the teacher should assess all point of the lesson like a final assessment (Mohammed); there was a teacher who thought that the teacher should move to next lesson (Salem); and one teacher suggested that students repeat the explanation of the lesson (Faris).

Q12: Seven of eleven teachers thought that the teacher in the vignette, after re-assessment, should re-explain the lesson to the students who did not understand during the next class. Also there were five of eleven teachers who thought the teacher in the vignette, after re-assessment, should re-explain the lesson to the students who did not understand outside of the class time. (Note: Salem said either in class or out of class time.).
4.5.4 Example Quotations

Q11:

i. Example of the teachers who think that their ideas are same or similar:

1. Hamad says, “[The teacher in the vignette] method is excellent and I also mentioned a similar method.” (Lines 141). Hamad was referring to his earlier comment in which he described using a similar the method to the method in the vignette.

ii. Example of the teachers who think that their ideas are different:

1. Ahmed says, “I suggested homework, but the teacher [in the vignette] used paper work, and I think it's a good way” (Lines 101)

2. Ibrahim says, “I suggested homework and the teacher used a worksheet. Both methods are correct. The difference between them is that the worksheet can make sure during the class directly that the student do it individually and not groups; then make sure the student has changed the wrong idea about the law of conservation of mass. For homework, it is possible that the student uses some help from others. I prefer to use homework to save time.” (Lines 127-131)

3. Mohammed says, “Here the teacher [in the vignette] only assessed the points that the students did not understand. I think [the teacher in the vignette] should assess all points. As a final exam or final assessment of the lesson, all points of the lesson should be assessed, not just focusing on the point that the students did not understand.” (Lines 129-131)

4. Salem says, “I see what the teacher [in vignette] did is better than my point of view, which is moving on to the next lesson, so that [the teacher in vignette] focused more on the problem and reviewed it.” (Lines 114)
5. Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assessed. What the teacher [in vignette] has done is good but I don't prefer to re-assess the students.” (Lines 125-127).

Q12:

i. Example of the teachers who think teacher in the vignette, after re-assessment, should re-explain what the students who did not understand in the next class:

1. Abdullah says, “If the problem persists, the problem may be in the way the lesson is explained. I am referring to the explanation method where there is a problem so that I look for the problems that caused the students not to understand the lesson and try to solve it. And what the students did not understand was returned in a different way.” (lines 144-146)

2. Bader says he would “divide students into three groups. Students who do not understand. Students who understood. And outstanding students. Students who do not understand I repeat the lesson for them. Understanding students give them additional enrichment. The top students give them more enriching things, so they don't get bored.” (Lines 140-142)

ii. Example of the teachers who think teacher in the vignette after re-assessment should re-explain what the students who did not understand out of class time:

1. Salem says, “If there are simple things of the lesson that students did not understand, I will explain them during the next class. But if they don't understand things that need a long time to explain, then they are explained individually after class in office hours.” (Lines 121-123)

2. Ibrahim says, “I explained the lesson and then give the students handouts, but there are students who still do not understand…so I will ask the good students to re-explains to the
students who did not understand or I will re-explain to students who do not understand after the class individually.” (Line 138-140)

4.5.5 Summary

Q11: Six of the eleven teachers thought that their ideas are the same or similar to the teacher in the vignette. However, there were five teachers who thought their ideas are different from the teacher in the vignette. For example, two teachers suggested that the teacher could use homework for this part (Ahmed and Ibrahim); one other teacher thought that in this part, the teacher should assess all point of the lesson like a final assessment (Mohammed); there was a teacher who thought that the teacher should move to next lesson (Salem); and one teacher suggested that students repeat the explanation of the lesson (Faris).

Q12: Seven of eleven teachers thought the teacher in the vignette, after re-assessment, should re-explain the lesson to the students who did not understand during the next class. Five of the eleven teachers thought the teacher in the vignette after re-assessment should re-explain the lesson to the students who did not understand outside of the class time. Salem said either in class or out of class time. Bader worried about boredom with the students who had already accomplished the goals of the lesson.

4.6 Conclusion Sub-Questions

Note: Here I will mention formative assessment concept and explain to the teachers the model of formative assessment.
4.6.1 Interview Questions Regarding Response to Conclusion Sub-Questions

Looking back to the vignette, this method is called formative assessment.

Q13: Overall, what do you think of the formative assessment approach?

Q14: Can you tell me about a time when you have done something similar? Explain.

Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?
   – IF YES:
   – What do you think the difficulties or obstacles of using such instruction? Explain.
   – What do you see as hindering you from using such instruction? Explain.
   – In your opinion, how you could you overcome these difficulties or obstacles?

Q16: Given this vignette, would you adopt formative assessment in your teaching?
   – IF YES:
   – What extent you would be willing to applying formative assessment in your classroom? If so, how often?
   – What could improve the Saudi teachers to use formative assessment approach in their classrooms?
   – IF NOT: why not?

4.6.2 Summary Statement:

Q13: Teachers generally think formative assessment is a good method for use in their classrooms, but some of them said there were difficulties and obstacles that hinder its application. (Note: I combined the difficulties and obstacles with Q15.)
Q14: Generally, teachers mentioned that they use similar strategies to this method in their class to make sure of students’ understanding and repeat what the students did not understand.

Q15: There are four difficulties or obstacles that could hinder teachers from using formative assessment. Ten of eleven teachers thought that the lack of time is what hinders them from using formative assessment; two of eleven teachers thought that the large number of students in the classroom is a major obstacle in the use of formative assessment (Abdullah and Hamad); and also two of eleven teachers mentioned the length of the curriculum as one of the obstacles (Abdullah and Salem). Finally, only one teacher (Fahad) of the sample thought that it is possible that formative assessment is boring to some of the students who understand the concepts from the first stage. (Note: Omar mentioned boring in his answer of Q9 (Line 103).)

Three solutions are mentioned by teachers to overcome the difficulties or obstacles that they face using formative assessment. They include: organizing time and lesson management and working collectively as student groups.

Q16: Ten of eleven teachers would always, or most of the time, adopt formative assessment in their classrooms, and only one teacher said he would adopt formative assessment only occasionally (Fares).

Eight of eleven teachers suggested that teachers could take workshops to improve using the formative assessment approach. Another possible solution was teacher observations by visiting colleagues who have experience in the use of formative assessment; these suggestions were made by three of eleven teachers. The last suggestion
was self-development, so the teacher could improve himself in the use of formative assessment by individual reading and practice.

4.6.3 Example Quotations

Q13:

i. Example comments from those who think formative assessment is a good method and useful to their classrooms:

1. Mohammed says, “As for the formative and pre-assessment method, the teacher [in the vignette] gives a clear picture of the students' understanding of the lesson. It is very useful before moving from point to point. If this assessment is made, the teacher's explanation and transition between the lesson points will be smooth and move only after the student's understanding is fully understood. The transition from one lesson to the next is better and helps to understand the students.” (Line 143-147)

2. Abdullah says, “In my view, this method is a very excellent method of formative assessment, but I note that there are some teachers who do not use this method.” (Line 153-154).

3. Faris says, “This method is very perfect and attractive to discover the problems of students and put your hand on the problems. In this way, I do not have a difficulty to discover the students' problem, and then I could resolve this problem immediately for those students who did not understand.” (Line 143-144).

4. Salem says, “This method is very excellent after each goal explained by [the teacher in the vignette] by asking students to this goal, and this method is very excellent and powerful in the installation of information with students.” (Line 132-133)
5. Ahmed says, “It is a well-known and applied method. Its advantage is focusing on students and understanding, but there is a problem with time.” (Line 120).

Q14:

1. Mohammed says, “I use pre-assessment and formative assessment after each point in the lesson and after each activity in the lesson. So that I put questions before moving from one point to another. So, I ask questions to be discussed by students in groups or assist students individually. I make sure students understand before moving to the next point. The assessment method varies from lesson to lesson. Sometimes I use a discussion, a working paper, or oral questions.” (Lines 150-154)

2. Ibrahim says, “For me, I use formative evaluation in most classes, especially in those with mathematical problems. First, I make sure the student understands the point that I explained.” (Lines 153-156)

3. Amer says, “This method is always used so that we evaluate after each goal has been explained and if it is problematic we explain.” (Lines 137-138)

Q15:

i. Example of the teachers who think that time hinders them from using formative assessment:

1. Abdullah says, “Second, time. This method takes a long time.” (Line 172)

2. Salem says, “But we have a time problem so that the curriculum is long in the secondary school. The problem is the time because I have a curriculum. At the same time, I need to explain it very efficiently.” (Line 148-149)

3. Omar says, “The disadvantages. I see that the biggest negative is the time when the teacher finds it difficult to find time to diversify in teaching or re-explain in another way.
I discovered that the time has been limited to the teacher in the method of evaluation formative and difficult to return in another way.” (Line 146-147)

4. Hamad says, “But sometimes in the case of a large number of students may cause the length of the explanation period. If you have a larger number of students, the process of ascertaining the arrival of the concept to each student takes a longer period may be used in case if the number of students is normal or in the case of the number of students above, for example, 40 students or 50 students in some schools, make sure that the concept reaches every student and takes a longer time. The formative evaluation is an obstacle by taking a longer period of time. In the same lesson, you take more than one course of study to ensure that students' understanding is fully understood and that the formative assessment is strictly applied.” (Line 173-179)

ii. Example of the teachers who think that the large number of students in the classroom are an obstacle of using formative assessment:

1. Abdullah says, “The large number of students” (Line 173)

2. Hamad says, “But sometimes in the case of a large number of students may cause the length of the explanation period. If you have a larger number of students, the process of ascertaining the arrival of the concept to each student takes a longer period may be used in case if the number of students is normal or in the case of the number of students above. For example, with 40 students or 50 students in some schools, making sure that the concept reaches every student takes a longer time. The formative evaluation is an obstacle by taking a longer period of time. In the same lesson, you take more than one course of study to ensure that students' understanding is fully understood and that the formative assessment is strictly applied.” (Line 173-179)
iii. Example of the teachers who think that the length of curriculum as an obstacle of using formative assessment:

1. Abdullah says, “First Curriculum. The number of lessons is too many and the information is very large.” (Line 171)

2. Salem says, “But we have a time problem so that the curriculum is long in the secondary school. The problem is the time because I have a curriculum. At the same time, I need to explain it very efficiently.” (Line 148-149)

iv. Example of the teachers who think that formative assessment is boring to some of the students who understand the concepts from the first stage:

1. Fahad says, “It is possible that the method is boring to some of the students who understand it from the first stage and find that they are finished. They think that they understand the goal so why the longest period is take at the same point in that way.” (Line 213)

v. Example of the solutions are mentioned by teachers to overcome the difficulties or obstacles:

1. Ibrahim says, “For me to overcome the time problem, I use distinguished students in each group. I put the leader of the group in who is distinguished to help me correct the wrong ideas of the students in the group, instead of what I ordered on every group or every student….For example, make sure that the leader of the group solved and answer correctly. If [the teacher in the vignette] had a mistake, I correct his mistake, and then [the teacher in the vignette] corrects his peers mistakes and explain to his peers in the group and thus I benefit from the time and I use less time in the method.” (Line 177-180)
2. Abdullah says, “I overcome this problem by working collectively by dividing students into groups as well as organizing time and using the clock so that each part of the lesson has a specific time.” (Line 174-175)

3. Hamad says, “There are elements as much as we do, and there are other elements that cannot be affected. For example, the number of students. We cannot influence them because of the composition of the housing and the school serves a large number of the population in which we cannot change where we work on the aspects we appreciate and change it. For example lesson design. We try to reduce the lesson as much as we can rely on the explanation of all points, for example in some lessons where points of interest. These points should not be fully accessible to students. We try to focus on the main points. If we focus on the main points of the lesson, we will be dealing with the issue of time in its points of interest and the main points. If the number is large and the time factor is influential in the teaching process, we focus on the main points to deliver them fully and therefore take less time than we focus on the main points and enrichment.” (Line 190-198)

4. Ahmed says, “Solutions. Divide the lesson into parts and distribute the parts to student groups and assess each group.” (Line 134)

Q16:

i. **Example of the teachers who always or most times would adopt formative assessment**

1. Ibrahim says, “Yes, I always use it.” (Line 169)

2. Omer says, “By a very large percentage I adopted it.” (Line 170)

3. Hamad says, “Yes, for me formative assessment is important for all lessons.” (Line 204)
ii. Example from the teacher who would adopt formative assessment occasionally:

1. Fares says, “I uses it sometimes because I see that it is suitable for some classes and inappropriate for others because of the defects I mentioned to you.” (Line 168)

iii. Example of potential workshops:

1. Mohammed says, “Training courses for teachers by preparing them better to use this method. The courses develop the teacher and help him to master this method.” (Line 183-184)

2. Abdullah says, “One of the best ways I see it is to exchange experience between teachers and training courses. There are reciprocal visits between teachers to share experiences and make use of teachers.” (Line 192-194)

iv. Example of visiting colleagues:

1. Abdullah says, “One of the best ways I see it is to exchange experience between teachers and training courses. There are reciprocal visits between teachers to share experiences and make use of teachers.” (Line 192-194)

v. Example of self-development:

1. Ahmed says, “The teacher must develop himself so that [the teacher in the vignette] can organize time in the classroom and be aware of the individual differences and determined by the students and distribute the work between them. Developing knowledge through reading as well as applying it and learning it through its application several times to be mastered.” (Line 145-147)
4.6.4 Summary

Q13: Generally, the teachers’ opinions about formative assessment were positive and they thought it is good and useful to use in their classroom. They mentioned some of the formative assessment advantages in the examples above.

Q14: The teachers generally felt that they understood formative assessment and they were quick to assert that they used it in their classrooms.

Q15: They also generally suggested that they had to develop the skill of using it, as they tried to work around time and student population constraints. Both Mohammed and Abdullah felt that training courses and workshops would be valuable in helping teachers utilize formative assessment.

To sum up, here are four difficulties or obstacles that could hinder teachers from using formative assessment. Ten of eleven teachers thought that the lack of time is what hinders them from using formative assessment; two of eleven teachers thought that the large number of students in the classroom is a major obstacle in the use of formative assessment (Abdullah and Hamad); and also two of eleven teachers mentioned the length of the curriculum as one of the obstacles (Abdullah and Salem). Finally, only one teacher (Fahad) of the sample thought that it is possible that formative assessment is boring to some of the students who understand the concepts from the first stage. (Note: Omar mentioned boring in his answer of Q9 (Line 103))

 Teachers mentioned three solutions to overcome the difficulties or obstacles that they face in using formative assessment. Their solutions include ideas for organizing time, lesson management, and working collectively in students groups.
Q16: Ten of eleven teachers would always or most of the time adopt formative assessment in their classrooms, and only one teacher said he would adopt formative assessment only occasionally (Fares). Although teachers had concerns about using formative assessment in their classrooms, they were willing to learn some techniques that they might use to apply the technique such as workshops, visiting colleagues, and self-development. They realized the value of formative assessment and wanted to explore ways to use it.

4.7 Data Summary: The Teachers’ Analyses

The data suggest that there were two distinct groups of teachers among those interviewed. First, there were three teachers, Omar, Fahad, Hamad, who appeared to have some idea about what formative assessment is and support formative assessment. The second group of teachers included eight of the eleven sampled teachers who did not understand the formative assessment method. Most of them understood formative assessment to be simply re-teaching the lesson by using the same strategy that had been previously used or using summative assessment.

- The first group including Omar, Fahad, Hamad:

  - Omar

  - Part one: Background context of instruction: A. Initial instruction

    Omar read the initial instructions of the vignette and then was asked about his own instruction. Omar uses the lecture method due to time limitations, and he also uses other methods such as the cooperative learning method, story, and research methods. He thinks an assessment to make sure if the students understand or not that should happen after the initial instructional step.

- Part one: Background context of instruction: B. Assessment for learning
After Omar read the assessment for learning part of the vignette, he was then asked to compare what he suggested to what the teacher in the vignette did. Omar thought his opinion and what the teacher did in the vignette were closely aligned; that is, an assessment of student understanding.

Omar thought the purpose of this part is assessing students' understanding. Omar’s opinion about what the teacher in the vignette would do next indicates that he would reteach where necessary.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  At the beginning of his answer to this part of the vignette (response to formative assessment), Omar felt that teacher in the vignette should "re-explain." However, then Omar suggested that the teacher in the vignette could use other methods to re-explain, such as collaborative learning, or the search method to answer the question. So, here Omar is suggesting other strategies to re-explain to the students, which could be considered a good application of formative assessment, because he changed the teaching strategies in re-explaining.

  Omar said he uses a similar method to the method in the vignette. He mentioned that this method would help students to understand and correct their mistakes and help the students who did not understand the first time to remember and memorize information. However, he thought that this method could be a boring method for the student who has already learned the objective because the teacher would be repeating the same points.

  When Omar was asked his opinion about what the teacher should do after this part of the vignette (response to the formative assessment), he thought the teacher in the vignette should reassess his students and make sure of the students’ understanding.

- **Part two: Practice of formative assessment: B. Reassessment**
Omar thought that his ideas are similar to the teacher in this part, that is reassessment. When asked about what the teacher in the vignette should do next after the reassessment step, Omar suggested that the teacher in the vignette could ask students who did not understand to search for information about the concept on the Internet, or he could use peer-to-peer learning so that teacher in the vignette could put a student who understands the subject with a student who does not understand to benefit from each other. It would seem that Omar is suggesting that the teacher re-explain by using another strategy after the reassessment step.

- **Conclusion sub-questions:**

  Omar’s opinion about formative assessment is positive. He mentioned some advantages of formative assessment, such as the observation of continuous learning of the student. The second is to make sure that any information and any part of the curriculum is available to the students. The third point is that it is possible to develop this method of teaching. Omer thinks the disadvantages of using formative assessment is that formative assessment method will bore students who have already learned the objective, and the time constraint. Omar suggested that workshops could improve teachers ability to use formative assessment.

- **Fahad**

  - **Part one: Background context of instruction: A. Initial instruction**

    Fahad opinion about the lecture was negative. He mentioned that he would use media or handouts to assess students’ achievement. Fahad suggested an assessment for the next step after initial instruction.

  - **Part one: Background context of instruction: B. Assessment for learning**

    Fahad mentioned that his idea is close to the vignette. He assesses the students by using handouts and activities. This sounds like he values formative assessment. When Fahad was asked
about the purpose of what the teacher in the vignette did in this part (assessment for learning), Fahad valued formative assessment and gave this example: “For example, the second goal depends on the first, and the third on the second, so before moving from goal to goal, you must be sure to achieve the first goal. At each stage, you must make sure to achieve the goal and then move to the next stage.” (Lines 82-85). For the next step after assessment for learning, Fahad suggested that the teacher should follow up with students by assessing their understanding and achieving the objectives.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Fahad felt that his idea is same as the vignette in this part (response to formative assessment), and he mentioned that he always taught similarly to this part of the vignette to make sure the goal is achieved.

  Fahad explained that sometimes a teacher should move from plan A to plan B, and move from one teaching method to another if students have a problem achieving the goals. It is possible that the level of scientific understanding among students or a variety of many other factors can affect learning, so the teaching method is not just dependent upon the teacher’s style or ability. Sometimes the style of the teacher is not wrong but possible does not correspond to a specific group of students. Here Fahad indicated that he reteaches his students, and he changes the teaching strategies if the students do not achieve the objectives. Fahad thinks this method helps students to achieve goals, but the disadvantage of this method is the difficulty of moving from one teaching method to another.

  After this part of the vignette (response to formative assessment), Fahad thinks teachers should make sure students understand by assessing them.

- **Part two: Practice of formative assessment: B. Reassessment**
Fahad thought his opinion is in agreement with the vignette, and he suggested if the students still did not understand the material, he would re-explain what students did not understand out of class time.

- **Conclusion sub-questions:**
  
  Fahad’s opinion about formative assessment is positive because it helps students to achieve the goals. The disadvantage of formative assessment is that this method will bore students who have learned the objective. Fahad suggests workshop and teacher self-development by workshops and the Internet would improve teacher use of formative assessment. Fahad says, “It is very important and helps the teacher to be able to achieve the goals......It’s necessary; I always call for not to hurry in teaching but step by step and eventually reach your goal using multiple methods. Reach the goal in the easiest way.” (Line 196-202).

- **Hamad**

  - **Part one: Background context of instruction: A. Initial instruction**
    
    Hamad does not prefer to use the lecture method because he thinks it is a traditional method and in the lecture method the teacher is fully in control of the learning process. For the next step, Hamad thinks the teacher would make sure the student understands the point explained by asking questions.

  - **Part one: Background context of instruction: B. Assessment for learning**
    
    Hamad thought that what the teacher did in this part of the vignette is assessment, and it is the same as what he suggested. Hamad thought this method in assessment for learning is helpful in knowing if the students understand or not. Hamad suggested that if the students understand, he moves to the next point. However, if the most students did not understand, he would re-explain the point by using a different method, because it is possible that the explanation
method he used was not accepted by the student. Hamed says, “If I notice that the students have a high level of understanding, I move to the second points in the lesson. After the lesson, I go back to the simple part that is not understood; I apply the feedback at the end of class. But if the proportion of students understood very little, I try not to move to the next point, unless the percentage of understanding of the students is higher. For example, I explain the point in a second way because it is possible that the explanation method I used was not accepted by the student. So repeat it a second or display it in a different way until the concept is better.” (Line 77-81). Therefore, this comment sounds more like assessment for learning.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Hamad thought the method in the vignette (response to formative assessment) is almost the same as the method that he mentioned, and his comment supports his use of formative assessment. He suggested that he thinks that feedback needs to be more immediate, not in the next class. Hamad mentioned that he always applies the method in the vignette. Hamad uses this method as in the vignette to explain the concept and the students get it correctly. Also, the method is supposed to be used in the teaching process, and not for evaluation.

  Hamad mentioned for the next step after (response to formative assessment) he would make sure the students understand and focus on the students who did not understand.

- **Part two: Practice of formative assessment: B. Reassessment**

  When he was asked to compare his idea with what the teacher did in re-assessment part of the vignette, Hamad mentioned that the teacher’s method in the vignette is excellent and his suggestion is similar to the vignette. Hamad mentioned he would re-explain by using another way as the next step after reassessment. Hamad says, “If the students understood the lesson, but I still have students who do not understand. I will focus on the students who did not understand by
reviewing the previous lesson that would be at the beginning of the next lesson; my explanation relies on students’ previous knowledge. I will start with a video, and will use another way to explain the previous lesson to make sure the students will understand. After all these steps, if the students don't understand, I will give them links to enter on YouTube, pictures, or explanation that would be out of the class time.” (Lines 149-154)

- **Conclusion sub-questions:**

  Hamad thought that formative assessment is an excellent method, and this method is an appropriate way to ensure that the concept reaches more accurately to the students, and formative assessment is better than just an evaluation at the end of the lesson. For the obstacles of using formative assessment, Hamad mentioned that it is difficult to apply this method with large numbers of students and time constraints. Hamad asserted that teachers couldn’t reduce the large number of students because that depends on the population, and his school serves a large number of the population. However, the teachers could overcome the time constraint by trying to reduce the lesson as much as he can by focusing on just the main points of the lesson to save time.

  Hamad mentions that formative assessment is important for all lessons. Hamad thinks a teacher could improve himself by reading on this subject and about the teaching method.

- **The second group of teachers includes eight of the eleven sampled teachers**

- **Mohammed**

- **Part one: Background context of instruction: A. Initial instruction**

  Mohammed read the initial instructions for the vignette and then was asked about his own instruction. Mohammed had a positive comment about the lecture, but he thought another method might be better than a lecture, such as an activity. He thought an assessment should happen after the initial instructional step.
Part one: Background context of instruction: B. Assessment for learning

After Mohammed read the assessment for learning part of the vignette, and then was asked to compare his own suggestion to what the teacher in the vignette did, Mohammed regarded his idea as similar to this part of the vignette, and he felt the purpose of this idea was to assess the students' understanding. Finally, at the end of the assessment for learning part, his opinion about what the teacher in the vignette would do next sounds like an assessment for learning response because Mohammed indicated that going to the next point depends on whether or not the students learned the current point.

Part two: Practice of formative assessment: A. Response to formative assessment

Mohammed read the way the vignette responded to formative assessment, and he felt that what the teacher did was similar to his own ideas. Then, Mohammed talked about his classroom and gave an example that indicated that he used assessment for learning. His example supported his claim, because he focused on "use extra classroom activities to clarify the point or re-explain in another way." (Line 98-101).

Mohammed’s comment: “Teaching may not be appropriate, such as using traditional methods. This means that students do not understand the lesson and therefore it is best to re-explain using better methods such as classroom activity or a video showing the lesson. Re-explanation often leads to better access to information.” (Line 107-108). It is not clear that he understands that there are no perfect methods and that formative assessment and assessment for learning are appropriate for all instructional approaches.

Mohammed thought that the method of the teacher in the vignette had one advantage—that of student understanding, and the time constraint would be the disadvantage of this method.
At the end of this part Mohammed was asked his opinion regarding the next step; he thought the teacher in the vignette should make a summative assessment, such as tests or a short quiz.

- **Part two: Practice of formative assessment: B. Reassessment**

  When reviewing the part of the vignette on reassessment, Mohammed focused on reviewing the lesson objectives; he didn’t focus on the student but more on the material. He is focusing on summative assessment, rather than formative assessment or assessment for learning. When asked about what the teacher in the vignette should do next after the reassessment step, Mohammad mentioned that he would review the reason that caused the students to not understand the lesson, such as the teaching method.

- **Conclusion sub-questions:**

  Here, in the conclusion questions, Mohammed signaled his approval of formative assessment, and he thought that formative assessment is very useful before moving from point to point, but he also thought that time constraints would be an obstacle in applying this method. To overcome this obstacle, teachers should assess during the same class and not use additional classes to apply formative assessment. Also, the teacher should quickly apply formative assessment, because it would take a long time. Mohammed felt that training courses and workshops would be valuable in helping teachers utilize formative assessment.

- **Amer**

- **Part one: Background context of instruction: A. Initial instruction**

  Amer's opinion was negative about the lecture method. Amer prefers to use an activity, and he thinks the discussion method is better than the lecture. After this part of the vignette that
is the initial instruction, he was asked about the next step; he suggested using assessment, such as teacher questions.

- **Part one: Background context of instruction: B. Assessment for learning**

  Amer thought what the teacher did in this part of the vignette (assessment for learning) was the same with what he suggests, which is assessing the achievement of learning objectives. Amer considers the assessment is essential in his teaching because it shows if the student understands or not. Amer's opinion about what the teacher in the vignette would do next sounds like summative assessment. In this part he did not indicate that he would reteach his students or change his teaching method if his students did not understand.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  After Amer read the assessment for learning part of the vignette, he was then asked to compare what he suggests to what the teacher in the vignette did. Amer thought his opinion and what the teacher did in the vignette are the same. When Amer asked about applying this part (response to formative assessment), he mentioned that he would apply it if there was enough time (Q7), so time constraints determine his applicability of the assessment for learning. Amir felt that the purpose of what the teacher did in the vignette is to help students understanding. Also, the teacher in vignette did not give the correct answer, but he let the student find the answer.

  Amer felt that this method helps students to acquire information, but it has a disadvantage that the teacher did not solve the problem until the lesson is finished. When Amer was asked his opinion about what the teacher should do after this part of the vignette (response to the formative assessment), his answer sounds like reassessment of the students.

- **Part two: Practice of formative assessment: B. Reassessment**
Amer thought that his ideas are similar to the teacher in reassessment, but he thought the teacher in the vignette should give them similar questions that he had already asked while adding new questions. When thinking of the students who still do not understand, Amer felt that the final solution would be to take the students aside in their spare time and re-explain to them.

- **Conclusion sub-questions:**
  Amer mentions that formative assessment is very important, and he always uses it. However, his comments indicate that he re-teaches, and that he is not describing assessment for learning. Amer thinks time constraints are obstacles to applying this method, and he suggests that reducing explanation time and assessment time could help to overcome the problem of time constraints. Finally, Amer thinks workshops and visiting colleges that teach the application of formative assessment could improve teachers’ use of this method.

- **Abdullah**

  - **Part one: Background context of instruction: A. Initial instruction**
    Abdullah’s opinion about the lecture method was positive, and he uses this method. After this part of the vignette (initial instruction), Abdullah was asked about the next step. He suggested that he would ask students about what he explained to make sure that the information has reached the students, and he called this step “feedback.”

  - **Part one: Background context of instruction: B. Assessment for learning**
    Abdullah thought there is a little difference between what the teacher did in this part of the vignette and his idea. Abdullah thought that the teacher in the vignette’s method is one of the successful methods that can be used in order to make sure that the students have understood the lesson. The method that Abdullah used is asking student groups about what he explained to make sure that the information has reached the students, and he called this step feedback.
purpose of this step of the vignette (assessment for learning), Abdullah mentioned that his main goal is to make sure that the lesson is clear so that the students understand the lesson. When Abdullah was asked about the next step that the teacher in the vignette would do after the assessment for learning part, Abdullah comment sounds like the teacher addresses student weaknesses by giving them "extra homework," but extra homework is not re-teaching and certainly not assessment for learning.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

After Abdullah read the assessment for learning part of the vignette, and was then asked to compare what he suggests to what the teacher in the vignette did, Abdullah valued the method of the teacher in the vignette, but he says there is a little difference between his method and the teacher in the vignette method. Abdullah suggests giving students extra homework. Extra homework is not re-teaching and certainly not assessment for learning. Here he seems to suggest that what the vignette approach is better than what he had. In his answer there is no suggestion that his reviews lead to any re-teaching or assessment for learning.

Abdullah mentions assessment and that his main goal is to make sure that the lesson is clear and that the students understand the lesson. Abdullah thought the advantage of the vignette method is to improve the students’ understanding and help with achieving learning goals. On the other hand, Abdullah mentioned there are disadvantages to the vignette method, including time constraints and a large number of students in the classroom.

When Abdullah was asked his opinion about what the teacher should do after the response to the formative assessment component of the vignette, he suggests teacher would re-assess the students and makes sure that the problem is resolved by students.

- **Part two: Practice of formative assessment: B. Reassessment**
Abdullah thinks his idea is same with vignette in this part (reassessment). When Abdullah was asked if the students still did not understand the material and what do you think would be the next step, Abdullah responded, “If the problem persists, the problem may be in the way the lesson is explained. I am referring to the explanation method where there is a problem, so that I look for the problems that caused the students not to understand the lesson and try to solve it. And what the students did not understand was returned in a different way.” (Lines 144-146). Here Abdullah would reassess his instructional strategy, and he would reteach in a different way.

- **Conclusion sub-questions:**

  After Abdullah was asked about his opinion about formative assessment, he thinks this method is a very excellent, and he mentioned that he sometimes use this method by asking a student who understand the lesson to re-explain in his way to other students who did not understand.

  Abdullah thinks the time constraint could hinder his use of formative assessment, and in his answer of question (Q9), he mentions time and large number of students in the classroom are disadvantages of the method in the vignette. Abdullah mentioned he could overcome these difficulties by dividing students into groups and using cooperative learning methods. Abdullah thinks workshops and visiting colleges who apply formative assessment could improve teachers’ use of this method.

- **Ahmed**

- **Part one: Background context of instruction: A. Initial instruction**

  Ahmed mentioned that the lecture method is essential and he always uses it. Ahmed’s opinion was that the teacher in the vignette would assess the students after the initial instruction step.
• **Part one: Background context of instruction: B. Assessment for learning**

  Ahmed mentioned what the teacher in the vignette did in this part (assessment for learning) is the same as what he suggested, and he thinks assessment is an excellent method. Ahmed mentioned that he uses worksheets to assess his students. For the next step after the assessment for learning component, Ahmed’s opinion doesn't indicate that re-teaching is a possibility. He only suggests reviewing the "right answers."

• **Part two: Practice of formative assessment: A. Response to formative assessment**

  Ahmed thought his idea is similar to what the teacher did in this part of the vignette (response to formative assessment). Ahmed mentioned that he would check the answers of the students and then goes on to explain again the points that the students do not understand. However, Ahmed did not indicate that he would change his teaching strategy. Ahmed thinks the response to formative assessment method needs a long time, and he would apply it in his teaching if time allowed.

  Ahmed says, “The teacher [in the vignette] explains in a different way to help students understand and also focuses on weaknesses and improves students' understanding.” (Lines 82-83) Here Ahmed mentioned that the teacher in the vignette explains in a different way. Ahmed thought this method is excellent, and it has advantages that are the teacher focuses on weaknesses and improves students' understanding more as well as taking into account individual differences. However, he thinks time constraint and the large number of students hinder using this method.

  For the next step after response to the formative assessment step, Ahmed thought that the teacher in the vignette should review the whole lesson in general and all points. Also, he would make sure that students understand the lesson. It is possible that the teacher should give students
homework. Here it sound likes summative assessment because he will review all the point of the lesson not just what the students did not understand.

- **Part two: Practice of formative assessment: B. Reassessment**

  Ahmed suggested that there are differences between his idea, which is homework, and the teacher in the vignette method, which is a worksheet. Ahmed felt that if students still do not understand the objectives, he would try several different ways.

- **Conclusion sub-questions:**

  Ahmed thinks formative assessment is a good method, but it has a problem with the time. Ahmed solution to the time constraint would be: “Divide the lesson into parts and distribute the parts to student groups and assess each group.” (Line 134).

  Ahmed mentioned he applies formative assessment, but sometimes he does not apply it because it needs a long time. Also, Ahmed mentioned formative assessment depends on the lesson. In some lessons, he applies it, and it is effective. However, in some lessons, he does not apply it because it needs a long time.

  Ahmed thinks a teacher should consider self-development to improve his information about formative assessment.

- **Salem**

- **Part one: Background context of instruction: A. Initial instruction**

  Salem’s idea about the lecture was negative, and he mentioned he would use media or ask questions. Salem’s opinion about what the teacher in the vignette should do after the initial instruction seemed to be summative assessment.

- **Part one: Background context of instruction: B. Assessment for learning**
Here Salem mentioned that his idea is similar to what the teacher in the vignette did in this part (assessment for learning), which is to assess the students understanding.

Salem suggested that the purpose of this step (assessment for learning) is that the teacher could know if the students understood the information or not. Salem thinks this step is important because some lessons are based on past lessons, and if the teacher does not manage it well, there could be a bad problem.

For the next step after the assessment for learning part, Salem’s comment sounds like summative assessment. There’s no mention of possibly re-teaching concepts were students are weak.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Salem thought what his idea is the same as what the teacher did in this part of the vignette (response to formative assessment). Salem mentioned that he would apply the method in the vignette if the lesson were short.

  Salem felt that if the students did not understand, the teacher should repeat the information to make sure they understand the lesson, because the next lesson might depend on this lesson. Here his opinion sounds like repeat, but not re-teach by changing the teaching strategy. Salem thought that there is no disadvantage for this method.

  Salem mentioned the teacher in the vignette after the response to formative assessment step could proceed if the students now understand the objectives, but he does not indicate that he would reassess to determine whether or not learning has improved.

- **Part two: Practice of formative assessment: B. Reassessment**

  Salem thought his idea is different with what the teacher did in this part of the vignette (response to formative assessment). Salem seemed to suggest that the teacher recognizes the
value of assessment for learning that includes reassessment, and that this is better than what he had in mind.

Salem’s opinion about the next step after re-assessment was that there is a time constraint, but within the time constraint, he is still thinking about improving student learning.

- Conclusion sub-questions:

  Salem’s thoughts about formative assessment are positive. Salem said he uses formative assessment permanently, but sometimes during class and sometimes at the end of the lesson. Salem worries about time constraints and the curriculum is long in the secondary school; both of these are difficulties that hinder the use of formative assessment. He would overcome these difficulties by managing the lesson and the time, so he would then try to use this method if possible.

  Salem thinks workshops and self-development could improve teachers’ use of formative assessment.

- Ibrahim

- Part one: Background context of instruction: A. Initial instruction

  Ibrahim does not use the lecture method because students’ attention span is short, but he prefers to use the research and discussion method. Ibrahim thinks the next step after initial instruction would be to assess students understanding with teacher directed questions.

- Part one: Background context of instruction: B. Assessment for learning

  Ibrahim mentioned that his idea is almost the same as what the teacher in the vignette did in this part (assessment for learning). Ibrahim mentioned this method is a very important way to make sure how many students understood him in the classroom, and whether the method he used was good or not. Also, Ibrahim thought this method is good and better than a summative
assessment. However, his example sounds like summative assessment. There is no indication that he would re-teach where necessary. Ibrahim says, “Students answers are now assessed and students' understanding is determined to ascertain the proportion of students who understand and how much they do not understand. I focus on identifying students' erroneous ideas, for example. “The Law of Preservation of the Block,” for example, gives an extra grade to the students who understand. And I correct the students who understand them. I am correcting the idea they have. Start evaluating students' answers to make sure the point or goal is understood.” (Line 67-69)

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Ibrahim thought his idea is exactly same with what the teacher did in this part of the vignette (response to formative assessment). After reading this part, he indicated he would use this method, but he does not use it always because of the time constraint. He seemed to recognize assessment for learning because he mentioned the teacher in the vignette discovered through the answers of students that the teaching method is not good, so the teacher used a second method—learning by experience.

  Ibrahim mentioned that there are many advantages, such as changing the teaching method if it is not appropriate to the lesson or the students, and he said there is no disadvantage of this method.

  Ibrahim thinks the next step after response to formative assessment would be homework, and in the next class he makes sure of the students’ understanding from their homework answers.

- **Part two: Practice of formative assessment: B. Reassessment**

  Ibrahim believed that there are differences between his idea, which is homework, and the teacher in the vignette’s method, which is a worksheet that could assess students during the class, not like homework. Ibrahim thinks both methods are correct, but he prefers homework because it
saves time. Ibrahim gave an example about what he does if the students do not understand; he will ask the good students to re-explain to the students who did not understand, or he will re-explain to students who do not understand after the class individually. However, in his answers in this part, he focused on the time constraint, and he is trying to save time, so it sounds like he is paying attention to student needs, but it is not clear how serious he is being.

- **Conclusion sub-questions:**

Ibrahim mentioned that he prefers to use formative assessment, and he explained the advantages of formative assessment. Ibrahim says, “There are many advantages. The benefits of this assessment is that after each point shows that the method of teaching is not appropriate or will not suit the students, so I have to change the way of teaching and explain to them.” (Line 106-107). Ibrahim thinks the time constraint is a difficulty that could hinder using formative assessment, and he seems to be using peer-to-peer instruction in group settings to overcome the time constraint.

Ibrahim thinks workshops and visiting colleges are a help to improve Saudi teachers use of formative assessment.

- **Faris**

- **Part one: Background context of instruction: A. Initial instruction**

Faris mentioned that lectures are very practical, and that he also uses media. During the next step after initial instruction, Faris gives examples and asks questions, and he uses worksheets.

- **Part one: Background context of instruction: B. Assessment for learning**

Faris suggested that his idea is the same as what the teacher in the vignette did in this part (assessment for learning). For Faris, the purpose of this part is brainstorming, so the teacher can discover the information stored in the students minds.
For the next step after (assessment for learning), Faris suggests re-teaching, but it not formative assessment in that the re-teaching appears to be just explaining the concepts again. Faris did not change his teaching strategy.

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Faris felt that the teacher in the vignette’s method is the same as what he suggested. Also, however, he says yes he applies it, but it doesn't seem that he is giving examples of what he does that are similar to the vignette. Faris says, “Yes, apply it and try to let the student get the information. And I do not give him the information so that [the teacher in the vignette] concludes the information such as using brainstorming.” (Line 85-86).

  Faris thinks this method is a good method because it gives students the opportunity to infer and reach to understand by themselves, but he thinks the constraint is the disadvantage of this method. Faris mentions the next step would be to ask a student to re-explain the lesson in his own way because the student understands from his peers and receives information better than from the teacher. Then he re-assesses the students understanding after this step.

- **Part two: Practice of formative assessment: B. Reassessment**

  He is very clear; he does not prefer to reassess student learning. So, he is not ready for assessment for learning.

  Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assesses. What the teacher [in vignette] has done is good, but I don't prefer to re-assess the students.” (Lines 125-127).

- **Part two: Practice of formative assessment: B. Re-assessment**

  When he asked to compare his idea with what the teacher did in re-assessment part of the vignette, Faris was very clear; he does not prefer to reassess student learning. Therefore, it is
apparent that Faris is not ready for assessment for learning. Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assesses. What the teacher [in vignette] has done is good but I don't prefer to re-assess the students.” (Lines 125 -127).

Faris suggests if the students still did not understand, he will re-explain to them in next class.

- **Conclusion sub-questions:**

  Here, when Faris was asked about formative assessment, he seems to approve of formative assessment, and he thinks it is very perfect method. Faris mentions he sometimes use formative assessment in some classes. He thinks the time constraint is a disadvantage of this method. Faris thinks the advantages of formative assessment are to help teachers to discover the students’ problem and who did not understand.

- **Bader**

  - **Part one: Background context of instruction: A. Initial instruction**

    Bader’s opinion about the lecture was negative, because the lecture method is primitive indoctrination. He prefers to use active learning, with student-centered instruction. For the next step, Bader would ask questions and assign homework.

  - **Part one: Background context of instruction: B. Assessment for learning**

    Bader understood his suggestion to be similar to what the teacher did in the vignette (assessment for learning), and Bader mentioned giving students questions, and he would be like a mentor and supportive to the students, and they would get the information by themselves. In the vignette the teacher uses a handout describing adding sugar to juice. Bader seems to say that this should be an activity that the teacher does at the beginning of class where the students try to
answer some questions before the teacher explains the concepts involved. For the next step after assessment for learning, Bader comments sound like assessment for learning. Bader says, “Identify those who do not understand. For example, for students, I take them to the side of class and give them an activity and let them discover on their own or in groups. And because the groups are discussing the information, they can understand from a peer more than a teacher.” (Line 65-67).

- **Part two: Practice of formative assessment: A. Response to formative assessment**

  Bader approved of the vignette except that he thought that the weaker students should have been singled out. Bader thought that the way of the teacher in the vignette is wrong, because he should give handouts to only the students who do not understand the lesson. Bader mentioned he uses this method in the vignette, and he thought the teacher in vignette should re-teach because the students did not understand the lesson. The reason for the students not understanding the lesson is the teacher’s method at the beginning, because he should let the students search and answer the questions by themselves. Bader believes that the difficulty in the application of this method is the lack of an appropriate place to apply this method, such as a large and equipped science lab. For the next step, he would assess the students understanding.

- **Part two: Practice of formative assessment: B. Reassessment**

  Bader understood that what he does is similar to the vignette. Bader says he would “Divide students into three groups, that are students who do not understand, students who understood, and outstanding students. Students who do not understand, I repeat the lesson for them. Understanding students, give them additional enrichment. The top students, give them more enriching things. So don't get bored.” (Lines 140-142) Bader mentioned that he would
repeat the lesson to students who do not understand. However, he did not indicate that he would change the teaching strategy, but would repeat the lesson.

- Conclusion sub-questions:

  Bader’s opinion about formative assessment is positive, and he thinks it helps the teacher to ensure that information is delivered to the student without any shortage or problems. He would like to apply it always, but this method consumes a great time from the teacher as he explains and then is forced to repeat. Bader thinks workshops would help to improve the teachers’ ability to apply this method.

4.8 Conclusion

I began this research with an earlier study, “Investigating the Use of Formative Assessment among Male Saudi Arabian High School Science Teachers” (Kariri, K., Cobern, W. W., & Bentz, A., 2018). In the interviews for that study, I asked the teachers what they thought about formative assessment, so I mentioned the term of formative assessment directly. The results of that earlier study showed that while the interviewed teachers spoke well of formative assessment, in practice they fell far short of using the practice in their classrooms. None of the interviewees mentioned that they retaught lessons or changed methods to make sure that students had learned what they needed to learn. It was apparent that the teachers involved in these preliminary interviews felt a great deal of pressure because of a new curriculum, large class sizes, and time constraints. In other words, there was little recognition that formative assessment should lead to the adjustment of instruction to address the gaps in understanding.

This earlier study indicated that many Saudi science teachers did not understand formative assessment very well. Therefore, now in this study, it would not have been helpful to
simply ask teachers what they thought about formative assessment. Instead, I showed teachers examples of authentic formative assessment in the form of vignettes that related to the science subjects the teachers taught: physics, chemistry, and biology.

The results of this study showed that the sample of eleven teachers could be divided into two groups. First, three of eleven teachers who appeared to have some idea about what formative assessment is and support formative assessment. Second, eight of eleven teachers of the sample did not understand the formative assessment method.

To sum up, following the interviews, the interviewees, science teachers in Saudi Arabia, have a positive opinion about using practices that are forms of formative assessment as provided in the vignettes. The interviewees felt the practice in the vignette was an important technique that had many advantages. Amer summarized the formative assessment method when he indicated that if the student doesn’t understand the information in the first method, he would not fully grasp the information in the next lesson. Fahad suggested the advantage of formative assessment is that there is no hurry in this teaching method; step-by-step may be the best way to reach the learning goal.

However, the interviews showed that the difficulties and obstacles teachers felt they were facing—such as time management, large classroom sizes, and the length of the curriculum—were challenges that would need to be faced as Saudi teachers developed and utilized the technique of formative assessment. There are three solutions mentioned by teachers to overcome the difficulties or obstacles that they face using formative assessment. They include: organizing time, lesson management, and working collectively in student groups. Although teachers had concerns about using formative assessment in their classrooms, they were willing to learn some
techniques that support their use of formative assessment such as workshops, visiting colleagues, and self-development.

Here is a summary of the important point for all eleven teachers in the sample:

- Starting with the first group that includes three teachers, Omar, Fahad, Hamad, who appear to have some idea about what formative assessment is and support formative assessment.

1. Omar, at the end of assessment for learning part, suggests that what the teacher in the vignette would do next indicates that he would reteach where necessary. Then, at the beginning of his answer following the response to formative assessment portion of the vignette, Omar thought that the teacher in the vignette should "re-explain." However, then Omar suggested that the teacher in the vignette could use other methods to re-explain, such as collaborative learning, or the search method to answer the question. So here, Omar is suggesting other strategies to re-explain to the students, which seems to be a good application of formative assessment, because he changed the teaching strategies in re-explaining.

2. At the beginning of the interview Fahad’s comment indicates that he uses assessment. In the response to formative assessment, Fahad indicated that he reteaches his students, and he changes the teaching strategies if the students do not achieve the objectives. Fahad thinks this method helps students to achieve goals, but the disadvantage of this method is the difficulty of moving from one teaching method to another.

3. Hamad’s example of the assessment for learning part is, “I explain the point in a second way because it is possible that the explanation method I used was not accepted by the student. So repeat it a second time or display it in a different way until the concept is
better.” (Line 77-81). Therefore, this comment sounds more like assessment for learning. Hamad thinks the method in the vignette (response to formative assessment) is almost same as the method that he mentioned, and his comment supports his use of formative assessment. Also, he thinks the method is supposed to be used in the teaching process and not for evaluation.

- The second group of teachers includes eight of the eleven sampled teachers who did not understand the formative assessment method.

1. After the assessment of learning part (Q5), Mohammed was asked his opinion about what the teacher in the vignette would do next sounds like an assessment for learning response because Mohammed indicates that going to the next point depends on whether or not the students learned the current point. However, after the response to formative assessment, Mohammed was asked about his opinion about the next step, he thinks the teacher in the vignette should make a summative assessment such as tests or a short quiz. Also, in the reassessment portion of the vignette, Mohammed focuses on reviewing the lesson objectives. He doesn't focus on the student but more on the material. He is focusing on summative assessment, rather than formative assessment or assessment for learning.

2. Amer's opinion about what the teacher in the vignette would do after the assessment for learning step sounds like summative assessment. In this part he did not indicate that he would reteach his students or change his teaching method if his students did not understand. When Amer asked about applying this strategy (response to formative assessment), he mentioned that he would apply it if there were enough time (Q7), so time constraints determine his applicability of the assessment for learning. In the concluding
questions, Amer’s comments indicate that he re-teaches, but he is not describing assessment for learning.

3. When Abdullah was asked about the next step that the teacher in the vignette would do after both the assessment for learning and the response to formative assessment parts, Abdullah’s comments sound like the teacher addresses student weaknesses by giving them "extra homework," but extra homework is not re-teaching and certainly not assessment for learning or response to formative assessment. In the conclusion questions, when Abdullah was asked about formative assessment, he thinks this method is a very excellent, and he mentioned that he sometimes uses this method by asking a student who understands the lesson to re-explain in his way to other students who did not understand.

4. When Ahmed was asked about the next step after the assessment for learning part, Ahmed’s opinion doesn't indicate that re-teaching is a possibility. He only suggested reviewing the "right answers." Ahmed mentioned that he would check the answers of the students and then goes on to explain again the points that students did not understand. However, Ahmed did not indicate that he would change his teaching strategy, and he thinks this method needs a long time, and he would apply it in his teaching if time were allowed.

5. Salem’s opinion about what the teacher in the vignette should do after the initial instruction step would be summative assessment. Although Salem thinks this step is important because some lessons are based on past lessons, and if the teacher does not do it, the students will face a great problem. For the next step after assessment for learning, Salem’s comment sounds like summative assessment. There’s no mention of possibly re-teaching concepts where students are weak. At the end of the response to formative
assessment, Salem thinks that if the students did not understand, the teacher repeats the information to make sure they understand the lesson because the next lesson may depend on this lesson. Here his opinion sounds like the teacher should repeat, but not re-teach by changing the teaching strategy. After the reassessment section, Salem seems to suggest that the teacher recognizes the value of assessment for learning that includes reassessment and that this is better than what he had in mind.

6. At the assessment for learning part, Ibrahim’s example sounds like summative assessment. There is no indication that he would re-teach where necessary. However, after reading this part (response to formative assessment), Ibrahim indicates he would use this method in the vignette, but he does not use it always because of the time constraint. He seems to recognize assessment for learning because he mentioned the teacher in the vignette discovered through the answers of students that the teaching method was not good, so the teacher used a second method, which is learning by experience.

7. For the next step after assessment for learning, Faris suggested re-teaching, but not through formative assessment in that the re-teaching appears to be just explaining the concepts again. Faris did not change the teaching strategy. When Faris was asked to compare his idea with what the teacher did in the re-assessment part of the vignette, he was very clear; he does not prefer to reassess student learning. Therefore, it is apparent that Faris is not ready for assessment for learning.

8. Bader thought the difficulty in applying this method is the lack of an appropriate place to apply this method, such as a large and equipped science lab. Bader mentioned that he would repeat the lesson to students who do not understand. However, he did not indicate that he would change the teaching strategy, but only repeat the lesson.
4.8.1 The Four Research Questions


From discussion of the interview questions 2, 5, 7, 9, and 13:

- Interview Question 2: The interviewees were asked about what they felt should happen after the initial instructional step. All the teachers use assessment after initial instruction part. Teachers ask students about the lesson and learning objectives.

- Interview Question 5: When the teachers were asked about their opinion of the step after assessment for learning step, ten of the eleven teachers emphasized that they review and analyze the assessment result. There was only one teacher who gave no indication that he reviewed and analyzed the assessment result after the assessment for learning step.

- Interview Question 7: Although they do not use the term formative assessment, six of the eleven teachers said they always, or most times, adopted practices that are forms of formative assessment in their classrooms in ways similar to those shown in the vignette. Also, five of the eleven teachers said they sometimes use practices that are forms of formative assessment for certain circumstances and reasons. There was no teacher of the sample who said he did not adopt practices that are forms of formative assessment like the response to formative assessment section of the vignette.

- Interview Question 10: When the teachers were asked their opinion about what the teacher should do after the response to the formative assessment component of the vignette, ten of eleven teachers say the teacher in the vignette should reassess his students
and make sure of the students’ understanding. On the other hand, only one teacher of the sample, Salem, said he should move on to the next lesson after the response to formative assessment part, and he does not indicate that he would reassess to determine whether or not learning has improved.

- Interview Question 13: Teachers generally think formative assessment is a good method for use in their classrooms, but some of them said there were difficulties and obstacles that hinder its application.

4.8.1.2 Research Questions Two: What Do They See as The Advantages to be Gained by Implementing Formative Assessment?

From discussion of the interview questions 9, 13, and 14:

- Interview Question 9: Nine of eleven teachers thought that the advantage of this method is to help to improve the students’ understanding and help with achieving learning goals, and one teacher thought that this method helps to ensure the use of an effective teaching method (Ibrahim).

- From Interview Question 13 and 14: Teachers think that formative assessment is useful for their teaching, and they mention its many advantages. Amer summarized the formative assessment method when he indicated that if the student doesn’t understand the information in the first method, he would not fully grasp the information in the next lesson. Fahad suggests the advantage of formative assessment is that there is no hurry in this teaching method; step-by-step may be the best way to reach the learning goal. Teachers believe in the utility of formative assessment, and the following statements are examples of their positive assessment:
1. Mohammed says, “This way helps the teacher a lot to identify the students' understanding. It is important, even if it has its disadvantages. It works to promote education better, helps students understand and strengthens the teacher and student, and helps me move from one point to another. A teacher who does not use this method is faced with confusion by shifting misconceptions to students and thus encounters problems in the following related lessons. It helps save time and effort by tackling misconceptions faster as well as understanding the student more.” (Line 164-167)

2. Abdullah says, “One of the advantages of this method is to get the student to know and understand and overcome the problems they face.” (Line 113)

3. Ahmed says, “The teacher focuses on the weaknesses of students and improves student understanding as well as taking into account individual differences.” (Line 83-84). Also, Ahmed says, “It is a well-known and applied method. Its advantage is focusing on students and understanding, but there is a problem with time.” (Line 120).

4. Salem says, “The method is very excellent and powerful in installing information for students.” (Line 132)

5. Omar says, “This method has positives. I will explain them in the following points: first, for example, the observation of continuous learning of the student. And the second is to make sure of any information and any part of the curriculum is reached to the students or not ….. I notice whether the understanding of the lesson is received or not. And the third point is possible to develop the method of teaching, I mean to vary in ways so that if the first method is not received by students, I have the skill of diversification in teaching methods.” (Line 140-145)
6. Ibrahim says, “There are many advantages. It is the benefits of this assessment that after each point shows that the method of teaching is not appropriate or will not suit the students, so I have to change the way of teaching and explain to them.” (Line 106-107)

7. Amer says, “I prefer this method and use it always, of course, because the goals depend on what happened before. If the student did not achieve the first goal before moving to the second goal; this will cause a problem.” (Line 140-141)

8. Faris says, “This method is very perfect and attractive to discover the problems of students and put your hand on the problems. In this way, I do not have a difficulty to discover the students' problem, and then I could resolve this problem immediately for those students who did not understand.” (Line 143-144).

9. Hamad says, “This method is an appropriate way to ensure that the concept reaches more accurately to the students and better than the evaluation at the end of the lesson only.” (Line 180)

10. Fahad says, “It is very important and helps the teacher to be able to achieve the goals......Its necessary, I always call for not to hurry in teaching but step by step and eventually reach your goal using multiple methods. Reach the goal in the easiest way.” (Line 196-202).

11. Bader says, “Helps the teacher to ensure the delivery of the information and there is no shortage or problems.” (Line 151).
4.8.1.3 Research Questions Three: What Do They Say Would Hinder Their Implementation of Formative Assessment?

- From Interview Question 15: There are four difficulties or obstacles that could hinder teachers from using formative assessment. Ten of eleven teachers think that the lack of time is what hinders them from using formative assessment; two of eleven teachers think that the large number of students in the classroom is a major obstacle in the use of formative assessment (Abdullah and Hamad); and also two of eleven teachers mentioned the length of the curriculum as one of the obstacles (Abdullah and Salem). Finally, only one teacher (Fahad) of the sample thinks that it is possible that formative assessment is boring to some of the students who understand the concepts from the first stage. (Note: Omar mentioned boring in his answer of Q9 (Line 103)). Three solutions are mentioned by teachers to overcome the difficulties or obstacles that they face using formative assessment. They include: organizing time, lesson management, and working collectively as student groups.

4.8.1.4 Research Questions Four: What Support Do They Say They Would Need in Order To Implement Formative Assessment

- From Interview Question 16: Ten of eleven teachers would always or most of the time adopt formative assessment in their classrooms, and only one teacher said he would adopt formative assessment only occasionally (Fares). Although teachers had concerns about using formative assessment in their classrooms, they were willing to learn some techniques that they might use to apply the technique such as workshops, visiting
colleagues, and self-development. They realized the value of formative assessment and wanted to explore ways to use it.

Thus, following the interviews, the interviewees, science teachers in Saudi Arabia have a positive opinion about using practices that are forms of formative assessment as provided in the vignettes. The interviewees felt the practice in the vignette was an important technique that had many advantages. Amer summarizes the formative assessment method when he indicated that if the student doesn’t understand the information in the first method, he would not fully grasp the information in the next lesson. Fahad suggests the advantage of formative assessment is that there is no hurry in this teaching method; step-by-step may be the best way to reach the learning goal.

The early study (Kariri, K., Cobern, W. W., & Bentz, A., 2018) showed that the interviewees did not understand the term “formative assessment,” so when they talk about formative assessment, they may talk about something completely different. In this study, the interviewees were showed vignettes as examples of formative assessment. There were three of eleven teachers who knew clearly what formative assessment is, but back to the early study (Kariri, K., Cobern, W. W., & Bentz, A., 2018) there were no teachers who gave any indication that they knew what formative assessment is, but they just reteach or give more homework.

To sum up, there are two distinct groups of teachers among those interviewed. In the first group, there are three teachers, Omar, Fahad, Hamad, who gave some indication that they had some idea what formative assessment is and support formative assessment. However, those three teachers need some teacher development to improve their application of formative assessment and to overcome the difficulties of applying it. They mentioned time constraints, bored students who have already learned the objective, and the large numbers of students. On the other hand,
eight other teachers in the second group of teachers spoke positively about formative assessment, and they mentioned that it is a good method to use in classrooms. My impression was they knew the term formative assessment because their answers were positive about it and they seemed to know the term when I mentioned the term “formative assessment” in the conclusion questions. However, generally, their comments about the vignette and their examples showed that they did not understand the formative assessment method, because most of them had an idea about the application of formative assessment to include simply re-teaching by using the same strategy or using summative assessment. Furthermore, when these teachers saw the vignette they had difficulties in applying assessment. For example, ten of eleven teachers thought that the lack of time is what hinders them from using formative assessment; two of eleven teachers thought that the large number of students in the classroom is a major obstacle in the use of formative assessment (Abdullah and Hamad); and also two of eleven teachers mentioned the length of the curriculum as one of the obstacles (Abdullah and Salem). Finally, only one teacher (Fahad) of the sample thought that it is possible that formative assessment is boring to some of the students who understand the concepts from the first stage. Thus, I cannot say these teachers are ready to implement the formative assessment.
CHAPTER 5
CONCLUSIONS

5.1 Conclusion

This dissertation looked at the understanding and use of formative assessment in Saudi Arabian high school science classrooms. The definition of formative assessment used for the study was “an activity that is used as an assessment of learning progress before or during the learning process itself” (Hattie, 2012). Black and Wiliam (2009) distinguished the difference between formative and summative assessment by asserting that formative assessment attempts to utilize assessment techniques to inform in-process teaching and learning modifications for both teacher and student. In other words, to see what the students are learning (formative) rather than what they learned (summative).

I was prompted to create this study when I traveled from Saudi Arabia to study science education in the United States and discovered vastly different teaching techniques. I realized from observation and class work that formative assessment was an extremely important teaching strategy that was generally missing in the Saudi science classroom. I quickly engaged with the interactive nature of most American classrooms and based my dissertation on trying to understand what Saudi science teachers understood about formative assessment and how they did-or-did not use it in their classrooms. I wanted to gage the potential for integrating formative assessment techniques into Saudi classrooms as the first step in creating instructional curriculum that would include more classroom interaction and engagement.
The study utilized a qualitative, phenomenological research design; the phenomenon was formative assessment use in Saudi Arabian secondary science classrooms. The goal was to ascertain the readiness of Saudi science teachers to implement formative assessment practices in their classrooms. Data was collected using a convenience sample with interviews of volunteer classroom teachers in the Eastern Region of Saudi Arabia. Eleven participants, some convenience recruits, ended up being interviewed, and the resultant commentary formed the basis for the study. Participants were interviewed by the researcher during a visit to Saudi Arabia in the spring of 2019.

A journal article (Karini et al., 2018) and the research found in the literature review formed the basis of the research questions, all of which were related to readiness for the use of formative assessment. The questions were:

- What do Saudi Arabian science teachers think about using formative assessment when presented with authentic formative assessment examples?
- What do they see as the advantages to be gained by implementing formative assessment?
- What do they say would hinder their implementation of formative assessment?
- What support do they say they would need in order to implement formative assessment?

5.2 Addressing the Research Questions

I realized early in the research that Saudi science teachers had a very sketchy idea of the nature and value of formative assessment. Thus, in order to make sure that I, as the researcher, and the teachers I interviewed were talking about the same topic, I showed them examples in
their particular field through vignettes that were based on formative assessment instruction ideas (Keeley, Eberle & Farrin, 2005).

The most obvious response to the research questions was that when the teachers were presented with authentic formative assessment examples, some were able to recognize that these were indeed examples of formative assessment, while others had no idea of the concept or its application. Just three of the eleven teachers presented with the vignettes were able to identify with formative assessment and give examples of ways in which they had or would use formative assessment.

When asked what they thought of formative assessment as a method, they all spoke well of the practice but few teachers had adopted any of its aspects in their classrooms. This was particularly true during the initial study (Karini et al., 2018). When teachers were shown the vignettes of authentic formative assessment, more teachers responded that the method had a great deal of merit and that its use had many advantages, such as not hurrying through lessons and making frequent checks for learning.

The teachers in the study, however, found many reasons why they were not able to use formative assessment methods in their classrooms, including new curriculum, limited time, and large class sizes. They spoke of the rush to complete the curriculum, and several felt that the only way to complete the tasks at hand were through the lecture and test methods that they had always used.

Most of the teachers spoke approvingly of teacher education that would help them understand better how formative assessment could impact the learning of their students. This, some felt, could be accomplished through teacher workshops, observations of formative
assessment in action, and changes to the curriculum that would include formative assessment methods.

5.3 Implications

The major implication from this study is that the teachers interviewed are not ready to apply formative assessment in their Saudi Arabian classrooms. There are two distinct groups of teachers among those interviewed. In the first group, there are three teachers, who gave some indication that they have some idea what formative assessment is and support formative assessment. In the second group, the eight other teachers spoke positively about formative assessment, and they mentioned that it is good method to use in classroom. My impression is they know the term formative assessment because their answers are positive about it, and they seems know the term when I mentioned the term “formative assessment” in the conclusion questions. However, generally, their comments about the vignette and their examples show that they do not understand the formative assessment method, because most of them have an idea about the application of formative assessment that is simply re-teaching by using the same strategy or using summative assessment. Furthermore, when these teachers saw the vignette, they had difficulties in applying assessment.

They mentioned four difficulties or obstacles that could hinder teachers from using formative assessment. Ten of eleven teachers think that the lack of time is what hinders them from using formative assessment; two of eleven teachers think that the large number of students in the classroom is a major obstacle in the use of formative assessment (Abdullah and Hamad); and also two of eleven teachers mentioned the length of the curriculum as one of the obstacles (Abdullah and Salem). Finally, only one teacher (Fahad) of the sample thought that it is possible
that formative assessment would be boring to some of the students who understood the concepts from the first stage. (Note: Omar mentioned boring in his answer of Q9 (Line 103))

There were three solutions mentioned by teachers to overcome the difficulties or obstacles that they might face using formative assessment. They include: organizing time, lesson management, and working collectively in student groups. Although teachers had concerns about using formative assessment in their classrooms, they were willing to learn some techniques that support their use of formative assessment such as workshops, visiting colleagues, and self-development.

5.3.1 Practical Advice to Developing and Implementing Formative Assessment

Interviewed teachers mentioned four difficulties or obstacles that could hinder teachers from using formative assessment. They included the lack of time, the large number of students in the classroom, and the length of the curriculum. Interviewees suggested supports to improve their implementation of formative assessment; these included workshops, visiting colleagues, and self-development. To mitigate obstacles and address suggested supports, here is some practical advice to Saudi science teachers to help them overcome the difficulties that they faced from applying formative assessment practice. These steps include: organizing time, lesson management, and working collectively as student groups.

First of all, I would like to suggest Saudi Arabian science teachers might benefit from learning more about using formative assessment to improve their abilities of effectively using formative assessment strategies, as well as overcome the problems that they could face when applying this technique. According to Nilsson (2013) in order for new teachers to understand how to use formative assessment in their classrooms, they needed to have experienced
instruction where formative assessment was used. Therefore, Nilsson added obvious formative assessment techniques to her own classroom interactions with student teachers. Once the student teachers observed these formative assessment techniques, the prospective teachers began to look critically at what they knew about science, about children, and about their own understanding of teaching.

Secondly, when referring back to the literature review, Banilower, Pasley, and Weiss (2008) discussed the features of effective science instruction and suggested that in order for instruction to be effective, the teacher must elicit the students’ prior knowledge so that they can compare their ideas to those presented in class. Therefore, a science teacher should use pre-assessment to elicit students’ prior knowledge to understand what the students know about the lesson, as well as the misconceptions that students have, which will help the teacher to apply formative assessment by using the appropriate teaching method and assessment. Also, the teacher could monitor the development of learning progress during the class. At the same time, this strategy helps to save time and to deal with lengthy curriculum because the teacher has information about what the students know. Additionally, preassessment strategies help the teacher learn what they need to know about the students before the class begins, so they can organize the lesson objectives, classroom time, and appropriate lesson plans.

5.4 Strengths and Limitations

One major strength of this study was the use of vignettes, or examples of authentic formative assessment to help guide the interview process. This was an improvement over the preliminary study, in which there were no examples used and the teachers had a very limited frame of reference. Additionally, the teachers were able to relate the vignettes to topics that they
were actually teaching and compare the methods used in the vignette with their own experience using the example, which was in Arabic and had been adapted for use in Saudi Arabia.

An additional strength of the study was my own understanding of Saudi Arabian teaching practices as well as my personal relationships with most of the interviewees. While the subjects were eager to please me because of our prior relationships, they were also honest in their assessment of the current state of Saudi teaching practices. They were forthcoming with their concerns regarding curriculum, class sizes, and time limitations, but they also indicated that they were willing to grow and change in their future teaching strategies.

A limitation that could be remedied in future studies was that I only used self-reported interview data. It would have been helpful to have observed actual teaching sessions in the classrooms of all the teachers interviewed, particularly in the classrooms of the teachers who said that they used formative assessment methods in their classrooms.

The major limitation of the study as it was designed was the lack of a female researcher. Gender segregation is the norm in Saudi schools. Therefore, I was not able to interview any female science teachers.

5.5 Future Work

Future research will be threefold. First, I will do classroom observation to understand if and how formative assessment is being used in Saudi Arabian science classrooms. Some teachers indicated that they were familiar with these methods and used them in their classrooms. I will connect with these teachers and do classroom observations with them. I will also engage in discussions with groups of teachers and brainstorm ways that formative assessment could be implemented in their classrooms. Dini, Sevian, Caushi, and Picon (2020) created an approach to
modeling formative assessment that can be a tool to help science teachers make choices in classroom interactions that can move their students’ understanding forward to achieve curriculum goals. They highlighted three understandings: the centrality of noticing and interpreting student understanding; the teacher’s actions and what they elicit based on what they notice and interpret; and how the teacher advances the learning based on these observations and understandings. They defined and directed these three purposes: noticing and interpreting, eliciting information, and advancing learning. This method, while simple in context, can be extremely useful in helping teachers take the information they have elicited from their students and advancing those ideas to achieve the curriculum goals.

It will also be important to speak with the educators who designed the current curriculum and discuss with them changes in the curriculum that would include more formative and less summative assessment techniques. This could be followed with workshops to train teachers in the techniques that they are lacking.

Finally, it is important to find a cooperating female researcher who could conduct a similar study among female science teachers in Saudi Arabia. This will put an additional perspective on the study and broaden its impact in significant ways.
REFERENCES


Appendix A

Western Michigan University Institutional Review Board
Letter of Approval and Informed Consent
Date: February 25, 2019

To: William Cobern, Principal Investigator
    Amy Bentz, Co-Principal Investigator
    Brandy Pleasants, Co-Principal Investigator
    Khalid Kariri, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: IRB Project Number 19-02-47

This letter will serve as confirmation that your research project titled “Saudi Arabian Science Teachers and Formative Assessment” has been approved under the expedited category of review by the Western Michigan University Institutional Review Board (IRB). The conditions and duration of this approval are specified in the policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes to this project (e.g., add an investigator, increase number of subjects beyond the number stated in your application, etc.). Failure to obtain approval for changes will result in a protocol deviation.

In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB for consultation.

The Board wishes you success in the pursuit of your research goals.

A status report is required on or prior to (no more than 30 days) February 24, 2020 and each year thereafter until closing of the study.

When this study closes, submit the required Final Report found at https://wmich.edu/research/forms.

Note: All research data must be kept in a secure location on the WMU campus for at least three (3) years after the study closes.
Informed consent

Western Michigan University

Principal Investigator: Dr. William Cobern
Student Investigator: Khalid Kariri
Title of Study: Saudi Arabian science teachers and Formative Assessment

STUDY SUMMARY:
This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. Participation in this study is completely voluntary. The purpose of the research is to: will be to investigate what Saudi Arabian science teachers think about using formative assessment, and thus to better assess the readiness of Saudi science teachers to adopt formative assessment practices and will serve as Khalid Kariri’s Doctoral Dissertation in Science Education at the Mallinson Institute for Science Education for the requirements of the Ph.D. degree. If you take part in the research, you will be asked to participate by in one interview about and its use in Saudi Arabian secondary science classrooms. Your time in the study will take approximately 40 - 60 minutes to complete the interview at the time you prefer. Possible risk and costs to you for taking part in the study may be is your time, but you are protected, and you can quit any time without penalty. There is no known risk related to the interview questions because the questions involve nothing personal and potential benefits of taking part may be you may contribute to the development of teaching science in Saudi Arabia, which may benefit future generations by providing information on teacher readiness for adopting formative assessment practices. There are no direct benefits to you for participating in this research study. Your alternative to taking part in the research study is not to take part in it.

What are we trying to find out in this study?
The goal of this dissertation will be to address this absence of research investigating what Saudi Arabian science teachers think about using formative assessment, and thus to better assess the readiness of Saudi science teachers to adopt formative assessment practices.

Who can participate in this study?
The participants in our study are high school male science teachers in the Eastern Region of Saudi Arabia.

Where will this study take place?
The data would be collected by an interview in your schools or after school at a convenient public place for us to conduct the interview.

What is the time commitment for participating in this study?
You will participate by in one interview. The interview will take approximately 40 - 60 minutes to complete the interview at the time you prefer.
What will you be asked to do if you choose to participate in this study?
You will be asked to answer the interview questions about formative assessment and its use in Saudi Arabian secondary science classrooms.

What information is being measured during the study?
This study aims to investigate Saudi Arabian secondary, science teachers readiness to implement formative assessment practices and what they think about formative assessment.

What are the risks of participating in this study and how will these risks be minimized?
There is no known risk related to the interview questions because the questions involve nothing personal. The only cost of this study is your time, but you are protected, and you can quit any time without penalty. After the data are transcribed, we will use pseudonyms for all the research procedures. Also, paper copies of the text messages indicating the agreement will be kept securely by my advisor, Dr. William Cobern, and then the student researcher will delete all text messages.

What are the benefits of participating in this study?
You may contribute to the development of teaching science in Saudi Arabia, which may benefit future generations. There are no direct benefits to you for participating in this research study.

Are there any costs associated with participating in this study?
Your participation in this research is voluntary. You may elect not to participate at any time, to not answer certain questions, or to request your data not be included in the analysis, without prejudice or penalty.

Is there any compensation for participating in this study?
There will be no financial compensation for this study.

Who will have access to the information collected during this study?
All the information collected from you is confidential. That means your name or other identifying features will not be used in any analysis or in any reporting of the research. Data will be reported only in aggregate form. All transcripts of this interview will be retained for at least three years in a locked file, with only coded identifying marks, in the principal investigator’s office. Only the co-principal investigators will have access to the file. After three years the transcripts will be destroyed.

What if you want to stop participating in this study?
You can choose to stop participating in the study at anytime for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study.
Future Use of Information:
After information that could identify you has been removed, de-identified information collected for this research may be used by or distributed to investigators for other research without obtaining additional informed consent from you.

The investigator can also decide to stop your participation in the study without your consent. Should you have any questions prior to or during the study, you can contact the investigator, Khalid Kariri at [+1 (269) 779-3516/ +966569859914] or [khalidabdullah.kariri@wmich.edu]. You may also contact my advisor, who is Dr. William Cobern, Director The George G. Mallinson Institute for Science Education, University Distinguished Professor of Biological Sciences and Science Education at Western Michigan University at [+1 (269) 760-1206] or [bill.cobern@wmich.edu].

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

______________________________________________________________________________________

Please Print Your Name

______________________________________________________________________________________

Participant’s signature Date
نموذج الموافقة المسبقة

جامعة ميشيغان العربية (Western Michigan University)

المؤلف

الباحث الرئيسي: د. بيل كويرن
الطالب الباحث: آ. خالد كريزي
عنوان الدراسة: معلمو العلوم في المملكة العربية السعودية والتقييم التكويني

ملخص الدراسة:

يتمثل نموذج الموافقة المسبقة بتوافق على المشاركة في الدراسة الجملية، ويفترض عامة المعلومات التي ستساعده على تحديد قراش وعينات في المشاركة. تعتبر المشاركة في هذه الدراسة الحالية تطوعية تماماً. الهدف من الدراسة هو تحقيق من أداء وأفكار معلمي العلوم حول التقييم التكويني، ومدى استعدادهم لتطبيقه في تدريسهم الدراسية، وذلك لتحديد أبحاث كافية عن مجال موضوع البحث. هذا البحث مثابثة مشروع مثابثة للطالب خالد كريزي لرسالة الدكتوراه في قسم تعلم العلوم بجامعة ميشيغان العربية. سيتم جمع البيانات عن طرق المقابلة الشخصية، وسوف تشارك مشاركين واحدة لمدة (60 دقيقة تقريباً). وستجري في الوقت المناسب. لا يوجد أي مخاطر معرفية لل 보면ية لغة المقابلة، لأن الأسئلة لا تتعلق على سلسة شخصية.

المطلوب الواجب صوره من هذه الدراسة هو وقت المشاركة، ويجب أن يتم الإدعاء من أداء. ويتضمن حماية عامة، حيث يعتمد المشاركون سنتها خلال جراء جمع البيانات. وستقوم المواقف المتضمنة على المشاركة بسرية تامة عن طريق المشرف الدراسى فقط. ومن المذهب المستقبلي لهذه الدراسة ربما ستتمهم في تطوير تعلم العلوم في المملكة العربية السعودية، وربما ستكون بال funcionários على الأحوال القادمة في المستقبل. لا يوجد فوائد مباشرة للمشارك في هذه الدراسة. ولك كاهل الحق في عدم المشاركة في الدراسة.

ما هو الهدف من هذه الدراسة؟

الهدف من هذه الدراسة هو تحقيق من أداء وأفكار معلمي العلوم حول التقييم التكويني، ومدى استعدادهم لتطبيقه في تدريسهم الدراسية. وذلك لتحديد أبحاث كافية عن مجال موضوع البحث.

من يمكنه المشاركة في الدراسة؟

المشاركون في هذه الدراسة هم معلمو العلوم من الذكور في المرحلة الثانوية في المنطقة الشرقية في المملكة العربية السعودية.

إذا استفقت هذه الدراسة؟

سيتم جمع البيانات عن طريق المقابلة الشخصية في مدرستهم أو بعد الدوام الرسمي في المكان المناسب لإجراء المقابلة.

ما هو الوقت اللازم للدراسة؟

سوف تشارك مشاركين واحداً لمدة (60 دقيقة تقريباً) وستجري في الوقت المناسب لك.

ما هو المطلوب منك إذا أوقفت على المشاركة في الدراسة؟

سوف بطلب مشارك إجابات على أسئلة المقابلة الشخصية بخصوص التقييم التكويني وتطبيقه في المدارس الثانوية في السعودية.
ماهي المعلومات التي يتم قياسها خلال الدراسة؟

تهدف هذه الدراسة إلى التحقق من أراء وأفكار معلمي العلم حول التقييم التكويني ومدى استعدادهم تطبيقه في فصولهم الدراسية.

ما هي مخاطر المشاركة في هذه الدراسة وكيف سيتم التقليد منها؟

لا يوجد أي مخاطر معروفة تتعلق بأسلوب المقابلة، لأن الأسئلة لا تتطلب من أي شخصية المتطلب الوجود منكم في هذه الدراسة هو وقت المشاركة، وبحكم لكم الإسحاب على أي ارادة. ولضمان حماية خصوصية المشاركين سيتم استخدام أسماء مشاريع أخرى في جمع اتجاهات البحث، وسيتم حفظ الموقعة على المشاركة بطريقة تامة عن طريق المشرف الدراسى فقط.

ما هو الوالد المرجع من المشاركة في هذه الدراسة؟

لا يوجد تفاهم مباشر للمشارك في هذه الدراسة.

هل هناك أي تأكيد مرتبط بالمشاركة في هذه الدراسة؟

مثلك، ففي هذا البحث، ككل، كامل الحق في عدم المشاركة أو الإسحاب من المقابلة الشخصية في أي وقت أو عدم الإجابة عن بعض الأسئلة، وأرجو التواصل معنا إذا غيرت رأيك في المشاركة في هذا البحث.

هل هناك أي تعويضات عن المشاركة في الدراسة؟

لا يوجد أي تعويضات مالية.

من الذي يمكنه الحصول على المعلومات التي تم جمعها خلال الدراسة؟

جميع المعلومات التي يتم جمعها منك تعتبر سرية، وهذا يعني أن أسس ومعنوياتك الشخصية لن تستخدم في إجراءات البحث كتحليل للذات. سيستغرق البحث في ظل جمع محفز، وسيتم الحفاظ على جميع المعلومات من هذه المقابلة لمدة ثلاث سنوات على الأقل في ملفات مغلقة سري في مكتبنا التابع الرئيسي فقط، ولن نسمح لأي شخص بالوصول إليها سوى الباحثين المشتركون في الدراسة. وسيتم الحفظ لكل من جميع المعلومات بعد ثلاث سنوات.

ماذا لو رغبت في التوقف عن المشاركة في هذه الدراسة؟

يمكن أن تقرر التوقف عن المشاركة في الدراسة لأي سبب من الأسباب دون أن تترتب عليه أي عقوبات أو إجراءات، ولن نواجه أي نتائج أكاديمية أو شخصية إذا أخترت الإسحاب من المشاركة. كما يحق للباحث أن يوقف مشاركتك في الدراسة دون الرجوع إلى موافقتك.

الاستخدام المستقبلي للمعلومات التي تم جمعها:

بعد إزالة المعلومات التي تحدد هوت، قد يتم استخدام المعلومات التي تم جمعها من قبل الباحثين وقد تستخدم لتبادل أخرى دون أخذ موافقة إضافية منكم.
إذا كان لديك أي أسئلة قبل أو أثناء الدراسة، الرجاء التواصل مع الباحث، خالد كريري على وسائل التواصل التالية:
(khalidabdullah.kariri@wmich.edu) أو (+1 629-779-3516/ +966569859914) أو [bill.cobern@wmich.edu] (269) 760-1206] [FEB 25 2019]
ويمكن التواصل مع مشرف الدراسة د. بيل كوبنر عن طريق:
قد تمت الموافقة على نموذج الموافقة المباشرة والسماح لإستخدامه لمدة سنة واحدة من قبل لجنة المراجعة المؤسسية للبحوث الإنسانية "Human Subjects Institutional Review Board (HSIRB)". لا تشارك في الدراسة إذا كان هذا النموذج مخالفاً بتاريخ قيد من سنة.

لفترات هذه الوثيقة (نموذج الموافقة المباشرة)، وأن الفوائد والمخاطر قد تم شرحها لك، فماذا موافق على المشاركة في هذه الدراسة.

اسم المعلّم:
التاريخ:
التوقيع:
Appendix B

Recruitment Protocol in English
Date:

Dear Mr. _____________

After Greetings,

I am a lecturer in Education College at Imam Abdulrahman Bin Faisal University and now a Ph.D. student in Western Michigan University in the United States as a Science Education major, and my advisor is Dr. Bill Cobern, University Distinguished Professor of Biological Sciences and Science Education at Western Michigan University. We are conducting a dissertation research titled, “Saudi Arabian science teachers and Formative Assessment.” We would like to investigating what Saudi Arabian science teachers think about using formative assessment, and thus to better assess the readiness of Saudi science teachers to adopt formative assessment practices.

We are inviting you to participate in an interview. It will take approximately 40 - 60 minutes to complete the interview. We will be able to conduct the interview at time and place that are convenient for you.

All the information collected from you is confidential. That means your name or other identifying features will not be used in any analysis or in any reporting of the research. Your participation in this research is voluntary. You may elect not to participate, to quit at any time during the interview, or to not answer certain questions, or to contact me if you change your mind about participating. You may choose how much or how little you will participate without prejudice or penalty. The information collected about you for this research will not be used by or distributed to investigators for other research.

Please carefully read the attached Informed Consent Form. If you wish to participate in an interview, please respond to this message, so that we can review the Consent Form and make an appointment for the interview should you wish to continue.

We are willing to answer any questions

Best wishes,

Khalid Kariri

+1 269-779-3516/ +966569859914/ khalidabdullah.kariri@wmich.edu

Doctoral student at Mallinson Institute for Science Education, Western Michigan University

Lecturer in Education College at Imam Abdulrahman Bin Faisal University
Appendix C

Recruitment Protocol in Arabic
التاريخ:

المكرم الأستاذ /

المحترم،

السلام عليكم ورحمة الله وبركاته

أفيدكم بأنني محاضر بكلية التربية بجامعة الإمام عبد الرحمن بن فيصل، والأن أدرس الدكتوراه في تخصص تعلم العلوم في جامعتي ميشيغان الغربية (Western Michigan University) في الولايات المتحدة الأمريكية، ومشرفي الآداب هو الأستاذ الدكتور بيل كاربن، أستاذ العلوم البيولوجية وتعليم العلوم ومديرة قسم جورج مالينسون لتعليم العلوم بجامعة ميشيغان الغربية. نحن نقوم بإجراء بحث لرسالة دكتوراة بعنوان "معلمو العلوم في المملكة العربية السعودية وقيمة التكوين". ورغب في التحقق من آراء وأفكار معلمي العلوم حول التقييم التكويني و مدى استعدادهم لتطبيقه في فصولهم الدراسية.

نحن ندعوكم للمشاركة في هذه الدراسة من خلال المقابلة الشخصية لمدة (40 - 40) دقيقة تقريباً. إجراء المقابلة سيكون في الوقت المناسب والمكان المناسب لكم.

جميع المعلومات الخاصة بكِ والتي يتم جمعها عن طريق المقابلة ستحتفظ بها بسرية تامة، فلن يتم استخدام اسمك أو أي وسيلة تعريفية تدل علىك في التحليل أو إجراءات البحث. مشاركتك في هذا البحث هي تطوعية، فكلكم كأمل الحق في عدم المشاركة أو الإسحاب من المشاركة الشخصية في أي وقت تريده، أو عدم الإجابة عن بعض الأسئلة، وكذلك لكم الحق في تحديد مقدار مشاركتكم في هذه الدراسة دون أن تكون مسئولة، ولن يتم استخدام المعلومات التي يتم جمعها في هذا البحث في أي أبحاث أخرى.

كما أرجوا منكم قراءة النموذج المرفق للمواصفة الشخصية بدقة. إذا كنت ترغبون في المشاركة في المقابلة الشخصية، الرجاء الرد على هذه الرسالة لنقوم بمراجعة نموذج الموافقة المسبقة ومحدد موعد للمقابلة الشخصية.

إذا لمكم أي أسئلة أو استفسارات لا تترددون في الاتصال بي.

ولكم جزيل الشكر والتقدير،

خالد بن عبدالله كريري

المحاضر بجامعة الإمام عبد الرحمن بن فيصل

طالب الدكتوراه بجامعة ميشيغان الغربية

+966569859914

khalidabdullah.kariri@wmich.edu
Appendix D

Appointment Message in English
Thank you for considering participation in my study. Please be sure to look at the Consent Form, in the attachment, and let me know if you have questions. If you are reliable to the Consent Form, I would like to make an appointment for the interview, so please specify the date, time, and place that are convenient for you to conduct the interview.

Best wishes,

Khalid Kariri

+1 269-779-3516/ +966569859914

khalidabdullah.kariri@wmich.edu

Doctoral student at Mallinson Institute for Science Education, Western Michigan University

Lecturer in Education College at Imam Abdulrahman Bin Faisal University
Appendix E

Appointment Message in Arabic
شكراً جزيلاً على إهتمامك بالمشاركة في هذه الدراسة. أرجو منك أن تتطلع على نموذج الموافقة، وكما أرجو أن لا تتردد بال التواصل معنا إذا كان لديك أي أسئلة دعنا نقوم بتحديد موعد للمقابلة الشخصية. أرجو أن تحدد التاريخ والوقت والمكان المناسب لكم لإجراء المقابلة الشخصية.

ولكم جزيل الشكر والتقدير،

خالد بن عبدالله كريري

المحاضر بجامعة الإمام عبد الرحمن بن فيصل
وطالب الدكتوراه بجامعة ميشيغان الغربية

+1 269-779-3516 / +966569859914

khalidabdullah.kariri@wmich.edu
Appendix F

Informed Consent in English
Informed Consent

Western Michigan University

Principal Investigator: Dr. William Cobern

Student Investigator: Khalid Kariri

Title of Study: Saudi Arabian science teachers and Formative Assessment

You have been invited to participate in a research project titled "Saudi Arabian science teachers and Formative Assessment." This project will serve as Khalid Kariri’s Doctoral Dissertation in Science Education at the Mallinson Institute for Science Education. This consent document will explain the purpose of this research project and will go over all of the time commitments, the procedures used in the study, and the risks and benefits of participating in this research project. Please read this consent form carefully and completely and please ask any questions if you need more clarification.

What are we trying to find out in this study?

The goal of this dissertation will be to address this absence of research investigating what Saudi Arabian science teachers think about using formative assessment, and thus to better assess the readiness of Saudi science teachers to adopt formative assessment practices.

Who can participate in this study?

The participants in our study are high school male science teachers in the Eastern Region of Saudi Arabia.

Where will this study take place?

The data would be collected by an interview in your schools or after school at a convenient public place for us to conduct the interview.

What is the time commitment for participating in this study?

You will participate by in one interview. The interview will take approximately 40 - 60 minutes to complete the interview at the time you prefer.

What will you be asked to do if you choose to participate in this study?

You will be asked to answer the interview questions.

What information is being measured during the study?
This study aims to investigate Saudi Arabian secondary, science teachers readiness to implement formative assessment practices and what they think about formative assessment.

What are the risks of participating in this study and how will these risks be minimized?

There is no known risk related to the interview questions because the questions involve nothing personal. The only cost of this study is your time, but you are protected, and you can quit any time without penalty. After the data are transcribed, we will use pseudonyms for all the research procedures. Also, paper copies of the text messages indicating the agreement will be kept securely by my advisor, Dr. William Cobern, and then the student researcher will delete all text messages.

What are the benefits of participating in this study?

You may contribute to the development of teaching science in Saudi Arabia, which will benefit future generations.

Are there any costs associated with participating in this study?

Your participation in this research is voluntary. You may elect not to participate at any time, to not answer certain questions, or to request your data not be included in the analysis, without prejudice or penalty.

Is there any compensation for participating in this study?

There will be no financial compensation for this study.

Who will have access to the information collected during this study?

All the information collected from you is confidential. That means your name or other identifying features will not be used in any analysis or in any reporting of the research. Data will be reported only in aggregate form. All transcripts of this interview will be retained for at least three years in a locked file, with only coded identifying marks, in the principal investigator’s office. Only the co-principal investigators will have access to the file. After three years the transcripts will be destroyed.

What if you want to stop participating in this study?

You can choose to stop participating in the study at anytime for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study.

The investigator can also decide to stop your participation in the study without your consent.
Should you have any questions prior to or during the study, you can contact the investigator, Khalid Kariri at [+1 (269) 779-3516/ +966569859914] or [khalidadbullah.kariri@wmich.edu]. You may also contact my advisor, who is Dr. William Cobern, Director The George G. Mallinson Institute for Science Education, University Distinguished Professor of Biological Sciences and Science Education at Western Michigan University at [+1 (269) 760-1206] or [bill.cobern@wmich.edu].

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

-------------------------------------------------------------------------------------------------------------------

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

Please Print Your Name

___________________________________ ____________________________
Participant’s signature Date
Appendix G

Informed Consent in Arabic
نموذج الموافقة المسبقة
جامعة ميشيغان الغربية (Western Michigan University)

الباحث الرئيسي: أ.د. بيل كوبن
الطالب الباحث: أ. خالد كريري

عنوان الدراسة: معلمو العلوم في المملكة العربية السعودية والتقييم التكويني

أنت مدعو للمشاركة في الدراسة البحثية بعنوان "معلمو العلوم في المملكة العربية السعودية والتقييم التكويني". هذا البحث بمثابة مشروع بحثي لرسالة الدكتوراه في قسم تعليم العلوم بجامعة ميشيغان الغربية. هذا النموذج سيقدم شرح عن الغرض من هذه الدراسة البحثية، وسيوضح الوقت والإجراءات المستخدمة ومخاطر وفوائد المشاركة في هذه الدراسة. الرجاء قراءة هذا النموذج بعناية وطرح أي أسئلة أو استفسارات.

1. ما هو الهدف من هذه الدراسة؟
الهدف من هذه الدراسة هو التحقق من آراء وأفكار معلمي العلوم حول التقييم التكويني، ومدى إستعدادهم لتطبيقه في فصولهم الدراسية، وذلك لعدم توفر أبحاث كافية عن مجال موضوع البحث.

2. من يمكنه المشاركة في الدراسة؟
المشاركين في هذه الدراسة هم معلمو العلوم من الذكور في المرحلة الثانوية في المنطقة الشرقية في المملكة العربية السعودية.

3. أين ستنفذ هذه الدراسة؟
سيتم جمع البيانات عن طريق المقابلة الشخصية في مرادستكم أو بعد الدوام الرسمي في المكان المناسب لكم لإجراء المقابلة.

4. ما هو الوقت اللازم للدراسة؟
 سوف تشارك بمقابلة واحدة لمدة (04-05) دقيقة تقريبا، وستجري في الوقت المناسب لك.

5. ما هو المطلوب منك إذا وافقت على المشاركة في الدراسة؟
سوف يطلب منك الإجابة على أسئلة المقابلة الشخصية.

6. ما هي المعلومات التي يتم قياسها خلال الدراسة؟
تهدف هذه الدراسة إلى التحقق من آراء وأفكار معلمي العلوم حول التقييم التكويني ومدى إستعدادهم لتطبيقه في فصولهم الدراسية.

7. ما هي مخاطر المشاركة في هذه الدراسة وكيف سيتم التقليل منها؟
لا توجد أي مخاطر معروفة تتعلق بآسالة المقابلة، لأن الأسئلة لا تنطوي على أسألة شخصية. المتطلبات الوحيدة منكم في هذه الدراسة هو وقت المشاركة، وحقكم الإسحاب من أرادة. ولضمان حماية خصوصية المشاركين سيتم استخدام أسماء مستعارة في جميع إجراءات البحث. وسيتم حفظ الموافقة على المشاركة بسرية تامة عن طريق المشرف الدراسي فقط.
ما الفوائد المرجوة من المشاركة في هذه الدراسة؟
ربما تكون مساهماً في تطوير التعليم في المملكة العربية السعودية، مما سيعود بالنفع على الأجيال القادمة في المستقبل.

هل هناك أي تكاليف مرتبطة بالمشاركة في هذه الدراسة؟
مشاركتك في هذا البحث هي تطوعية، فلك كامل الحق في عدم المشاركة أو الإنسحاب من المقابلة الشخصية في أي وقت أو عدم الإجابة عن بعض الأسئلة، وأرجو التواصل معنا إذا غيرت رأيك في المشاركة في هذا البحث.

هل هناك أي تعويضات عن المشاركة في الدراسة؟
لا يوجد أي تعويضات مالية.

من الذي يمكنه الحصول على المعلومات التي تم جمعها خلال الدراسة؟
جميع المعلومات التي سنجمعها منك تعتبر سرية، وهذا يعني أن اسمك ومعلوماتك الشخصية لن تستخدم في إجراءات البحث كتحليل البيانات. سيتم استخدام البيانات في نماذج بشكل مجمل، وسيتم الاحتفاظ بجميع النصوص من هذه المقابلة لمدة ثلاث سنوات على الأقل في ملفات مقفلة برموز سرية في مكتب الباحث الرئيسي فقط، وسنحمي أي شخص بالوصول إليها سوى الباحثين المشاركين في الدراسة. وسيتم التخليص كلما من جميع النصوص بعد ثلاث سنوات.

ماذا لو رغبت في التوقف عن المشاركة في هذه الدراسة؟
يمكنك أن تقرر التوقف عن المشاركة في الدراسة لأي سبب من الأسباب دون أن تترتب عليك أي عقوبات أو إجراءات، ولن تواجهك أي نتائج أكاديمية أو شخصية إذا أخترت الإسحاب من المشاركة. كما يحق للباحث أن يوقف مشاركتك في الدراسة دون الرجوع إلى موافقتك.

إذا كان لديك أي أسئلة قبل أو أثناء الدراسة، الرجاء التواصل مع الباحث، خالد كريري على وسائل التواصل التالية:
(1) 269 779 3516 أو (966569859914) +1. أكا 269 760 1206 أو bill.cobern@wmich.edu.
ويمكنك الحصول على نموذج الموافقة المسبقة من قبل لجنة المراجعة المؤسسية للبحوث الإنسانية "Human Subjects Institutional Review Board (HSIRB)". قد تمت الموافقة على نموذج الموافقة المسبقة والسماح لإستخدامه لمدة سنة واحدة من قبل لجنة المراجعة المؤسسية للبحوث الإنسانية "Human Subjects Institutional Review Board (HSIRB)". لا تشارك في الدراسة إذا كان هذا النموذج مختوط بتاريخ أقدم من سنة.

لقد قرأت هذه الوثيقة (نموذج الموافقة المسبقة)، وأن الفوائد والمخاطر قد تم شرحها لك، وأنا موافق على المشاركة في هذه الدراسة.

اسم المعلم:
التاريخ:
Appendix H

Interview Protocol (Vignettes and Interview Questions) in Arabic
المقابلة الشخصية

تأكيد الموافقة:
أود أن أشكرك على الموافقة على المشاركة في هذه الدراسة. قبل أن نبدأ، من فضلك إقرأ نموذج الموافقة، وأخبرني إذا كان لديك أي أسئلة.

هل أنت موافق على نموذج الموافقة؟
إذا كان الإجابة بنعم، أرجو منك التوقيع على نموذج الموافقة المسبق. إذا كان الإجابة بلا، نتوقف عن إجراء المقابلة.

تمهيد:
أرجو أن تحدثني عن ما تخرجت منها، خبرتك التعليمية، المراحل الدراسية التي تدرسها حالياً، التخصص الذي تدرسه (فيزياء، أو كيمياء، أو أحياء).

أطلب من المشارك في المقابلة قراءة الأمثلة المرفقة، ثم نبدأ بطرح أسئلة المقابلة الشخصية أدناه بعد كل قسم:

مثال 1: درس مصغر لمادة الأحياء، عنوان النشاط "هل هذا الكائن ينتمي للحيوانات؟"
(Keeley, Eberle, & Farrin, 2005, pp. 117-122)

1. بداية الدرس
أ. التمهيد والشرح:
الأستاذ أحمد معلم أحياء للصف الأول ثانوي. شرح درساً بعنوان "خصائص الحيوانات". أهداف الدرس: 1) أن يحدد الطلاب خصائص الحيوانات التي تميزها عن الكائنات الحية في الممالك الأخرى. 2) من خلال الصور والوصف المكتوب للكائنات الحية يصبح الطالب قادراً على التعرف على الحيوانات بناءً على خصائصها.

قام أحمد بشرح الدرس باستخدام طريقة المحاضرة ووضوح خصائص الحيوانات وما يميزها عن غيرها وقام بعرض صور توضيحية لذلك.

أسئلة المقابلة الشخصية:

س/ هل سبق لك تطبيق طريقة تدريس مشابهة للطريقة المستخدمة في هذا المثال؟

1. إذا كان الجواب ينعم، ما سبب استخدامك لها، وهل تعتقد أنها الطريقة المثلى؟ إشرح من فضلك.

2. إذا كان الجواب بلا، لم لا؟ إشرح الطريقة التي من الممكن أن تستخدمها في هذه الحالة؟

ب. تقييم التعلم:

ومن ثم قال أ. أحمد: "أحمد يوزع أوراق عمل على طلابه تحتوي على صور للكائنات حية مختلفة تتمنى للنباتات والفطريات وكذلك للحيوانات، وتتضمن ورقة العمل على سؤال وهو "هل هذا الكائن ينتمي للحيوانات؟"، وطلب من كل طالب الإجابة على السؤال وتحديد كل كائن ما إذا كان ينتمي للحيوانات أم لاً مع الشرح. في نهاية الحصة الدراسية، أعاد الطلاب أوراق العمل للمعلم بعد أن أجابوا على السؤال.
أسئلة المقابلة الشخصية:

س٣/ من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ما قام به المعلم وما قمت بتقريمه في إجابتك السابقة؟

س٤/ من وجهة نظرك، ما هو الهدف مما قام به المعلم في المثال المطروح أمامك؟ إشرح أكثر من فضلك.

س٥/ في ضوء ماقل المعلم في هذا المثال، من وجهة نظرك، ما الذي سيقوم به المعلم لاحقًا؟

٢. ممارسة التقييم التكويني:

أ. التقييم التكويني

بعد إنتهاء الحصة الدراسية، قام أ. أحمد بمراجعة إجابات الطلاب، ومن خلال إجاباتهم تأكد أن الطلاب لديهم مشكلة في تحديد الشعاب المرجانية كحيوانات مع أن الوصف المقدم لهم يبين أن خصائص الشعاب المرجانية تجعلها تنتمي لمملكة الحيوانات. فتوصل أ. أحمد أن الطلاب كان اعتمادهم فقط على شكل الشعاب المرجانية في الصور وليس على خصائصها كحيوانات. فقرر التركيز على هذه المشكلة قبل الانتقال للدرس التالي.

في الحصة القادمة، قام أ. أحمد بتقسيم الطلاب إلى مجموعات، وقام بتوزيع أوراق عمل تتضمن تتضمن أوصافلة للشعاب المرجانية، ولكن لا تحتوي على صور. ثم طلب من كل مجموعة مناقشة ما إذا كانت الشعاب المرجانية حيوانات أم لا، وذلك إعتمادًا على خصائصها مع توضيح الإجابة.

بعد ذلك يتجول أ. أحمد بحول مجموعات الطلاب ويستمع إلى نقاشهم. وطرح أسئلة موجهة ليحدد الأفكار والمفاهيم الخاطئة. بعد إنتهاء المجموعات من المناقشة، قام أ. أحمد بقيادة النقاش الجماعي وطرح جميع الطلاب، وطلب من الطلاب استخدام خصائص الحيوانات التي تميزها عن غيرها من المخلوقات لتحديد الشعاب المرجانية كحيوانات. وقام بتوضيح أي ليس لدى الطلاب.

أسئلة المقابلة الشخصية:

س٢/ من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ما قام به المعلم وما إقترحته في إجابتك السابقة؟

س٣/ هل تطبق في تدريسي طريقة مماثلة للتي قام بها المعلم في المثال المطروح؟ إذا كان الجواب بنعم، ما مدى تطبيقك لها؟ من فضلك إشرح بإيجاز كيف تقوم بتطبيقها في تدريسك.

إذا كان الجواب بلا، ننتقل للسؤال التالي.

س٤/ من وجهة نظرك، بما مدى تطبيقك لها؟ من فضلك إشرح بإيجاز كيف تقوم بتطبيقها في تدريسك.

س٥/ ما هي إيجابيات وسلبيات الطريقة التي قام بها المعلم في المثال؟ أشرح أكثر من فضلك.

س٦/ في ضوء ماقل المعلم في هذا المثال، من وجهة نظرك، ما الذي سيقوم به المعلم لاحقًا؟
وفي نهاية الحصة الدراسية، قام أ. أحمد بتوزيع أوراق عمل مشابهة لتلك التي استخدمها في اليوم السابق، وفي هذه المرة تحتوي على صور ووصف للحيوانات التي قد يواجه الطلاب في تحديدها مشكلة مثل الشعاب المرجانية. وطلب من الطلاب الإجابة عليها بشكل فردي.

أسئلة المقابلة الشخصية:

س١١/ من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ما قام به المعلم والطريقة التي قمت بإقتراحها في إجابتك السابقة؟

س١٢/ إذا افترضنا أن المعلم لاحظ أن طلابه لم يفهموا الدرس بعد، ما هي الخطوة القادمة التي سيتبعها المعلم من وجهة نظرك؟

الأسئلة الختامية:

في هذا القسم سنتحدث عن طريقة التقييم التكويني (البنائي) مع استخدام نموذج توضيحي.

س١٣/ بشكل عام، ما وجهة نظرك من تطبيق طريقة التقييم التكويني؟

س١٤/ هل سبق لك تطبيق طريقة تدريس مشابهة للطريقة المستخدمة في هذا المثال (طريقة التقييم التكويني)؟

س١٥/ في حال رغبتك في تطبيق مثل الطرق المستخدمة في المثال (التقييم التكويني) هل هناك معوقات أو صعوبات ستواجهك؟

إذا كان الجواب بنعم:

* من فضلك أذكر هذه المعوقات والصعوبات التي ستواجهك عند استخدام هذه الطرق.

* من وجهة نظرك، ما هو العائق الأكثر أهمية الذي سيمنعك من استخدام هذه الطرق؟

ما الذي يمكن أن تقوم به لمواجهة وتخطي هذه المعوقات والصعوبات؟

إذا كان الجواب باللا، إشرح من فضلك، لماذا؟

س١٦/ في ضوء المثال المطروح للدالة على التقييم التكويني، هل ستعتمد تطبيق طريقة التقييم التكويني في تدريسك؟

إذا كان الجواب بنعم:

* ما مدى رغبتك في تطبيق التقييم التكويني؟ هل ستكون هذه الطرق غالبًا على طريقة تدريسك، أم نادراً

* ما ستستخدمها.

* كيف يمكن تطوير معلم العلوم في السعودية بحيث يصبح متمكنًا من تطبيق طريقة التقييم التكويني؟

إذا كان الجواب بلا، إشرح من فضلك، لماذا؟

مثال ٢: درس مصغر لمادة الكيمياء، عنوان النشاط "عصير الليمون" (Keeley, Eberle, & Farrin, 2005, pp. 55-59)

1. بداية الدرس

أ. التمهيد والشرح: 
الأستاذ علي: معلم كيمياء للصف الثاني ثانوي. شرح درساً بعنوان حالات المادة. أهداف الدرس: 
١) أن يستخدم الطالب أسلوبه في تعريف حالات المادة وكيف يمكن أن تتغير المادة من الحالة الصلبة إلى الحالة السائلة، وأن يكون قادرًا على ذكر أمثلة لكل منها.
٢) أن يعرف الطالب بأسلوبه قانون حفظ المادة بعد ذوبان المادة الصلبة في المذيب مع ذكر أمثلة على ذلك.

في بداية الحصة الدراسية قام أ. علي بشرح حالات المادة وقانون حفظ الكتلة باستخدام طريقة المحاضرة، وركز على كيفية ذوبان المواد الصلبة.

أسئلة المقابلة الشخصية:

س١/ هل سبق لك تطبيق طريقة تدريس مشابهة للطريقة المستخدمة في هذا المثال؟
- إذا كان الجواب بنعم، ما سبب استخدامك لها، وهل تعتقد أنها الطريقة المثلى؟ إشرح من فضلك.
- إذا كان الجواب بلا، لمَ لا؟ إشرح الطرق التي من الممكن أن تستخدمها في هذه الحالة؟

س٢/ في ضوء ماقام به المعلم في هذا المثال، من وجهة نظرك، مالذي سيقوم به المعلم لاحقًا؟

ب. تقييم التعلم:
ومن ثم قام أ. علي بوزع ورقة عمل على طلابه تحتوي على صورة ومسألة رياضية بما يتعلق بذوبانية السكر في عصير الليمون غير المحلى. تتضمن المسألة وزن عصير الليمون قبل إضافة السكر، وزن السكر، ومن ثم وضع سؤال عن وزن الخليط بعد إذابة السكر في عصير الليمون. سؤال آخر هو: هل يتغير الوزن أم لا؟ مع الشرح. في نهاية الحصة الدراسية، أعاد الطلاب أوراق العمل للمعلم بعد أن أجابوا عليها.

أسئلة المقابلة الشخصية:

س٣/ من ملاحظتك لما قام به المعلم في المثال؟ كيف تقارن بين ماقام به المعلم وما قمت بإقتراحه في إجابتك السابقة؟
س٤/ من وجهة نظرك، ما هو المفيد مما قام به المعلم في المثال المطروح أمامك؟ إشرح أكثر من فضلك.
س٥/ في ضوء ماقام به المعلم في هذا المثال، من وجهة نظرك، مالذي سيقوم به المعلم لاحقًا؟

٢. ممارسة التقييم التكويني:
أ. التقييم التكويني:
بعد إنتهاء الحصة الدراسية، قام أ. علي بمراجعة إجابات الطلاب، ومن خلال إجاباتهم تأكد أن هناك مشكلة يواجهها الطلاب وهي أنهم يعتقدون أن المادة الصلبة تختفي تماماً عند ذوبتها، وهذا يتعارض مع قانون حفظ المادة. فقرر تكييف تدريسه وعدم الانتقال للدروس التالية حتى يفهم الطلاب هذه النقطة.

وفي الحصة التالية، طلب أ. علي من الطلاب تدريبوا في صفيح حلوان ماء حفظ المادة في سياق الذوبان. حيث جلب عدداً كافياً من الكؤوس التي تحتوي على عصير الليمون غير المحلى، وسكر، وميزان. ثم قام بوزع عصير الليمون غير المحلى والسكر على الطلاب. وطلب من كل طالب أن يقوم بوزن الكأس الذي يحتوي على عصير الليمون غير المحلى وتسجيل الوزن. وثم طلب من الطلاب إضافة السكر إلى العصير غير المحلى وتخليطه. وبعد ذلك، طلب من الطلاب وزن الخليط (عصير الليمون بعد إذابة السكر فيه) وتسجيل الوزن، ومقارنة وزن عصير الليمون غير المحلى وزن الخليط.
بعد ذلك أتاح للطلاب مناقشة التغير في الوزن بين وزن عصير الليمون غير المحلى ووزن الخليط ومشاركة النقاش مع جميع الطلاب. وذلك للإجابة على أسئلة الطلاب وتصحيح المفاهيم الخاطئة إن وجدت.

أسئلة المقابلة الشخصية:

س٢/ من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين مقامقته مع المعلم وما إقتراحاته في إجابك السابقة؟

س٧/ هل تطبق في تدريسك طريقة مشابهة للتي قام بها المعلم في المثال المطروح؟

أ ما كان الجواب بنعم، ما مدى تطبيقاتك لها؟ من فضلك إشرح كيف تقوم بتطبيقها في تدريسك.

أ ما كان الجواب بلا، ننتقل للسؤال التالي.

س٨/ من وجهة نظرك، لماذا قام المعلم بإعادة تدريس النقطة التي لم يفهمها الطلاب كما في المثال؟ ما الأسباب التي حملته على ذلك من وجهة نظرك؟

س٩/ ما هي إجابات وسلبيات الطريقة التي قام بها المعلم في المثال؟ أشر أكثر من فضلك.

س١٠/ في ضوء ما قام به المعلم في هذا المثال، من وجهة نظرك، ماذا سيقوم بالمعلم لإجابة عليها بشكل فردي.

ب- إعادة التقييم مرة أخرى:

وفي نهاية الحصة الدراسية، قام المعلم بدعوة أوراق عمل مضبوطة للكلاص استخدمها في اليوم السابق. وفي هذه المرة ركز على النقطة التي واجه الطلاب مشكلة في فهمها وهي قانون حفظ المادة في سياق ذوبان المادة الصلبة. وطلب من الطلاب الإجابة عليها بشكل فردي.

أسئلة المقابلة الشخصية:

س١١/ من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ما قام به المعلم والطريقة التي قمت بإقتراحها في إجابك السابقة؟

س١٢/ إذا إفترضنا أن المعلم لاحظ أن طلابه لم يفهموا الدرس بعد، ماهي الخطوة القادمة التي سيتبعها المعلم من وجهة نظرك؟

الأسئلة الختامية:

في هذا القسم سنتحدث عن طريقة التقييم التكويني (البنائي) مع استخدام نموذج توضيحي.

س١٣/ بشكل عام، ما وجهة نظرك من تطبيق طريقة التقييم التكويني؟

س١٤/ هل سبق لك تطبيق طريقة تدريس مشابهة لطريقة المستخدمة في هذا المثال (طريقة التقييم التكويني)؟

س١٥/ في حال رغبت في تطبيق مثل الطريقة الموضحة في المثال (التقييم التكويني) هل هناك معوقات أو صعوبات ستواجهك؟

أ ما كان الجواب بنعم:

من فضلك أذكر هذه المعوقات والصعوبات التي ستواجهك عند استخدام هذه الطريقة.

من وجهة نظرك، ما هو العائق الأكثر أهمية الذي سيمنعك من استخدام هذه الطريقة؟
ما الذي يمكن أن تقوم به لمواجهة وتخفي هذه المعوقات والصعوبات؟

س 1/ في ضوء المثال المطروح للدالة على التقييم التكويني، هل ستعتمد تطبيق طريقة التقييم التكويني في تدريسك؟
- إذا كان الجواب بنعم:
  - ما مدى رغبتك في تطبيقك للتقييم التكويني؟ هل ستنبؤ هذه الطريقة غالباً على طريقة تدريسك، أم نادراً ما سستخدمها.
  - كيف يمكن تطوير معلم العلوم في السعودية بحيث يصبح متمكناً من تطبيق طريقة التقييم التكويني؟

إذا كان الجواب بلا، إشرح من فضلك، لماذا؟

مثال 3: درس مصغر لمادة الفيزياء، عنوان النشاط "انعكاس الضوء" (Keeley, Eberle, & Farrin, 2005, pp. 25-29)

1. بداية الدرس
أ. التمهيد والشرح:
الأستاذ فيصل: معلم فيزياء للصف الثاني ثانوي. شرح درساً بعنوان الضوء والذي يتضمن مفهوم انعكاس الضوء. أهداف الدرس: (1) أن يحدد الطالب خصائص الضوء. (2) أن يرسم الطالب نموذج يوضح انعكاس الضوء. (3) أن يشرح الطالب كيفية انعكاس الضوء من الأجسام إلى أعيننا وبالتالي نتمكن من رؤيته.

ب. تقييم التعلم:
بعد ذلك، قام أ. فيصل بتوزيع أوراق عمل على طلابه تضمنت قائمة من مواد مختلفة (مثل: ماء، حصى، ورقا، مرارة، خشب، إلخ) والسؤال: بعد المواد التي يمكنها أن تعكس الضوء؟ وطلب من الطلاب تحديدها بوضع دائرة حولها مع الشرح. في نهاية الحصة الدراسية، أعاد الطلاب أوراق العمل للمعلم بعد أن أجابوا على السوال.

ب. تقييم التعلم:
أسئلة المقابلة الشخصية:

س/3 من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ماقام به المعلم وما قمت بإقتراحه في إجابتك السابقة؟

س/4 من وجهة نظرك، ما هو الهدف مما قام به المعلم في المثال المطروح أمامك؟ إشرح أكثر من فضلك.

س/5 في ضوء ماقام به المعلم في هذا المثال، من وجهة نظرك، ما الذي سيقوم به المعلم لاحقًا؟

2. ممارسة التقييم التكويني:

أ. التقييم التكويني

بعد إنتهاء الحصة الدراسية، قام أ. فيصل بمراجعة إجابات الطلاب، ومن خلال إجاباته تأكد أن الطلاب فهموا أن إنعكاس الضوء يساعدنا على الرؤية، ولكن هناك مشكلة يواجهها بعض الطلاب وهي أنهم يعتقدون أن بعض المواد المرئية لا تعكس الضوء. فأدرك أ. فيصل أنه يتعين عليه تكييف أساليب التدريس لمساعدة الطلاب على فهم أن جميع المواد المرئية تعكس الضوء، ومن ثم الإنتقال للدروس التالية.

وفي الحصة التالية، أ. فيصل قسم الطلاب إلى مجموعات، وقام بعرض صورتين أ reservى. الصورة الأولى تتضمن جميع المواد التي كتبها ورق عمل في الحصة السابقة. وأما الصورة الثانية فإنه صورة عبارة عن صورة تحتوي على اللون الأسود فقط. وكتب عليها شرح أنها تتضمن نفس المواد التي في الصورة الأولى ولكن هذه الصورة أخذت في الظلام الحلال. ومن ثم فتح المجال للطلاب للنقاش حول الصورتين. وسأل لماذا لم يتمكن الطالب من رؤية المواد في الصورة الثانية كما في الصورة الأولى.

أتاح أ. فيصل للطلاب مناقشة سبب عدم متكاهم من رؤية المواد في الصورة الثانية، وشارك أ. فيصل في المناقشة إذا لزم الأمر. وكذلك يجيب على أسئلة الطلاب يصحح أخطئهم ومعاهمهم الخاطئة.

أسئلة المقابلة الشخصية:

س/6 من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ماقام به المعلم وما قمت بإقتراحه في إجابتك السابقة؟

س/7 هل تطبق في تدريسك طريقة مشابهة لتي قام بها المعلم في المثال المطروح؟

- إذا كان الجواب نعم، ما مدى تطبيقك لها؟ من فضلك إشرح إبجاح كيف تقوم بتطبيقها في تدريسك.

- إذا كان الجواب بلا، ننتقل للسؤال التالي.

س/8 من وجهة نظرك، لماذا قام المعلم بإعادة تدريس النقطة التي لم يفهمها الطلاب كما في المثال؟ ما الأسباب التي حملته على ذلك من وجهة نظرك؟

س/9 ما هي إجابات وسلسلات الطريقة التي قام بها المعلم في المثال؟ أشرح أكثر من فضلك.

س/10 في ضوء ماقام به المعلم في هذا المثال، من وجهة نظرك، ما الذي سيقوم به المعلم لاحقًا؟

ب. أعادة التقييم مرة أخرى

وفي نهاية الحصة الدراسية، قام أ. فيصل بتوزيع أوراق عمل مشابهة لتلك التي استخدمها في اليوم السابق. وفي هذه المرة ركز على النقطة التي لم يفهمها الطلاب وهي انعكاس الضوء. وطلب من الطلاب الإجابة عليها بشكل فردي.
أسئلة المقابلة الشخصية:

س١ / من ملاحظتك لما قام به المعلم في المثال، كيف تقارن بين ما قام به المعلم و الطريقة التي قمت بإقتراحها في إجابتك السابقة؟

س٢ / إذا افترضنا أن المعلم لاحظ أن طلابه لم يفهموا الدرس بعد، ماهي الخطوة القادمة التي سيتبعها المعلم من وجهة نظرك؟

الأسئلة الختامية:

في هذا القسم سنتحدث عن طريقة التقييم التكويني (البنائي) مع استخدام نموذج توضيحي.

س٣ / بشكل عام، ما وجهة نظرك من تطبيق طريقة التقييم التكويني؟

س٤ / هل سبق لك تطبيق طريقة تدريس مشابهة لطريقة المستخدمة في هذا المثال (طريقة التقييم التكويني)؟

س٥ / في حال رغبتك في تطبيق مثل الطريقة الموضحة في المثال (التقييم التكويني)، هل هناك معوقات أو صعوبات ستواجهك؟

إذا كان الجواب بنعم:

- من فضلك أذكر هذه المعوقات والصعوبات التي ستواجهك عند استخدام هذه الطريقة.
- من وجهة نظرك، ما هو العائق الأكثر أهمية الذي سيمكنك من استخدام هذه الطريقة؟
- ما الذي يمكن أن تقوم به لمواجهة وتحلل هذه المعوقات والصعوبات؟

س٦ / في ضوء المثال المطروح للدلالة على التقييم التكويني، هل ستعتمد تطبيق طريقة التقييم التكويني في تدريسك؟

إذا كان الجواب بنعم:

- ما مدى رغبتك في تطبيقك للتقييم التكويني؟ هل ستكون هذه الطريقة غالباً على طريقة تدريسك، أم نادراً ما ستستخدمها.
- كيف يمكن تطوير معلم العلوم في السعودية بحيث يصبح متمكنًا من تطبيق طريقة التقييم التكويني؟

إذا كان الجواب بلآ، إشرح من فضلك، لم لا؟
Appendix I

Interview Protocol (Vignettes and Interview Questions) in English
Vignette 1 “Is it an Animal?”

This interview vignette, to be used with biology teachers, is based on Keeley et al. (2005, pp. 117-122). Keeley et al. (2005) suggest that students at this level should “exhibit a general understanding of taxonomic classification and use hierarchical groupings to understand that seemingly different organisms in different phyla belong to the animal kingdom” (p. 119). They also suggest that probing student understanding will determine whether students revert to their old operating definitions. The assessment involves students responding to the following image.

“The purpose of this assessment probe is to elicit students’ ideas about animals. The probe specifically seeks to find out what characteristics students use to determine whether an organism is classified as an animal” (p. 118).

In Saudi Arabia, biology is taught in the first year of high school, and Unit 6 of the Saudi curriculum is titled “Animal Characteristics.”
The vignette “Is It an Animal?” is appropriate for this unit. The “Is it an Animal” was translated and adapted into the interview protocol using the model in Table I-1 as follows:

Part one: Background context of instruction

- Initial instruction

The interview opens with the subject reading the following text. The text describes the initial instruction in this vignette.

Mr. Ahmed is a biology teacher for first year of high school students. He taught a lesson on Animal Characteristics. The learning objectives for this lesson are: 1) the students will identify the characteristics of animals that make them different from other biological kingdoms, 2) and the student will able to identify if a given picture of an organism, with a written description, is an animal, based on its characteristics.

Mr. Ahmed chose to lecture on the characteristics of animals and the differences between animals and other organisms. He used pictures and verbal explanations of animals and other organisms to show his students the differences between them.

- Interview questions regarding initial instruction

Once the teaches has carefully read the above text, the interview proceeds with the following questions:

Q1: Is this method of teaching something you used in your teaching?

- IF YES, why? Do you think this is best method? Explain.
- IF NO, why not? Please, explain to me what method you could use?

Q2: Based on how Mr. Ahmed introduced the material, what do you think he should do next?

- Assessment for learning
Once the above interview questions have been answered, the interview proceeds to the second part of the background context of instruction, which is the assessment for learning. The subject reads the following text:

After his lecture, Mr. Ahmed decided to give each of his students a handout that included pictures and descriptions of organisms and the question, “Is it an Animal?” The handout also required the students to state why they decided on their answer. Students handed the worksheet in when they finished.

- Interview questions regarding assessment for learning

Q3: How does what Mr. Ahmed did compare to your idea?

Q4: In your opinion, what is the purpose of what Mr. Ahmed did? Please explain.

Q5: What do you think Mr. Ahmed should do next?

Part two: Practice of formative assessment

- Response to formative assessment

Once the above interview questions have been answered, the interview proceeds to the first part of practice of formative assessment, which is response to formative assessment. The subjects read the following text:

After class Mr. Ahmed checked his students’ answers to the assessment and discovered that students had trouble identifying corals as animals, even though the descriptions listed several characteristics that made it clear corals are animals. He realized that students were relying only on what corals in the pictures looked like, not on the given characteristics of animals. So, Mr. Ahmed decided to focus on this trouble that students were having.

For the next day’s class, Mr. Ahmed divided students into groups and gave them handouts that included only descriptions of corals’ characteristics to look at, with no pictures. He asked
the student groups to discuss if corals are animals or not based on their characteristics with an explanation of the answer.

Mr. Ahmed walks around the classroom, listening to the groups' justifications. Mr. Ahmed uses guided questioning to determine any incorrect ideas or misconceptions. When Mr. Ahmed identifies that each group of students has completed the discussion, he leads a whole class discussion. At this point, he allows the students to use the animal characteristics to justify their discussion about identifying corals as animals, using guidance question to address any confusions.

- Interview questions regarding response to formative assessment:

Q6: How does what Mr. Ahmed did in his lesson compare to what you were thinking?

Q7: Would this be something you could see yourself doing in a classroom?
   - IF YES,
   - How often?
   - Please briefly describe for me how you have done it.
   - IF NOT, move to next question.

Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did?

Q9: What are the pros and cons of taking such an approach? Please explain.

Q10: What do you think Mr. Ahmed do next?
   - Re-assessment

Once the above interview questions have been answered, the interview proceeds to the second part of practice of formative assessment, which is re-assessment. The subjects read the following text:
Mr. Ahmed handed out a worksheet similar to the one he had used the day before, but this one included more pictures and descriptions of confusing animals as corals. The student had to individually do the work again, and then hand it in.

- Interview questions regarding response to re-assessment:

  Q11: How does what Mr. Ahmed did in this part of the lesson compare to what you were thinking?

  Q12: If Mr. Ahmed had determined that the students still did not understand the material, what do you think he should do next?

Once the above interview questions have been answered, the interview proceeds to the conclusion sub-questions:

Conclusion sub-questions:

Note: Here I mention formative assessment concept and explain to the teachers the model of formative assessment.

Looking back to the vignette, this method is called formative assessment:

Q13: Overall, what do you think of the formative assessment approach?

Q14: Can you tell me about a time when you have done something similar? Explain.

Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?

  - IF YES:

  - What do you think the difficulties or obstacles of using such instruction? Explain.

  - What do you see as hindering you from using such instruction? Explain.

  - In your opinion, how you could you overcome these difficulties or obstacles?

Q16: Giving this vignette, would you adopt formative assessment in your teaching?
• IF YES:
  • What extent you would be willing to applying formative assessment in your classroom? If so, how often?
  • What could improve the Saudi teachers to use formative assessment approach in their classrooms?
• IF NOT: why not?

Vignette 2 “Lemonade”

This interview vignette is based on Keeley et al. (2005, pp. 55-59) to be used with chemistry teachers. The authors suggest that students at this grade level develop a more sophisticated picture of a particular model of matter and dissolving. They have a beginning understanding of hydrogen bonds and the attraction between molecules of a solute and a solvent. They may combine their understanding of a particulate model of matter with the conservation of dissolved substances. They may also revert to old conceptions. The assessment involves students responding to the following image.

“The purpose of this assessment probe is to elicit students’ ideas about conservation of matter in the context of dissolving. The probe is designed to find out what students think about the total
weight or mass of a solution when a solute, such as sugar, seemingly ‘disappears’ in a solvent” (p. 56).

In Saudi Arabia chemistry is taught during the second year of high school. It is Unit 6: States of Matter. The “Lemonade” was translated and adapted into the interview protocol using the model in Table I-1 as follows:

Part one: Background context of instruction

- Initial instruction

The interview opens with the subject reading the following text. The text describes the initial instruction in this vignette.

Mr. Ali is a chemistry teacher for second year of high school students. He taught a lesson called States of Matter. The learning objectives of this lesson are: 1) the students will use their own words to define the three main states of matter: solid, liquid, or gas, and be able to give examples for each. 2) The students will use their own words to define the conservation of matter after the solid matter dissolves, and be able to give an example related to state of matter.

Mr. Ali chose to lecture on the states of matter, discussing how there can be a change from a solid matter to a liquid matter. He mentioned the concept of conservation of matter by focusing on how some solids can dissolve.

- Interview questions regarding initial instruction

Once the teaches has carefully read the above text, the interview proceeds with the following questions:

Q1: Is this method of teaching something you used in your teaching?

- IF YES, why? Do you think this is best method? Explain.
• IF NO, why not? Please, explain to me what method you could use?

Q2: In this case Mr. Ali taught the lesson this way, so what do you think he would do next?

• Assessment for learning

Once the above interview questions have been answered, the interview proceeds to the second part of the background context of instruction, which is the assessment for learning. The subject read the following text:

After his lecture, Mr. Ali decided to give each of his students a handout that included pictures and a mathematical problem regarding the dissolving of sugar in unsweetened lemonade, as well as to decide if the lemonade changes the weight. The handout also required the students to describe their thinking about the answer they chose. Students handed in their work.

• Interview questions regarding assessment for learning

Q3: How does what Mr. Ahmed did in this part of his lesson compare to what you were thinking?

Q4: In your opinion, what is the purpose of what Mr. Ali did? Please explain.

Q5: What do you think Mr. Ali do next?

Part two: Practice of formative assessment

• Response to formative assessment

Once the above interview questions have been answered, the interview proceed to the first part of practice of formative assessment, which is response to formative assessment. The subjects read the following text:

After class Mr. Ali checked his students’ answers in the assessment and discovered that students were confused about one point; they thought the mass of a solution dissolves when a
solute seemingly “disappears” in a solvent, so this is incompatible with the conservation of matter. He realized that he would have to adapt his teaching methods if he were to help the students identify the conservation of matter in the context of dissolving, which is the point that students were having trouble with.

So, for the next day’s class, Mr. Ali decided to ask students to implement a class activity about the conservation of matter in the context of dissolving. He brought enough unsweetened lemonade, sugar, and cups for the entire class. He pulls out the scales for each student, passes out the cups and has the students weigh the cups and write the weight on their paper.

Then he goes around the class, filling each cup with unsweetened lemonade and gives the students a small amount of sugar. The students weigh the lemonade without sugar, note the weight, note the weight of the sugar and then combine the sugar and lemonade, which they then weigh. Then, he lets the students discuss the changes in weight of unsweetened lemonade and sweetened lemonade, engaging in whole class discussion, in order to answer the students' questions and challenge any incorrect conceptions.

Interview questions regarding response to formative assessment:

Q6: How does what Mr. Ahmed did in this part of his lesson compare to what you were thinking?

Q7: Would this be something you could see yourself doing in a classroom?

- IF YES,
  - How often?
  - Please briefly describe for me how you have done it.
- IF NOT, move to next question.
Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did?

Q9: What are the pros and cons of taking such an approach? Please explain.

Q10: What do you think Mr. Ali do next?
   • Re-assessment

   Once the above interview questions have been answered, the interview proceeds to the second part of practice of formative assessment, which is re-assessment. The subjects read the following text:

   Mr. Ali hands out a worksheet similar to the one he had used the day before and focused on the point that students had misunderstand regarding the conservation of matter in the context of dissolving. The students individually did the work again and handed it in.

   • Interview questions regarding response to re-assessment:

Q11: How does what Mr. Ahmed did in this part of the lesson compare to what you were thinking?

Q12: What if Mr. Ali had determined that the students still did not understand the material? What would you think he should do next?

   Once the above interview questions have been answered, the interview proceeds to the conclusion sub-questions:

   Conclusion sub-questions:

   Note: Here I mention formative assessment concept and explain to the teachers the model of formative assessment.

   Looking back to the vignette, this method is called formative assessment:

Q13: Overall, what do you think of the formative assessment approach?
Q14: Can you tell me about a time when you have done something similar? Explain.

Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?

• IF YES:
  • What do you think the difficulties or obstacles of using such instruction? Explain.
  • What do you see as hindering you from using such instruction? Explain.
  • In your opinion, how you could you overcome these difficulties or obstacles?

Q16: Giving this vignette, would you adopt formative assessment in your teaching?

• IF YES:
  • What extent you would be willing to applying formative assessment in your classroom?
    If so, how often?
  • What could improve the Saudi teachers to use formative assessment approach in their classrooms?
• IF NOT: why not?

**Vignette 3 “Can It Reflect Light?”**

This interview vignette is based on Keeley et al. (2005, pp. 25-29) to be used with physics teachers. The authors suggest that students at this level should have developed more sophisticated ideas about light reflection and optics. They may be stuck in their understanding of their older ideas that things like dull or bumpy surfaces might inhibit light reflection. The concept of light reflection by ordinary objects is fundamental to optics instruction and is used to understand image processes like photography. The assessment involves students responding to the following image.
“The purpose of this assessment probe is to elicit students’ ideas about light reflection off ordinary objects and materials. The probe is designed to find out if students recognize that all non-light-emitting objects that we can see reflect some light or if they believe that only certain types of objects reflect light” (p. 26).

In Saudi Arabia, physics is taught in the second year of high school in the curriculum. This lesson is in Unit 1 called Light. The “Can It Reflect Light?” was translated and adapted into the interview protocol using the model in Table I-1 as follows:

Part one: Background context of instruction

- Initial instruction

The interview opens with the subject reading the following text. The text describes the initial instruction in this vignette.

Mr. Faisal is a physics teacher for second-year high school students. He taught a lesson, Light. The learning objectives of this lesson are: 1) students will identify the characteristics of light. 2) The students will able to draw a picture showing the reflection
of light. 3) The students will define in their own words how the reflection of light helps sight.

Mr. Faisal chose to lecture on a lesson called light, which included the concept of the reflection of light. His intent was to teach students how light reflects from an object to our eyes. He explained how if you can see something, it must have been reflecting light.

- Interview questions regarding initial instruction

Once the teaches has carefully read the above text, the interview proceeds with the following questions:

Q1: Is this method of teaching something you used in your teaching?
   
   • IF YES, why? Do you think this is best method? Explain.
   
   • IF NO, why not? Please, explain to me what method you could use?

Q2: In this case Mr. Faisal did the lesson this way, so what do you think he would do next.

   • Assessment for learning

   Once the above interview questions have been answered, the interview proceeds to the second part of the background context of instruction, which is the assessment for learning. The subject read the following text:

   After his lecture, Mr. Faisal decided to give each of his students a handout that included a list of items with the question, “Can it reflect light?” Students circled the items that they thought reflected light. Students handed in their work.

- Interview questions regarding assessment for learning

Q3: You see what Mr. Faisal did; how is that comparing to what you think?

Q4: In your opinion, what is the purpose of what Mr. Faisal did? Please explain.

Q5: What do you think Mr. Faisal should do next? Part two: Practice of formative assessment
Response to formative assessment

Once the above interview questions have been answered, the interview proceed to the first part of practice of formative assessment, which is response to formative assessment. The subjects read the following text:

After class Mr. Faisal checked over the answers. Mr. Faisal realized that his students understand that the reflection of light helps sight, but many of them thought that some of the visible objects did not reflect the light. He realized that he would have to adapt his teaching methods to help the students identify that all visible objects reflect light, thus making them visible. This will enable the class to move on to the next lesson.

So, for the next day’s class, he divides students into groups, and he appoints the students, who reach the lesson objectives as leaders of the group discussion to help other students who have misunderstandings. Then, Mr. Faisal holds up two pictures. In the first picture, he includes all objects that were in the worksheet. They discuss the reflection of light. In the second picture, he includes the same objects, but this time everything is dark because the lights are off and windows closed. He again lets students discuss why they could not see the objects in the second picture, and he engages in the discussion, if necessary, answering the students questions and correcting their mistakes and misconceptions.

Interview questions regarding response to formative assessment:

Q6: How does what Mr. Faisal did in his lesson compare to what you were thinking?

Q7: Would this be something you could see yourself doing in a classroom?

• IF YES,
  • How often?
  • Please briefly describe for me how you have done it.
• IF NOT, move to next question.

Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did?

Q9: What are the pros and cons of taking such an approach? Please explain.

Q10: What do you think Mr. Faisal should do next?

• Re-assessment

Once the above interview questions have been answered, the interview proceeds to the second part of practice of formative assessment, which is re-assessment. The subjects read the following text:

Mr. Faisal hands out a worksheet similar to the one he had used the day before and focuses on the point that students had misunderstand. The students individually did the work again and handed it in.

• Interview questions regarding response to re-assessment:

Q11: How does what Mr. Faisal did in this part of his lesson compare to what you were thinking?

Q12: What if Mr. Faisal had determined that the students still did not understand the material? What would you think he should do next?

Once the above interview questions have been answered, the interview proceeds to the conclusion sub-questions:

Conclusion sub-questions:

Note: Here I mention formative assessment concept and explain to the teachers the model of formative assessment.

Looking back to the vignette, this method is called formative assessment:
Q13: Overall, what do you think of the formative assessment approach?

Q14: Can you tell me about a time when you have done something similar? Explain.

Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?

- IF YES:
  - What do you think the difficulties or obstacles of using such instruction? Explain.
  - What do you see as hindering you from using such instruction? Explain.
  - In your opinion, how could you overcome these difficulties or obstacles?

Q16: Giving this vignette, would you adopt formative assessment in your teaching?

- IF YES:
  - What extent you would be willing to applying formative assessment in your classroom? If so, how often?
  - What could improve the Saudi teachers to use formative assessment approach in their classrooms?

IF NOT: why not?
Appendix J

Tables
Table J-1. The Teachers' Subject Areas of Physics, Chemistry, and Biology

<table>
<thead>
<tr>
<th>The teachers' names (pseudonyms)</th>
<th>The teachers' subject areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mohammed</td>
<td>Physics</td>
</tr>
<tr>
<td>2. Abdullah</td>
<td>Biology</td>
</tr>
<tr>
<td>3. Ahmed</td>
<td>Biology</td>
</tr>
<tr>
<td>4. Salem</td>
<td>Physics</td>
</tr>
<tr>
<td>5. Omar</td>
<td>Physics</td>
</tr>
<tr>
<td>6. Ibrahim</td>
<td>Chemistry</td>
</tr>
<tr>
<td>7. Amer</td>
<td>Physics</td>
</tr>
<tr>
<td>8. Faries</td>
<td>Chemistry</td>
</tr>
<tr>
<td>9. Hamad</td>
<td>Physics</td>
</tr>
<tr>
<td>10. Fahad</td>
<td>Chemistry</td>
</tr>
<tr>
<td>11. Bader</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

Table J-2. Themes and Codes: Part 1. Background Context of Instruction: A. Initial Instruction

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Themes/Codes</th>
<th>Example Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Q1: Is this method of teaching something you used in your teaching? Prefer to apply the lecture method.</td>
<td>Teachers who apply the lecture method in their teaching, or think it is a good method for their classes.</td>
<td>Abdullah says, “Yes, I apply this method as an introduction to the lesson. It takes 5 to 10 minutes. Then I ask questions about the subject of the basic lesson and possibly introduce pictures.” (Line 48-49)</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td></td>
<td>Ahmed says, “Sure, this method is essential to me and I always use it.” (Line 42)</td>
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<td></td>
<td></td>
<td></td>
<td>Omar says, “I use this teaching method, especially since the curriculum is a lot, or time is limited, so I use it to shorten the time. But in general there are many types of methods can...”</td>
</tr>
<tr>
<td></td>
<td>(4 teachers)</td>
<td></td>
<td>be used such as classroom discussion or cooperative learning or learning through a certain scientific story or learning by research.” (Line 35-37)</td>
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<tr>
<td></td>
<td>Faris says, “It is very practical. We use it a lot in this way or borrow it with a video clip if the tools are available.” (Line 34- 35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Do not prefer to apply the lecture method</td>
<td>Teachers who don’t apply the lecture method in their teaching, or think it is not a good method for their classes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7 teachers)</td>
<td></td>
<td>Mohammed says, “Of course, the method of lecture and the delivery is good, but there are better ways. For example, I use a scientific experiment or activity that shows the student a lesson in a way that makes it easier to understand the lesson deeper, and learning becomes more stable in students. The use of a scientific activity or experiment is better than the abstract explanation of the concept.” (Line 51-53)</td>
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<td></td>
<td>Salem says, “The method of teaching used is the lecture, which I do not like, and there are better ways like using a picture or video to raise the attention of students and then ask questions and hear from the students instead of starting the teaching directly in the explanation of the manner of the lecture.” (Line 37- 41)</td>
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Ibrahim says, “As for the way the teacher [in the vignette] used the lecture method, I do not use it in my teaching. I use the method of reasoning. I ask the student to research and then start discussing with them. I do not like to use the method of the interview at the beginning of the lesson because the student is often attentive with me for 6 minutes or 7 minutes and then not focused. I prefer to keep the students in the lesson. I used the method of discussion and conclusion. I let the student look for information and then start to discuss with him.” (Line 35-39)

Amer says, “But the method used to explain the lesson is wrong in my view because it is not thought provoking. It is supposed to display a mirror on the students and ask them as if the picture appears as an input to the lesson. The explanation method is the lecture method, not very suitable. There are many ways to teach, for example, if you have a picture or a mirror. These are simple and available methods that can be used for the lesson and then begin to discuss the students and use the discussion method better than the lecture method.” (Line 36-40)

Hamad says, “The lecture method is the traditional method. It is clear that the teacher [in the vignette] is fully controlled in the learning process. I did not notice students participation in the class but only the listener. It became clear to me from this method that teacher teach and student just listen, that means the teacher is the master of the educational process and the student the listener.......regardless of the distribution of students in the classroom imposed at the beginning of any new part or even if students have an idea about the lesson is expected from teachers to ask questions, for example, or show a picture or video and ask students and take answers directly.” (Line 34-44)
<table>
<thead>
<tr>
<th>C</th>
<th>Assist students after initial instruction step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2: What do you think he should do next?</td>
<td>Teachers use assessment after initial instruction part. Teachers ask students about the lesson and learning objectives. (11 teachers; all teachers in the sample)</td>
</tr>
</tbody>
</table>

<p>| | |</p>
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</thead>
<tbody>
<tr>
<td>Fahad says, “This method is negative because it depends on the teacher, as well as education, depends on the teacher. The teacher used the method of the lecture, and this is wrong on his part. But the learning should depend on the student more than the teacher. It is special that the student is possible for the student to be the one who deduces the information and gets it. I do not use lecture because I want learning to depend on the student to get the information by himself.” (Line 47-51)</td>
<td></td>
</tr>
<tr>
<td>Bader says, “The method does not achieve the goals because the student must discover the information, but the teacher [in the vignette] here gave him the information, and this is contrary to active learning, the method now used in Saudi Arabia; active learning, that is, the student looking and learning and explore, the teacher used the method of indoctrination is primitive and old.” (Line 32-34)</td>
<td></td>
</tr>
<tr>
<td>Mohammed says, “The first step: the teacher [in the vignette] explains the lesson that is light and reflection. After the explanation, the teacher must ask the students some questions, and through the questions [The teacher in the vignette] knows if the scientific concept is reached.” (Line 57-58)</td>
<td></td>
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<tr>
<td>Abdullah says, “After explaining the lesson, I start by making sure that the information has reached the students with so-called feedback, so to make sure that the information has reached the students. Sometimes I ask students questions. Sometimes, students in each group are given the opportunity to ask questions to another group and so on.” (Line 53-55)</td>
<td></td>
</tr>
</tbody>
</table>
| Ahmed says, “It is assumed that after each point, there is an assessment, and then the teacher assess the students in
general on the whole lesson.” (Line 45-46)

Salem says, “After the explanation, the final assessment of
the lesson can be done by means of oral questions or
questions in the book, which are directly answered by
students individually or by groups.” (Line 47-48)

Omar says, “After explanation, go back to what has been
explained and be specific to the objectives of the lesson until
I know whether they were understood or not.” (Line 41)

Ibrahim says, “So as to make sure the student's
understanding, give them questions or discussion and can be
distributed in the form of groups.” (Line 42-43)

Amer says, “Assessment of the lesson. After I have finished
explaining, I ask about the main points which are the main
goals that I want to reach the students.” (Line 43)

Faris says, “The next step asks students to give examples of
the same solubility issue and how solids dissolve in liquid.
Often after the explanation, I use a worksheet about the
terms or vocabulary or concept.” (Line 37-40)

Hamed says, “Teacher make sure that students understand
the points [the teacher in the vignette] explained, for
example, give them questions which is post-assessment for
the point that is explained to make sure that information is
delivered perfectly to students.”
(Line 46-47)

Fahad says, “I always use an image and example or
worksheet that is distributed to them…. make sure that [the
teacher in the vignette] achieved the goals…..A stage of
assessment. In each goal, make sure that the goal is achieved or not. And then it possible at each stage of the lesson make sure of all the goals at the end of the lesson and for example in the whole chapter. I have to make sure that the goals are completely achieved.” (Line 55-66)

Bader says, “Feedback method. I give them homework, a way that differs from teacher to teacher. It is possible to ask a question that raises curiosity, which benefit from this lesson by solving this question.” (Line 39-40).

Table J-3. Themes and Codes: Part I. B. Assessment for Learning

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Themes\Codes</th>
<th>Example Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1. Background context of instruction: B. Assessment for learning</td>
<td>Q3: How did what think (Mr. Ahmed) did compare to your idea?</td>
<td>Same or Similar (10 teachers)</td>
<td>Mohammed says, “The teacher [in the vignette] used a worksheet to measure students' understanding. It is a good method which is similar to what I suggested.” (Line 69-70) Omar says, “The example method is close to what I said. It is an assessment of student understanding.” (Line 50-51) Ahmed Salem Ibrahim Amer Fares Hamad Fahad</td>
</tr>
<tr>
<td>Bader</td>
<td>Abdullah says, “This is one of the successful methods that can be used so that making sure that the students have understood the lesson, but there is little difference between our methods.” (Line 65-67)</td>
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<tr>
<td>There is little difference (One teacher)</td>
<td>Q4: In your opinion, what is the purpose of what think (Mr. Ahmed) did? Please explain. The purpose of this part is assess students' understanding of the lesson or achievement of learning goals. (9 teachers)</td>
<td>Abdullah says, “My first goal is to make sure that all students are assessed and therefore make sure that the majority of the students understand the lesson and that the lesson points are clear to them. This is one of my main goals for the lesson to be clear and that the students have understood the lesson.” (Lines 71-72) Salem says, “Through the assessment know whether the information arrived to students or not through their answers and interaction. If there is little or no interaction with students, there is a problem with students' understanding. A teacher who does not evaluate students during the lesson or after the lesson will face a great problem because some lessons are based on past lessons.” (Lines 63-66) Fahad says, “Sometimes the goals are cumulative. For example, the second goal depends on the first, and the third on the second, so before moving from goal to goal, you must be sure to achieve the first goal. At each stage, you must make sure to achieve the goals and then move to the next stage. I always say that even if you are tired in achieving the goal, even if you are late, it is better than you move to a second goal and the previous goal is not achieved. The assessment phase is very important and verified to achieve the objectives.” (Lines 82-85)</td>
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<tr>
<td>The purpose of this part is brainstorming (One teacher)</td>
<td>Faris says, “I always love using this brainstorming method. It has many advantages, the most important of which is the discovery of the information stored in the students, which is the background of the student. You will be shocked by some of the students that [the teacher in the vignette] has more information than his age and this is very important. Also, I use this method a lot in the consolidation of concepts, and I suffer a lot of times the student white page does not have any information or any background on the subject or some students has a lot of information that has more than his age.” (Lines 53-59)</td>
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<tr>
<td>This part of the vignette is supposed to be the entrance to the lesson (One teacher)</td>
<td>Bader says, “These are supposed to be at the beginning of the lesson as an entrance to the lesson. [The teacher in the vignette] prepares unsweetened juices and when added to sugar and weight gain and then begins the lesson, and then [the teacher in the vignette] explains more deeply” (Lines 59-60) However, he gave no indication that he reviewed and analyzed the assessment result.</td>
<td></td>
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<tr>
<td>After the assist assessment for the learning step, teachers review the assessment result.</td>
<td>Teachers review and analyze assessment result. (10 teachers)</td>
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<tr>
<td>Q5: What do you think (Mr. Ahmed)</td>
<td>Mohammed says, “The teacher [in the vignette] reads the assessment results and measures the students' knowledge of the lesson and the concepts that explained in the lesson. Then the teacher determines whether to move to the next point in the lesson or not.” (Line 79-80). Ahmed says, “I collect the handouts, and make sure of the students' answers. Also, I review with students the right answers.” (Line 62).</td>
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</tbody>
</table>
Salem says, “I conduct a phased assessment of each point or goal, and at the end of the lesson, I see students’ understanding.” (Line 69).

Omar says, “[Teacher in vignette] is supposed to correct errors in the worksheet to give them the correct answer. If the error rate is too large, he must return to the first method in order to reach the largest possible set of correct answers. But if the wrong answers are few and limited, he corrects them at the same moment and goes to other lessons.” (Line 64-67).

Ibrahim says, “Students answers are now assessed and students' understanding is determined to ascertain the proportion of students who understand and how much they do not understand. I focus on identifying students' erroneous ideas, for example, “The Law of Preservation of the Block,” for example, giving an extra grade to the students who understand. And I correct the students who understand them. I am correcting the idea they have. Start evaluating students' answers to make sure the point or goal is understood.” (Line 67-69)

Amer says, “Certainly, he assesses the answers. After collecting the papers, he is evaluating the answers if they are wrong or correct” (Line 69).

Faris says, “After the working paper modification phase, the teacher shows the answers; the students sometimes have mistakes. In concepts, for example, in cases of matter, or the transformation of a material from a state to a state, solubility, or mass conservation. So he can explain it again.” (Line 67-69)

Hamed says, “If I notice that the students have a high level of understanding, I move to the second points in the lesson. After the lesson, I back to the simple part that is not understood; I apply the feedback at the end of class.
<table>
<thead>
<tr>
<th>Teacher does not mention that he reviews the assessment result. (One teacher)</th>
<th>But if the proportion of students understood very little, I try not to move to the next point, unless the percentage of understanding of the students is higher. For example, I explain the point in a second way because it is possible that the explanation method I used was not accepted by the student. So repeat it a second or display it in a different way until the concept is better.” (Line 77-81).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fahad says, “Students need to be followed up to help them achieve their goals. Then leaving the student to reach the goal himself is better.” (Line 90).</td>
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<tr>
<td>Bader says, “Identify those who do not understand. For example, for students, I take them to the side of class and give them an activity and let them discover on their own or in groups. And because the groups are discussing the information, they can understand from a peer more than a teacher.” (Line 65-67).</td>
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<td>Abdullah says, “I can give students an extra homework. I ask them to specify additional information. For example, mention extra animals from your environment, especially with this lesson, write the reasons to classify them as animals.” (Line 75-76)</td>
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</tbody>
</table>
### Table J-4. Themes and Codes: Part Two: Practice of Formative Assessment: Response to Formative Assessment

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Themes/Codes</th>
<th>Example Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part two: Practice of formative assessment:</td>
<td>Q6: How does what Mr. Ahmed did in his lesson compare to what you were thinking?</td>
<td>Same or Similar</td>
<td>Ahmed says, “Almost similar to what I told you He checks the answers of the students and then goes on to explain again to the points that the students do not understand” (Lines 72-73)</td>
</tr>
<tr>
<td>Response to formative assessment</td>
<td></td>
<td>(9 teachers)</td>
<td>Amer says, “Yes, same as I suggested or close to it” (Lines 78)</td>
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<td></td>
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<td>Hamad says, “It is clear to me that this method is almost same as the method that I mentioned to you in the previous step. However, it became clear to me from the example that the feedback was not in the same class, but the feedback in the next class, and thus this made a long period between explaining the concept and correcting the concept as well as feedback” (Lines 90-94)</td>
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<td></td>
<td></td>
<td></td>
<td>Mohammed (Lines 90)</td>
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<td></td>
<td></td>
<td></td>
<td>Salem (Lines 80)</td>
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<td></td>
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<td></td>
<td>Omar (Lines 78-80)</td>
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<td>Ibrahim (Lines 83)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Faris (Lines 84)</td>
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<td></td>
<td></td>
<td></td>
<td>Fahad (Lines 100-101)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Different</td>
<td>Abdullah says, “The example suggested by me is homework. In the homework there is possibility that students propose organisms from their environment and their answers may be correct, but it is possible their answers include unclear organisms. I note this problem in the classification of insects and arthropods. Here in the example you gave me, the teacher [in the vignette way was so good that the teacher discovered the problems faced by students, and therefore I see this way better from my point of view in terms of identifying the problem. It is a lot of students falls into the problem of object</td>
</tr>
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<td></td>
<td></td>
<td>(2 teachers)</td>
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</tbody>
</table>
classification so that they are interested in shape and not characteristics. Thus, [the teacher in the vignette] was able to identify the problem. The students were then asked a question so that they would answer the question in terms of the characteristics they studied and not the shape. And [the teacher in the vignette] gave the opportunity for students to discuss is important way of teaching because the student sometimes understand from classmate more than from the teacher. The way the teacher used here is good.” (Line 86-94) Bader says, “This way is wrong. [The teacher in the vignette] should give handouts to the students who do not understand the lesson. Also, [the teacher in the vignette] should give those students who understand the lesson additional enrichment information. Therefore, these handouts help students to go deeper into the law of conservation of mass. If I were a teacher I would divide the class into three sections: First, students who did not understand the minimum limit of the lesson. I give them the handouts. And for those who understand, I give them additional enrichment information. And for those who are superior, I give them more difficult things related to the lesson.” (Line 84-86)

| Q7: Would this be something you could see yourself doing in a classroom? | YES. Teacher says he always or most times uses formative assessment in his classroom, like the authentic formative assessment examples that is Mohammed says, “Yes, always use it in my teaching…..I use an active learning method by displaying a video or applying an activity so that students understand faster and better. I give assessment questions after each part of the lesson to see if students understand or not. So that through these questions I measure whether students understand the information or not. If students do not understand, I use extra classroom activity to clarify the point or re-explain in another way, so the information reaches the student better.” (Line 98-101) Fahad says, “Always use it in every lesson and every time and give students freedom so that I make sure that the goal is |}

IF YES,

- How often?
- Please briefly describe for me how you have done it.

IF NOT,
<table>
<thead>
<tr>
<th>Move to next question.</th>
<th>Presented to him. (6 teachers)</th>
<th>Achieved or not achieved.” (Line 113-114) Faris says, “Yes, apply it and try to let the student get the information. And I do not give him the information so that [the teacher in the vignette] concludes the information such as using brainstorming.” (Line 85-86) Abdullah (101-108) Hamad 100 Bader 94-95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes Teacher says he uses formative assessment in in certain circumstances and reasons (5 teachers)</td>
<td>Ahmed says, “Yes I apply this method in my teaching if time is allowed. This method needs a long time.” (Line 78) Amer says, “I will apply it if there is enough time.” (Line 87) Salem says, “If the lesson helps me to apply it. Most of the time, I apply it in short lessons” (Line 88-89) Omar says, “Of course, I apply it, but the percentage of my application of this method depends on the proportion of students who do not understand. For example, if the proportion of students is very low, for example 20%, I do not apply it because of the time. But if the ratio is high, I can apply it in another way.” (Line 91-93) Ibrahim says, “I apply it if there is a deficiency in the teaching method that I used. I do not use it always because sometimes the method of teaching is appropriate and students understand the lesson and their answers are correct and evaluate them well. I used it if the teaching method was wrong at first and the students did not understand. I use it in a different way. I do not always use it because I have a curriculum that I have to finish.” (Line 87-90)</td>
<td></td>
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<tr>
<td>No. Teacher says he does not use formative assessment in his</td>
<td>There is no one from my sample who said he does not use it</td>
<td></td>
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<tr>
<td>Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did?</td>
<td>Because of the students did not understand. (6 Teachers)</td>
<td>Ahmed says, “The teacher [in the vignette] explains in a different way to help students understand and also focuses on weaknesses and improves students' understanding.” (Lines 82-83) Omar says, “The teacher [in the vignette] corrects the mistakes of the students and helps students who did not understand from the first time.” (Lines 93) Abdullah (Lines 111) Salem (Lines 96) Amer (Lines 93) Hamad (104-106)</td>
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<td></td>
<td>The teacher re-taught because he found that the teaching method was inappropriate. (2 Teachers)</td>
<td>Mohammed says, “Teaching may not be appropriate, such as using traditional methods. This means that students do not understand the lesson and therefore it is best to re-explain using better methods such as classroom activity or a video showing the lesson. Re-explanation often leads to better access to information.” (Line 107-108) Ibrahim says, “The teacher [in the vignette] found that the method of explaining at first time that is the lecture was good. Here [the teacher in the vignette] discovered through the answers of students that the teaching method is not good, so the teacher used a second method is learning by experience.” (Line 96-98)</td>
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</tbody>
</table>
It gives students the opportunity to infer and reach to understand by themselves. (3 teachers)

Faris says, “The features of this point, for example, the student devises information and the student is running his mind and does not forget the information by moving to the second level or a high level of Bloom's Taxonomy, which are remembering, understanding and comprehension ... etc. So, moving to higher levels that prove the information, so the student will not forget it. As well as linking the lesson and the student's daily life such as the idea of adding sugar on lemon juice.” (Lines 94-97)

Fahad says, “Not moving to the next lesson until students understand the point and through the practical side in the next class. The student concludes and knows his mistakes by himself.” (Lines 109-110)

Bader (Lines 98)

Q9: What are the pros and cons of taking such an approach? Please explain.

Pros #1: This method helps to improve the students’ understanding. (8 teachers)

Omar says, “Of course the advantages that you are constantly be assessing all students and trying to correct their mistakes and help them to understand. The second point, for example, some students who understood from the first time can help them to remember and memorize information.” (Lines 99-101)

Ahmed says, “Pros way these are excellent So [the teacher in the vignette] uses another method and explains another way to help students to understand. From the advantages the teacher focuses on weaknesses and improves students' understanding more as well as taking into account individual differences.” (Lines 83-84)

Abdullah says, “One of the advantages of this method is to get the student to know and understand and overcome the problems they face.” (Line 113)

Mohammed (Lines 113-116)
Salem (Lines 97-99)
<table>
<thead>
<tr>
<th>Pros #2: Achievement of learning goals. (1 teachers)</th>
<th>Fahad says, “making sure to achieve the goals. That means the goal is not necessary to be achieved at the same time, but it possible in the next class. It is good to use multiple methods.” (Lines 123-124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pros #3: Ensure proper teaching method (1 teachers)</td>
<td>Ibrahim says, “There are many advantages. It is the benefits of this assessment is that after each point shows that the method of teaching is not appropriate or will not suit the students, so I have to change the way of teaching and explain to them.” (Line 106-107)</td>
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<tr>
<td>Con 1: Time (5 teachers)</td>
<td>Ahmed says, “But negative thing is time. This method needs time and because of the large number of students it is difficult to deal with them and distribute them into groups, time is the only negative. Except this method is excellent.” (Lines 83-84) Faris” My biggest con in the way this is the time problem.” (Lines 105-109) Mohammed (Lines 113-116) Abdullah (Lines 115-119) Hamad (Lines 118)</td>
</tr>
</tbody>
</table>
Other cons such as: it could be Boring method, the number of students, difficulty of move from method to method, and lack of appropriate place to apply this method.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
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<tbody>
<tr>
<td>Q10: What do you think Mr. Ahmed do next?</td>
<td>1. Re-assessment and make sure students understand</td>
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<td></td>
<td>(10 teachers)</td>
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<td></td>
<td>Abdullah says, “In my point of view, the teacher [in the vignette] gives students different</td>
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<td>questions again and makes sure that the problem is overtaken by students.” (Line 125)</td>
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<td></td>
<td>Amer says, “He may not move to the next lesson, but [the teacher in the vignette] reviews</td>
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<td></td>
<td>with students and give them questions to make sure the information is reached. Then [the</td>
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<td>teacher in the vignette] move to next lesson.” (Line 107)</td>
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<td></td>
<td>Mohamed (120)</td>
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<td>Ahmed (91-92)</td>
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<td>Omar (112)</td>
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<td></td>
<td>Ibrahim (114-116)</td>
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<td>Fares (108-111)</td>
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<td></td>
<td>Hamad (124-126)</td>
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<td></td>
<td>Fares (135-138)</td>
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<tr>
<td></td>
<td>Badar (119)</td>
</tr>
</tbody>
</table>
2. Move to next lesson  
(Only one teacher)  
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Salem says, “If this step is applied in a good way, I expect the information to reach the student, and the students understand the lesson. No other steps are needed. [The teacher in the vignette] goes to the next lesson.” (Line104-105)

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Themes/Codes</th>
<th>Example Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part two: Practice of formative assessment: Re-assessment</td>
<td>Q11: How does what Mr. Ahmed did in this part of the lesson compare to what you were thinking?</td>
<td>Same or Similar (6 teachers)</td>
<td>Hamad says, “His method is excellent and I also mentioned a similar method.” (Lines 141) Hamad was referring to his earlier comment where he describe using a similar the method to the method that is in the vignette. Abdullah (Lines 133-134) Omar (Lines 121) Amer (Lines 117) Fahad (Lines 148-150) Bader (Lines 130-131)</td>
</tr>
<tr>
<td>Different (5 teachers) For Example:</td>
<td>Ahmed says, “I suggested homework, but the teacher used paper work and I think it's a good way” (Lines 101) Ibrahim says, “I suggested homework and the teacher used a worksheet. Both methods are correct. The difference between them is that the worksheet can make sure during the class directly that the student dissolved himself individually and not groups then make sure the student has changed the wrong idea about the law of conservation of mass. For homework possible the student uses help, but [the teacher in the vignette] does not mind the latter [the teacher in the vignette] will solve by himself. I prefer to use homework to save time.” (Lines 127-131)</td>
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</tbody>
</table>

Table J-5. Themes and Codes: Part Two: Practice of Formative Assessment: Re-Assessment
<table>
<thead>
<tr>
<th>Q12: If Mr. Ahmed had determined that the students still did not understand the material, what do you think he should do next?</th>
<th>Re-explain what students do not understand in the next class. (7 teachers)</th>
<th>Abdullah says, “If the problem persists, the problem may be in the way the lesson is explained. I am referring to the explanation method where there is a problem so that I look for the problems that caused the students not to understand the lesson and try to solve it. And what the students did not understand was returned in a different way.” (Lines 144-146) Bader says he would, “Divide students into three groups. Students who do not understand. Students who understood. And outstanding students. Students who do not understand I repeat the lesson for them. Understanding students gave them additional enrichment. The top students gave them more enriching things. So don't get bored.” (Lines140-142) Mohammed (Lines 135-136) Ahmed (Lines 109-111) Salem (Lines 121-123) Faris (Lines 134-135)</th>
</tr>
</thead>
<tbody>
<tr>
<td>student repeats the explanation of the lesson.</td>
<td>Mohammed says, “Here [in the vignette] the teacher only assisted the points that the students did not understand. I think all points [the teacher in the vignette] should have assisted. As a final exam or final assessment of the lesson, all points of the lesson should be assisted, not just focusing on the point that the students did not understand.” (Lines 129-131) Salem says, “I see what the teacher [in vignette] did is better than my point of view, which is moving on to the next lesson, so that [the teacher in vignette] focused more on the problem and reviewed it.” (Lines 114) Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assess. What the teacher [in vignette] has done is good but I don't prefer to re-assess the students.” (Lines 125-127).</td>
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<tr>
<td>Re-explain what students do not understand out of class time (5 teachers)</td>
<td>Salem says, “Because we are limited to a 45-minute class and a majority of students understand the lesson. In this case, if there are simple things of the lesson that students did not understand, I will explain them during the next class. But if they don't understand things that need a long time to explain, then they are explained individually after class in office hours.” (Lines 121-123) Ibrahim says, “I explained the lesson and then give the students handouts, but there are students still do not understand…so I will ask the good students to re-explains to the students who did not understand or I will re-explain to students who do not understand after the class individually.” (Line 138-140) Omar (Lines 127-130) Amer (Lines 129-130) Fahad (Lines 177-178)</td>
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<tr>
<td>Note: Salem said either in class or out of class time.</td>
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<tr>
<td>Vignette Part</td>
<td>Interview Questions</td>
<td>Themes/ Codes</td>
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</tr>
<tr>
<td>Conclusion sub-questions</td>
<td>Q13: Overall, what do you think of the formative assessment approach?</td>
<td>Teachers think formative assessment is a good method and useful to use in their classroom, but some of them say it has difficulties and obstacles that hinder their application. (11 teachers) (Note: I combined the difficulties and obstacles with Q15)</td>
</tr>
<tr>
<td>Conclusion sub-questions</td>
<td>Q14: Can you tell me about a time when you have done something similar? Explain.</td>
<td>Generally, Yes, I use similar to this method in my class to make sure of students understanding</td>
</tr>
</tbody>
</table>
Ibrahim says, “For me, I use formative evaluation in most classes, especially in those with mathematical problems. First, I make sure the student understands the point that I explained.” (Lines 153-156)
Amer says, “This method is always used so that we evaluate after each goal has been explained and if it is problematic we explain.” (Lines 137-138)

<table>
<thead>
<tr>
<th>Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?</th>
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<tbody>
<tr>
<td>Time (10 Teachers)</td>
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<tr>
<td>Abdullah says, “Second, time. This method takes a long time.” (Line 172)</td>
</tr>
<tr>
<td>Salem says, “But we have a time problem so that the curriculum is long in the secondary school. The problem is the time because I have a curriculum. At the same time, I need to explain it very efficiently.” (Line 148-149) **</td>
</tr>
<tr>
<td>Omar says, “The disadvantages. I see that the biggest negative is the time when the teacher finds it difficult to find time to diversify in teaching or re-explain in another way. I discovered that the time has been limited to the teacher in the method of evaluation formative and difficult to return in another way.’’(Line 146-147)</td>
</tr>
<tr>
<td>Hamad says, “But sometimes in the case of a large number of students may cause the length of the explanation period. If you have a larger number of students, the process of ascertaining the arrival of the concept to each student takes a longer period may be used in case if the number of students is normal or in the case of the number of students above For example, 40 students or 50 students in some schools, make sure that the concept reaches every student and takes a longer time. The formative evaluation is an obstacle by taking a</td>
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</table>
these difficulties or obstacles?

longer period of time. In the same lesson, you take more than one course of study to ensure that students' understanding is fully understood and that the formative assessment is strictly applied.”(Line 173-179) **

Mohammed (Line 179-180)
Ahmed (Line 133)
Ibrahim (Line 172-174)
Amer (Line 156-157)
Faris (Line 153-156)
Bader (Line 169)

Number of students in classroom (2 teachers)

Abdullah says, “The large number of students” (Line 173)

Hamad also says, “But sometimes in the case of a large number of students may cause the length of the explanation period. If you have a larger number of students, the process of ascertaining the arrival of the concept to each student takes a longer period may be used in case if the number of students is normal or in the case of the number of students above For example, 40 students or 50 students in some schools make sure that the concept reaches every student and takes a longer time. The formative evaluation is an obstacle to take a longer period of time.

In the same lesson, you take more than one course of study to ensure that students' understanding is fully understood and that the formative assessment is strictly applied.”(Line 173-179) **

Curriculum (2 teachers)

Abdullah says, “First Curriculum. The number of lessons is too many and the information is very large.” (Line 171)

Salem says, “But we have a time problem so that the curriculum is long in the secondary school. The problem is the time because I have a curriculum. At the same time, I need to explain it very efficiently.” (Line 148-149) **
Fahad says, “It is possible that the method is boring to some of the students who understand it from the first stage and find that they are finished. They think that they understand the goal so why the longest period is take at the same point in that way.” (Line 213)

Answer of Q9: Omar says, “But the drawbacks that may become some of the students who received the information from the first time will be to return the point boring them” (Lines 103)

In your opinion, how you could you overcome these difficulties or obstacles?

Time and lesson management, working collectively in groups

Ibrahim says, “for me to overcome the time problem, I use distinguished students in each group. I put the leader of the group in who is distinguished to help me correct the wrong ideas of the students in the group, instead of what I ordered on every group or every student….For example, make sure that the leader of the group solved and answer correctly. If [the teacher in the vignette] had a mistake, I correct his mistake, and then [the teacher in the vignette] correct his peers mistakes and explain to his peers in the group and thus I benefit from the time and I use less time in the method.” (Line 177-180)

Abdullah says, “I overcome this problem by working collectively by dividing students into groups as well as organizing time and using the clock so that each part of the...
lesson has a specific time.” (Line 174-175)

Hamad says, “There are elements as much as we do, and there are other elements we can not be affected. For example, the number of students we can not influence them because of the composition of the housing and the school serves a large number of the population in which we can not change where we work on the aspects we appreciate and change it. For example lesson design we try to reduce the lesson as much as we can rely on the explanation of all points, for example in some lessons where points of interest. These points should not be fully accessible to students. We try to focus on the main points. If we focus on the main points of the lesson, we will be dealing with the issue of time in its points of interest and the main points. If the number is large and the time factor is influential in the teaching process, we focus on the main points we focus on to deliver them fully and therefore take less time than we focus on the main points and enrichment.” (Line 190-198)

Ahmed says, “Solutions Divide the lesson into parts and distribute the parts to student groups and assess each group.” (Line 134)

Mohammed (Line 169-170)

Salem (Line 150)

Amer (Line 159-160)

<table>
<thead>
<tr>
<th>Q16: Giving this vignette, would you adopt formative assessment in your teaching?</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES, Always or most times (10 teachers)</td>
</tr>
</tbody>
</table>

Ibrahim says,” Yes, I always use it.” (Line 169)

Omer says, ”By a very large percentage I adopted it” (Line 170)

Hamad says, ”Yes, for me formative assessment is important for all lessons.” (Line 204)
<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency</th>
<th>Comments</th>
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<tbody>
<tr>
<td>• Would you be willing to apply formative assessment in your classroom? If so, how often?</td>
<td>Sometimes (One teacher)</td>
<td>Fares says, “It is sometimes suitable because I see that it is suitable for some classes and inappropriate for others because of the defects I mentioned to you.” (Line 168)</td>
</tr>
</tbody>
</table>
| • What could improve the Saudi teachers to use formative assessment approach in their classrooms? | Workshops (8 teachers) | Mohammed says, “Training courses for teachers by preparing them better to use this method. The courses develop the teacher and help him to master this method.” (Line 183-184)  
Abdullah says, “One of the best ways I see it is to exchange experience between teachers and training courses. There are reciprocal visits between teachers to share experiences and make use of teachers.” (Line 192-194)**  
Salem (Line 167-168)  
Omer (Line 174-175)  
Ibrahim (Line 199)  
Fahad (Line 230-234)  
Bader (Line 181) |
| • IF NOT: why not?                                                      | Visiting colleagues (3 teachers) | Abdullah says, “One of the best ways I see it is to exchange experience between teachers and training courses. There are reciprocal visits between teachers to share experiences and make use of teachers.” (Line 192-194)**  
Ibrahim (Line 192-194)  
Amer (Line 178-179) |
| Self development (3 teachers) | Ahmed says, “The teacher must develop himself so that [the teacher in the vignette] can organize time in the classroom and be aware of the individual differences and determined by the students and distribute the work between them. Developing knowledge through reading as well as applying it and learning it through its application several times to be mastered.” (Line 145-147) Salem (Line 166) Fahad (Line 235) Hamad (Line 212-217) |
Table J-7: Advantages of Formative Assessment

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Themes\Codes</th>
<th>Example Quotations</th>
</tr>
</thead>
</table>
| What do they see as the advantages to be gained by implementing formative assessment? | Advantages of formative assessment                                                   | What the teachers think as advantages of using formative assessment. (Note: Here are combining of the advantages of formative assessment that are teachers answers of Q9, Q13, and Q14) | Mohammed says, “This way the teacher helps a lot to identify the students' understanding. It is important, even if it has its disadvantages. It works to promote education better, helps students understand and strengthens the teacher and student, and helps me move from one point to another. A teacher who does not use this method is faced with confusion by shifting misconceptions to students and thus encounter problems in the following related lessons. It helps save time and effort by tackling misconceptions faster as well as understanding the student more.” (Line 164-167)  
Abdullah says, “One of the advantages of this method is to get the student to know and understand and overcome the problems they face.” (Line 113)  
Ahmed says, “The teacher focuses on the weaknesses of students and improves student understanding as well as taking into account individual differences.” (Line 83-84).  
Ahmed says, “It is a well-known and applied method. Its advantage is focusing on students and understanding, but there is a problem with time.” (Line 120).  
Salem says, “The method is very excellent and powerful in installing information for students.” (Line 132)  
Omar says, “This method has positives, I will explain them in the following points: first, for example the observation of continuous learning of the student. And the second is to make sure of any information and any part of the curriculum is reached to the students or not .... I notice whether the understanding of the lesson is received or not. And the third point is possible to develop the method of
teaching, I mean to vary in ways so that if the first method is not received by students, I have the skill of diversification in teaching methods.” (Line 140-145)
Ibrahim says, “There are many advantages. It is the benefits of this assessment is that after each point shows that the method of teaching is not appropriate or will not suit the students, so I have to change the way of teaching and explain to them.” (Line 106-107)
Amer says, “I prefer this method and use it always of course because the goals depend on what happened before. If the student did not achieve the first goal before moving to the second goal; this will cause a problem.” (Line 140-141)
Faris says, “This method is very perfect and attractive to discover the problems of students and put your hand on the problems. In this way, I do not have a difficulty to discover the students' problem, and then I could resolve this problem immediately for those students who did not understand.” (Line 143-144).
Hamad says, “This method is an appropriate way to ensure that the concept reaches more accurately to the students and better than the evaluation at the end of the lesson only.” (Line 180)
Fahad says, “It is very important and helps the teacher to be able to achieve the goals......Its necessary, I always call for not to hurry in teaching but step by step and eventually reach your goal using multiple methods. Reach the goal in the easiest way.” (Line 196-202).
Bader says, “Helps the teacher to ensure the delivery of the information and there is no shortage or problems.” (Line 151).
Table J-8. Teachers’ Examples

<table>
<thead>
<tr>
<th>Vignette Part</th>
<th>Interview Questions</th>
<th>Teachers’ examples and explanations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part one:</td>
<td>Q1: Is this method</td>
<td>Abdullah says, “Yes, I apply this</td>
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<tr>
<td>Background</td>
<td>of teaching something you used in your teaching?</td>
<td>method as an introduction to the</td>
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<tr>
<td>context of</td>
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<td>lesson. It takes 5 to 10 minutes.</td>
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<td>instruction:</td>
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<td>Then I ask questions about the</td>
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<td>A. Initial</td>
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<td>subject of the basic lesson and</td>
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<td>instruction</td>
<td></td>
<td>possibly introduce pictures.” (Line</td>
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<td>48-49)</td>
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<td></td>
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<td>Omar says, “I use this teaching</td>
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<td>method, especially since the</td>
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<td>curriculum is a lot, or time is</td>
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<td>limited, so I use it to shorten the</td>
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<td>time. But in general there are many</td>
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<td>types of methods can be used such</td>
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<td>as classroom discussion or</td>
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<td>cooperative learning or learning</td>
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<td>through a certain scientific story</td>
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<td></td>
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<td>or learning by research.” (Line</td>
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<td>35-37)</td>
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<td></td>
<td></td>
<td>Faris says, “It is very practical.</td>
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<td>We use it a lot in this way or</td>
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<td>borrow it with a video clip if the</td>
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<td></td>
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<td>tools are available.” (Line 34-35)</td>
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<td></td>
<td>Mohammed says, “Of course, the</td>
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<td></td>
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<td>method of lecture and the delivery</td>
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<td></td>
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<td>is good, but there are better ways.</td>
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<td></td>
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<td>For example, I use a scientific</td>
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<td>experiment or activity that shows</td>
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<td>the student a lesson in a way that</td>
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<td>makes it easier to understand the</td>
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<td>lesson deeper, and learning becomes</td>
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<td>more stable in students. The use of</td>
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<td></td>
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<td>a scientific activity or experiment</td>
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<td>is better than the abstract</td>
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<td>explanation of the concept.” (Line</td>
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<td>51-53)</td>
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<td></td>
<td>Salem says, “The method of teaching</td>
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<td>used is the lecture, which I do not</td>
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<td>like, and there are better ways like</td>
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<td>using a picture or video to raise</td>
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<td>the attention of students and then</td>
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<td>ask questions and hear from the</td>
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<td>students instead of starting the</td>
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<td>teaching directly in the</td>
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<td>explanation of the manner of the</td>
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<td>lecture.” (Line 37-41)</td>
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<td>Ibrahim says, “As for the way the</td>
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<td>teacher [in the vignette] used the</td>
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<td>lecture method, I do not use it in</td>
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<td>my teaching. I use the method of</td>
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<td>reasoning. I ask the student to</td>
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<td>research and then start discussing</td>
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<td>with them. I do not like to use the</td>
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<td>method of the interview at the</td>
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<td>beginning of the lesson because the</td>
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<td>student is often attentive with me</td>
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<td>for 6 minutes or 7 minutes and then</td>
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<td>not focused. I prefer to keep the</td>
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<td>students in the lesson. I used the</td>
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<td></td>
<td>method of discussion and conclusion.</td>
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<td>I let the student look for</td>
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<td></td>
<td></td>
<td>information and then start to</td>
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<td></td>
<td>discuss with him.” (Line 35-39)</td>
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<td></td>
<td>Amer says, “But the method used to</td>
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<td>explain the lesson is wrong in my</td>
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<td>view because it is not thought</td>
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<td>provoking. It is supposed to display</td>
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<td>a mirror on the students and ask</td>
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<td>them as if the picture appears as</td>
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<td>an input to the lesson. The</td>
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<td></td>
<td>explanation method is the lecture</td>
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<td>method.”</td>
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</table>
not very suitable. There are many ways to teach, for example, if you have a picture or a mirror. These are simple and available methods that can be used for the lesson and then begin to discuss the students and use the discussion method better than the lecture method.” (Line 36-40)

Hamad says, “The lecture method is the traditional method. It is clear that the teacher [in the vignette] is fully controlled in the learning process. I did not notice students participation in the class but only the listener. It became clear to me from this method that teacher teach and student just listen, that means the teacher is the master of the educational process and the student the listener.......regardless of the distribution of students in the classroom imposed at the beginning of any new part or even if students have an idea about the lesson is expected from teachers to ask questions, for example, or show a picture or video and ask students and take answers directly.” (Line 34-44)

Fahad says, “This method is negative because it depends on the teacher, as well as education, depends on the teacher. The teacher used the method of the lecture, and this is wrong on his part. But the learning should depend on the student more than the teacher. It is special that the student is possible for the student to be the one who deduces the information and gets it. I do not use lecture because I want learning to depend on the student to get the information by himself.” (Line 47-51)

Bader says, “The method does not achieve the goals because the student must discover the information, but the teacher [in the vignette] here gave him the information, and this is contrary to active learning, the method now used in Saudi Arabia; active learning, that is, the student looking and learning and explore, the teacher used the method of indoctrination is primitive and old.” (Line 32-34)

<table>
<thead>
<tr>
<th>Q2: What do you think he should do next?</th>
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<tbody>
<tr>
<td>Mohammed says, “The first step: the teacher [in the vignette] explains the lesson that is light and reflection. After the explanation, the teacher must ask the students some questions, and through the questions [The teacher in the vignette] knows if the scientific concept is reached.” (Line 57-58)</td>
</tr>
<tr>
<td>Abdullah says, “After explaining the lesson, I start by making sure that the information has reached the students with so-called feedback, so to make sure that the information has reached the students. Sometimes I ask students questions. Sometimes, students in each group are given the opportunity to ask questions to another group and so on.” (Line 53-55)</td>
</tr>
</tbody>
</table>
Ahmed says, “It is assumed that after each point, there is an assessment, and then the teacher assess the students in general on the whole lesson.” (Line 45-46)
Salem says, “After the explanation, the final assessment of the lesson can be done by means of oral questions or questions in the book, which are directly answered by students individually or by groups.” (Line 47-48)
Omar says, “After explanation, go back to what has been explained and be specific to the objectives of the lesson until I know whether they were understood or not.” (Line 41)
Ibrahim says, “So as to make sure the student’s understanding, give them questions or discussion and can be distributed in the form of groups.” (Line 42-43)
Amer says, “Assessment of the lesson. After I have finished explaining, I ask about the main points which are the main goals that I want to reach the students.” (Line 43)
Faris says, “The next step asks students to give examples of the same solubility issue and how solids dissolve in liquid. Often after the explanation, I use a worksheet about the terms or vocabulary or concept.” (Line 37-40)
Hamed says, “Teacher make sure that students understand the points [the teacher in the vignette] explained, for example, give them questions which is post-assessment for the point that is explained to make sure that information is delivered perfectly to students.” (Line 46-47)
Fahad says, “I always use an image and example or worksheet that is distributed to them…. make sure that [the teacher in the vignette] achieved the goals…..A stage of assessment. In each goal, make sure that the goal is achieved or not. And then it possible at each stage of the lesson make sure of all the goals at the end of the lesson and for example in the whole chapter. I have to make sure that the goals are completely achieved.” (Line 55-66)
Bader says, “Feedback method. I give them homework, a way that differs from teacher to teacher. It is possible to ask a question that raises curiosity, which benefit from this lesson by solving this question.” (Line 39-40).

<table>
<thead>
<tr>
<th>Part one:</th>
<th>Q3: How did what think (Mr. Ahmed) did compare to your idea?</th>
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<tbody>
<tr>
<td>Background context of instruction: B. Assessment for</td>
<td>Fahad says, “The example is very good and close to what I suggested because it was based on the student, and I always prefer this method. For example, I give students handouts that include mathematical matters. As for the practical side, it is possible use an activity such as adding sugar, like in the example. I combine the practical and theoretical side of the lesson.” (Line 75-77)</td>
</tr>
</tbody>
</table>
Q4: In your opinion, what is the purpose of what think (Mr. Ahmed) did? Please explain.

Abdullah says, “My first goal is to make sure that all students are assessed and therefore make sure that the majority of the students understand the lesson and that the lesson points are clear to them. This is one of my main goals for the lesson to be clear and that the students have understood the lesson.” (Lines 71-72)

Salem says, “Through the assessment know whether the information arrived to students or not through their answers and interaction. If there is little or no interaction with students, there is a problem with students' understanding. A teacher who does not evaluate students during the lesson or after the lesson will face a great problem because some lessons are based on past lessons.” (Lines 63-66)

Fahad says, “Sometimes the goals are cumulative. For example, the second goal depends on the first, and the third on the second, so before moving from goal to goal, you must be sure to achieve the first goal. At each stage, you must make sure to achieve the goals and then move to the next stage. I always say that even if you are tired in achieving the goal, even if you are late, it is better than you move to a second goal and the previous goal is not achieved. The assessment phase is very important and verified to achieve the objectives.” (Lines 82-85)

Ahmed says, “Student assessment is an excellent method. As in the example, I use the worksheet, and I allow students to find the answers.” (Line 59-60)

Amer says, “I see this assessment as essential during the class. It shows if the student understands or not. I have given them an assessment such as questions to answer, and the students resolved them. My conscience is relieved because I know that I delivered the information to them in the most effective way. I mean that assessment must be used, whether verbal or paper, or in any way. I consider the assessment to be essential in my teaching.” (Line 59-63)

Hamad says, “After each point, the teacher in the vignette should not give students a worksheet, but there can be more than one assessment method, which could be used after each point, that does not consume much time in order to discover the extent of understanding of students. For example, the teacher can ask a question or display a picture and ask them about it. These assessments help the teacher to see if the students understands..."
and whether the concept has reached them or not, even if the concept has reached them by 75%.” (Line 61-64)

Faris says, “I always love using this brainstorming method. It has many advantages, the most important of which is the discovery of the information stored in the students, which is the background of the student. You will be shocked by some of the students that [the teacher in the vignette] has more information than his age and this is very important. Also, I use this method a lot in the consolidation of concepts, and I suffer a lot of times the student white page does not have any information or any background on the subject or some students has a lot of information that has more than his age.” (Lines 53-59)

Bader says, “These are supposed to be at the beginning of the lesson as an entrance to the lesson. [The teacher in the vignette] prepares unsweetened juices and when added to sugar and weight gain and then begins the lesson, and then [the teacher in the vignette] explains more deeply” (Lines 59-60) However, he gave no indication that he reviewed and analyzed the assessment result.

### Q5: What do you think (Mr. Ahmed) should do next?

Mohammed says, “The teacher [in the vignette] reads the assessment results and measures the students' knowledge of the lesson and the concepts that are explained in the lesson. Then the teacher determines whether to move to the next point in the lesson or not.” (Line 79-80).

Ahmed says, “I collect the handouts, and make sure of the students' answers. Also, I review with students the right answers.” (Line 62).

Salem says, “I conduct a phased assessment of each point or goal, and at the end of the lesson, I see students' understanding.” (Line 69).

Omar says, “[Teacher in vignette] is supposed to correct errors in the worksheet to give them the correct answer. If the error rate is too large, he must return to the first method in order to reach the largest possible set of correct answers. But if the wrong answers are few and limited, he corrects them at the same moment and goes to other lessons.” (Line 64-67).

Ibrahim says, “Students answers are now assessed and students' understanding is determined to ascertain the proportion of students who understand and how much they do not understand. I focus on identifying students' erroneous ideas, for example, “The Law of Preservation of the Block,” for example, giving an extra grade to the students who understand. And I correct the students who understand them. I am correcting the idea they have. Start evaluating students' answers to make sure the point or goal is understood.”
Amer says, “Certainly, he assesses the answers. After collecting the papers, he is evaluating the answers if they are wrong or correct” (Line 69).

Faris says, “After the working paper modification phase, the teacher shows the answers; the students sometimes have mistakes. In concepts, for example, in cases of matter, or the transformation of a material from a state to a state, solubility, or mass conservation. So he can explain it again.” (Line 67-69)

Hamed says, “If I notice that the students have a high level of understanding, I move to the second points in the lesson. After the lesson, I back to the simple part that is not understood; I apply the feedback at the end of class.

But if the proportion of students understood very little, I try not to move to the next point, unless the percentage of understanding of the students is higher. For example, I explain the point in a second way because it is possible that the explanation method I used was not accepted by the student. So repeat it a second or display it in a different way until the concept is better.” (Line 77-81).

Fahad says, “Students need to be followed up to help them achieve their goals. Then leaving the student to reach the goal himself is better.” (Line 90).

Bader says, “Identify those who do not understand. For example, four students, I take them to the side of class and give them an activity and let them discover on their own or in groups. And because the groups are discussing the information, they can understand from a peer more than a teacher.” (Line 65-67).

Abdullah says, “I can give students an extra homework. I ask them to specify additional information. For example, mention extra animals from your environment, especially with this lesson, write the reasons to classify them as animals.” (Line 75-76)

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<tr>
<th>Part Two: Practice of formative assessment: A. Response to formative assessment</th>
<th>Q6: How does what Mr. Ahmed did in his lesson compare to what you were thinking?</th>
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<tr>
<td>Hamad says, “It is clear to me that this method is almost same as the method that I mentioned to you in the previous step. However, it became clear to me from the example that the feedback was not in the same class, but the feedback in the next class, and thus this made a long period between explaining the concept and correcting the concept as well as feedback” (Lines 90-94)</td>
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| Abdullah says, “The example suggested by me is homework. In the homework there is possibility that students propose organisms from their environment and their answers may be correct, but it is possible their answers include unclear organisms. I note this problem in
the classification of insects and arthropods. Here in the example you gave me, the teacher
[in the vignette way was so good that the teacher discovered the problems faced by
students, and therefore I see this way better from my point of view in terms of identifying
the problem. It is a lot of students falls into the problem of object classification so that they
are interested in shape and not characteristics. Thus, [the teacher in the vignette] was able
to identify the problem. The students were then asked a question so that they would answer
the question in terms of the characteristics they studied and not the shape. And [the teacher
in the vignette] gave the opportunity for students to discuss is important way of teaching
because the student sometimes understand from classmate more than from the teacher. The
way the teacher used here is good.” (Line 86-94)
Bader says, “This way is wrong. [The teacher in the vignette] should give handouts to the
students who do not understand the lesson. Also, [the teacher in the vignette] should give
those students who understand the lesson additional enrichment information. Therefore,
these handouts help students to go deeper into the law of conservation of mass. If I were a
teacher I would divide the class into three sections: First, students who did not understand
the minimum limit of the lesson. I give them the handouts. And for those who understand,
I give them additional enrichment information. And for those who are superior, I give them
more difficult things related to the lesson.” (Line 84-86)
Omar says, “The problem that [the teacher in vignette] has depends on whether the
percentage of students who do not understand is low or high. If this percentage is high, [the
teacher in vignette] should re-explain the point. But if the percentage is low, he does not
need to re-explain. [The teacher in vignette] could use collaborative learning, for example,
to exchange information between student groups, or it is possible to use the search method
to answer the question. In general, this is what the teacher can do.” (Lines 78-80)

| Q7: Would this be something you could see yourself doing in a classroom? |
|-----------------|----------------------------------|
| IF YES,         | Mohammed says, “Yes, I always use it in my teaching…..I use an active learning method by displaying a video or applying an activity so that students understand faster and better. I give assessment questions after each part of the lesson to see if students understand or not. So that through these questions I measure whether students understand the information or not. If students do not understand, I use extra classroom activities to clarify the point or re-explain in another way, so the information reaches the student better.” (Line 98-101) |
| How often?      | Abdullah says, “I always try to rely on searching through the Internet with student groups. We have a library in the school with the Internet service. I ask students to search for |
| Please         | |
| Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did? | Mohammed says, “Teaching may not be appropriate, such as using traditional methods. This means that students do not understand the lesson and therefore it is best to re-explain using better methods such as classroom activity or a video showing the lesson. Re-explanation often leads to better access to information.” (Line 107-108)  
Ibrahim says, “The teacher [in the vignette] found that the method of explaining at first time that is the lecture was good. Here [the teacher in the vignette] discovered through the answers of students that the teaching method is not good, so the teacher used a second method is learning by experience.” (Line 96-98)  
Faris says, “The features of this point, for example, the student devises information and the student is running his mind and does not forget the information by moving to the second level or a high level of Bloom's Taxonomy, which are remembering, understanding and |
| briefly describe for me how you have done it.  
• IF NOT, move to next question. | information through the Internet and then discuss it. Sometimes, during the same session in the last 10 minutes or at the beginning of the next session, we do a review of the lesson. I set review classes so that at the end of each unit or two units, we spend time reviewing. There will be scientific enrichment. I identify some of the problems in the lessons and ask students to look for it in the curriculum or through the Internet and each group prepares a report of what they found. Then each group's leader present what solution was reached, and the rest of the groups ask him questions to answer or turn the question to his group.” (Lines 101-108)  
Faris says, “Yes, apply it and try to let the student get the information. And I do not give him the information so that [the teacher in the vignette] concludes the information such as using brainstorming.” (Line 85-86)  
Omar says, “Of course, I apply it, but the percentage of my application of this method depends on the proportion of students who do not understand. For example, if the proportion of students is very low, for example 20%, I do not apply it because of the time. But if the ratio is high, I can apply it in another way.” (Line 91-93)  
Ibrahim says, “I apply it if there is a deficiency in the teaching method that I used. I do not use it always because sometimes the method of teaching is appropriate and students understand the lesson and their answers are correct and evaluate them well. I used it if the teaching method was wrong at first and the students did not understand. I use it in a different way. I do not always use it because I have a curriculum that I have to finish.” (Line 87-90) |
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<th>Q9: What are the pros and cons of taking such an approach? Please explain.</th>
<th>Omar says, “Of course the advantages that you are constantly be assessing all students and trying to correct their mistakes and help them to understand. The second point, for example, some students who understood from the first time can help them to remember and memorize information.” (Lines 99-101)</th>
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<td>Q10: What do you think Mr. Ahmed do next?</td>
<td>Salem says, “If this step is applied in a good way, I expect the information to reach the student, and the students understand the lesson. No other steps are needed. [The teacher in the vignette] goes to the next lesson.” (Line104-105) Abdullah says, “In my point of view, the teacher [in the vignette] gives students different questions again and makes sure that the problem is overtaken by students.” (Line 125) Amer says, “He may not move to the next lesson, but [the teacher in the vignette] reviews with students and give them questions to make sure the information is reached. Then [the teacher in the vignette] move to next lesson.” (Line 107) Fares says, “In the last step, a student explains the lesson in his way. Sometimes, I ask a student to re-explain the lesson in his own way. The student understands from his peers and receives information better than me because it is possible that the student uses simple vocabulary and phrases easy to understand by the other students. Then I assess their understanding.” (Line 108-111)</td>
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<td>Part two: Practice of formative assessment: B. Re-assessment</td>
<td>Mohammed says, “Here [in the vignette] the teacher only assisted the points that the students did not understand. I think all points [the teacher in the vignette] should have assisted. As a final exam or final assessment of the lesson, all points of the lesson should be assisted, not just focusing on the point that the students did not understand.” (Lines 129-131) Salem says, “I see what the teacher [in vignette] did is better than my point of view, which is moving on to the next lesson, so that [the teacher in vignette] focused more on the problem and reviewed it.” (Lines 114)</td>
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Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assess. What the teacher [in vignette] has done is good but I don't prefer to re-assess the students.” (Lines 125-127).

Fahad says, “I apply a method I call 4, 2, and 1. The last thing I do is individualized instruction. Each student or group to make sure the information reaches 70% of the classroom activity. Finally, I make sure that each student understands through the method of teaching 4, 2, and 1. In the first step, each group of four students is fully engaged. Then I give the students a second question, but now the students are in a group of two students instead of four; each group have two students. Thus, the students understand the information in a better way. In the end, I make sure the information is understood by moving to the method of individual teaching of each one of the students who did not understand.” (Lines 148-153)

Q12: If Mr. Ahmed had determined that the students still did not understand the material, what do you think he should do next?

Abdullah says, “If the problem persists, the problem may be in the way the lesson is explained. I am referring to the explanation method where there is a problem so that I look for the problems that caused the students not to understand the lesson and try to solve it. And what the students did not understand was returned in a different way.” (Lines 144-146)

Bader says he would, “Divide students into three groups. Students who do not understand. Students who understood. And outstanding students. Students who do not understand I repeat the lesson for them. Understanding students gave them additional enrichment. The top students gave them more enriching things. So don't get bored.” (Lines140-142)

Salem says, “Because we are limited to a 45-minute class and a majority of students understand the lesson. In this case, if there are simple things of the lesson that students did not understand, I will explain them during the next class. But if they don't understand things that need a long time to explain, then they are explained individually after class in office hours.” (Lines 121-123)

Ibrahim says, “I explained the lesson and then give the students handouts, but there are students still do not understand…so I will ask the good students to re-explains to the students who did not understand or I will re-explain to students who do not understand after the class individually.” (Line 138-140)

Ahmed says, "In more than one way, for example: first, students can be placed in diverse groups that take into account individual differences so that students learn from colleagues.
**Conclusion sub-questions**

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<th>Response</th>
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| Q13: Overall, what do you think of the formative assessment approach?   | Mohammed says, “As for the formative and pre-assessment method, the teacher gives a clear picture of the students' understanding of the lesson. It is very useful before moving from point to point. If this assessment is made, the teacher's explanation and transition between the lesson points will be smooth and move only after the student's understanding is fully understood. The transition from one lesson to the next is better and helps to understand the students.” (Line 143-147)  
Abdullah says, “In my view this method is a very excellent method of formative assessment, but I note that there are some teachers who do not use this method.” (Line 153-154).  
Faris says, “This method is very perfect and attractive to discover the problems of students and put your hand on the problems. In this way, I do not have a difficulty to discover the students' problem, and then I could resolve this problem immediately for those students who did not understand.” (Line 143-144).  
Salem says, “This method is very excellent after each goal explained by the teacher by asking students to this goal, and this method is very excellent and powerful in the installation of information with students.” (Line 132-133)  
Ahmed says, “It is a well-known and applied method. Its advantage is focusing on students and understanding, but there is a problem with time.” (Line 120). |
| Q14: Can you tell me about a time when you have done something similar? Explain. | Mohammed says, “I use pre-assessment and formative assessment after each point in the lesson and after each activity in the lesson. So that I put questions before moving from one point to another. So, I ask questions to be discussed by students on groups or assist students individually. I make sure students understand before moving to the next point. The assessment method varies from lesson to lesson. Sometimes I use a discussion, a working paper, or oral questions.” (Lines 150-154)  
Ibrahim says, “For me, I use formative evaluation in most classes, especially in those with mathematical problems. First, I make sure the student understands the point that I explained.” (Lines 153-156)  
Amer says, “This method is always used so that we evaluate after each goal has been explained and if it is problematic we explain.” (Lines 137-138) |
Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles?

Abdullah says, “Second, time. This method takes a long time.” (Line 172)
Salem says, “But we have a time problem so that the curriculum is long in the secondary school. The problem is the time because I have a curriculum. At the same time, I need to explain it very efficiently.” (Line 148-149)
Omar says, “The disadvantages. I see that the biggest negative is the time when the teacher finds it difficult to find time to diversify in teaching or re-explain in another way. I discovered that the time has been limited to the teacher in the method of evaluation formative and difficult to return in another way.” (Line 146-147)
Hamad says, “But sometimes in the case of a large number of students may cause the length of the explanation period. If you have a larger number of students, the process of ascertaining the arrival of the concept to each student takes a longer period may be used in case if the number of students is normal or in the case of the number of students above For example, 40 students or 50 students in some schools, make sure that the concept reaches every student and takes a longer time. The formative evaluation is an obstacle by taking a longer period of time. In the same lesson, you take more than one course of study to ensure that students’ understanding is fully understood and that the formative assessment is strictly applied.” (Line 173-179)
Abdullah says, “First Curriculum. The number of lessons is too many and the information is very large.” (Line 171)
Fahad says, “It is possible that the method is boring to some of the students who understand it from the first stage and find that they are finished. They think that they understand the goal so why the longest period is take at the same point in that way.” (Line 213)
Answer of Q9: Omar says, “But the drawbacks that may become some of the students who received the information from the first time will be to return the point boring them” (Lines 103)
Ibrahim says, “for me to overcome the time problem, I use distinguished students in each group. I put the leader of the group in who is distinguished to help me correct the wrong ideas of the students in the group, instead of what I ordered on every group or every student….For example, make sure that the leader of the group solved and answer correctly. If [the teacher in the vignette] had a mistake, I correct his mistake, and then [the teacher in the vignette] correct his peers mistakes and explain to his peers in the group and thus I
Abdullah says, “I overcome this problem by working collectively by dividing students into groups as well as organizing time and using the clock so that each part of the lesson has a specific time.” (Line 174-175)

Hamad says, “There are elements as much as we do, and there are other elements we can not be affected. For example, the number of students we can not influence them because of the composition of the housing and the school serves a large number of the population in which we can not change where we work on the aspects we appreciate and change it. For example lesson design we try to reduce the lesson as much as we can rely on the explanation of all points, for example in some lessons where points of interest. These points should not be fully accessible to students. We try to focus on the main points. If we focus on the main points of the lesson, we will be dealing with the issue of time in its points of interest and the main points. If the number is large and the time factor is influential in the teaching process, we focus on the main points we focus on to deliver them fully and therefore take less time than we focus on the main points and enrichment.” (Line 190-198)

Ahmed says, “Solutions Divide the lesson into parts and distribute the parts to student groups and assess each group.” (Line 134)

Q16: Giving this vignette, would you adopt formative assessment in your teaching?

Ahmed says, “The teacher must develop himself so that [the teacher in the vignette] can organize time in the classroom and be aware of the individual differences and determined by the students and distribute the work between them. Developing knowledge through reading as well as applying it and learning it through its application several times to be mastered.” (Line 145-147)
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<td>Mohammed</td>
<td>Mohammed says, “Of course, the method of lecture and the delivery is good, but there are better ways. For example, I use a scientific experiment or activity that shows the student a lesson in a way that makes it easier to understand the lesson deeper, and learning becomes more stable in students. The use</td>
<td>Mohammed says, “The teacher [in the vignette] used a worksheet to measure students' understanding. It is a good method which is similar to what I suggested.” (Line 69-70)</td>
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<td>Meghan says, “The first step: the teacher [in the vignette] explains the lesson that is light and reflection. After the explanation, the teacher must ask the students some questions, and through the questions [The teacher in the vignette] knows if the scientific concept is reached.” (Line 57-58)</td>
<td>Mohammed says, “I feel the purpose of this idea to assess the students' understanding.” (Line 75)</td>
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<td>Q1: Is this method of teaching something you used in your teaching?</td>
<td>Q2: What do you think he should do next?</td>
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<td>Q3: How did what think (Mr. Ahmed) did compare to your idea?</td>
<td>Q4: In your opinion, what is the purpose of what think (Mr. Ahmed) did? Please explain.</td>
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<td>Q5: What do you think (Mr. Ahmed) should do next?</td>
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Table J-9. Data Summary: The Teachers’ Comments Part 1: Background Context of Instruction
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<td>2. Abdullah says, “Yes, I apply this method as an introduction to the lesson. It takes 5 to 10 minutes. Then I ask questions about the subject of the basic lesson and possibly introduce pictures.” (Line 48-49)</td>
<td>Abdullah says, “After explaining the lesson, I start by making sure that the information has reached the students with so-called feedback, so to make sure that the information has reached the students. Sometimes I ask students questions. Sometimes, students in each group are given the opportunity to ask questions to another group and so on.” (Line 65-67)</td>
<td>Abdullah says, “This is one of the successful methods that can be used so that making sure that the students have understood the lesson, but there is little difference between our methods.” (Line 65-67)</td>
<td>Abdullah says, “My first goal is to make sure that all students are assessed and therefore make sure that the majority of the students understand the lesson and that the lesson points are clear to them. This is one of my main goals for the lesson to be clear and that the students have understood the lesson.” (Lines 71-72)</td>
<td>Abdullah says, “I can give students an extra homework. I ask them to specify additional information. For example, mention extra animals from your environment, especially with this lesson, write the reasons to classify them as animals.” (Line 75-76)</td>
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<td>Ahmed</td>
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<td>3.</td>
<td>Ahmed says, “Sure, this method is essential to me and I always use it.” (Line 42)</td>
<td>Salem says, “The method of teaching used is the lecture, which I do not like, and there are better ways like using a picture or video to raise the attention of students and then ask questions and hear from the students instead of starting the teaching directly in the explanation of</td>
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<td>Ahmed says, “It is assumed that after each point, there is an assessment, and then the teacher assess the students in general on the whole lesson.” (Line 45-46)</td>
<td>Salem says, “After the explanation, the final assessment of the lesson can be done by means of oral questions or questions in the book, which are directly answered by students individually or by groups.” (Line 47-48)</td>
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<td>Ahmed says, “This method is same as what I suggested” (Line 50)</td>
<td>Salem says, “My idea is similar to what [the teacher in the vignette] did that assess the students understanding.” (Line 52-53)</td>
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<td>Ahmed says, “Student assessment is an excellent method. As in the example, I use the worksheet, and I allow students to find the answers.” (Line 59-60)</td>
<td>Salem says, “Through the assessment know whether the information arrived to students or not through their answers and interaction. If there is little or no interaction with students, there is a problem with students' understanding. A teacher who does not evaluate students during the lesson or after the lesson will face a great problem because some lessons are based on past lessons.” (Lines 63-69)</td>
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<td>Ahmed says, “I collect the handouts, and make sure of the students' answers. Also, I review with students the right answers.” (Line 62).</td>
<td>Salem says, “I conduct a phased assessment of each point or goal, and at the end of the lesson, I see students' understanding.” (Line 69).</td>
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<td><strong>Omar</strong></td>
<td><strong>Ibrahim</strong></td>
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<td><strong>5.</strong></td>
<td>Omar says, “I use this teaching method, especially since the curriculum is a lot, or time is limited, so I use it to shorten the time. But in general there are many types of methods can be used such as classroom discussion or cooperative learning or learning through a certain scientific story or learning by research.” (Line 35-37)</td>
<td>Ibrahim says, “As for the way the teacher [in the vignette] used the lecture method, I do not</td>
<td>Omar says, “The example method is close to what I said. It is an assessment of student understanding.” (Line 50-51)</td>
<td>Omar says, “[Teacher in vignette] is supposed to correct errors in the worksheet to give them the correct answer. If the error rate is too large, he must return to the first method in order to reach the largest possible set of correct answers. But if the wrong answers are few and limited, he corrects them at the same moment and goes to other lessons.” (Line 64-67).</td>
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<td><strong>6.</strong></td>
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<td>Ibrahim says, “I think this method is the same as what said.” (Line 54)</td>
<td>Ibrahim says, “I think this method is a very important way to make sure how many students understood him in the classroom, Students answers are now assessed and students' understanding is determined to</td>
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use it in my teaching. I use the method of reasoning. I ask the student to research and then start discussing with them. I do not like to use the method of the interview at the beginning of the lesson because the student is often attentive with me for 6 minutes or 7 minutes and then not focused. I prefer to keep the students in the lesson. I used the method of discussion and conclusion. I let the student look for information and then start to discuss with him.” (Line 35-39)

discussion and can be distributed in the form of groups.” (Line 42-43)

and whether the method he used was good or not. This method is good and better than a summative assessment.” (Line 59-62)

ascertain the proportion of students who understand and how much they do not understand. I focus on identifying students' erroneous ideas, for example, “The Law of Preservation of the Block,” for example, giving an extra grade to the students who understand. And I correct the students who understand them. I am correcting the idea they have. Start evaluating students' answers to make sure the point or goal is understood.” (Line 67-69)
<p>| Amer | Amer says, “But the method used to explain the lesson is wrong in my view because it is not thought provoking. It is supposed to display a mirror on the students and ask them as if the picture appears as an input to the lesson. The explanation method is the lecture method, not very suitable. There are many ways to teach, for example, if you have a picture or a mirror. These are simple and available methods that can be used for the lesson and then begin to discuss Amer says, “Assessment of the lesson. After I have finished explaining, I ask about the main points which are the main goals that I want to reach the students.” (Line 43) Amer says, “This is same with what I suggest, which is assessing the achievement of learning objectives.” (Line 50) Amer says, “I see this assessment as essential during the class. It shows if the student understands or not. I have given them an assessment such as questions to answer, and the students resolved them. My conscience is relieved because I know that I delivered the information to them in the most effective way. I mean that assessment must be used, whether verbal or paper, or in any way. I consider the assessment to be essential in my teaching.” (Line 59-63) Amer says, “Certainly, he assesses the answers. After collecting the papers, he is evaluating the answers if they are wrong or correct” (Line 69). |
| 8. Faris | Faris says, “It is very practical. We use it a lot in this way or borrow it with a video clip if the tools are available.” (Line 34-35) | Faris says, “The next step asks students to give examples of the same solubility issue and how solids dissolve in liquid. Often after the explanation, I use a worksheet about the terms or vocabulary or concept.” (Line 37-40) | Faris says, “I think the teacher example [in the vignette] is same as my example.” (Line 43) | Faris says, “I always love using this brainstorming method. It has many advantages, the most important of which is the discovery of the information stored in the students, which is the background of the student. You will be shocked by some of the students that [the teacher in the vignette] has more information than his age and this is very important. Also, I use this method a lot in the consolidation of concepts, and I suffer a lot of times the student white page does not have any information or any background on the Faris says, “After the working paper modification phase, the teacher shows the answers; the students sometimes have mistakes. In concepts, for example, in cases of matter, or the transformation of a material from a state to a state, solubility, or mass conservation. So he can explain it again.” (Line 67-69) |</p>
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| 9. | Hamad | Hamad says, “The lecture method is the traditional method. It is clear that the teacher [in the vignette] is fully controlled in the learning process. I did not notice students participation in the class but only the listener. It became clear to me from this method that teacher teach and student just listen, that means the teacher is the master of the educational process and the student the listener......regar | Hamed says, “Teacher make sure that students understand the points [the teacher in the vignette] explained, for example, give them questions which is post-assessment for the point that is explained to make sure that information is delivered perfectly to students.” (Line 46-47) | Hamed says, “What the teacher [in the vignette] is assessing the students understanding, and that same as what I suggest.” (Line 54) | Hamad says, “After each point, the teacher in the vignette should not give students a worksheet, but there can be more than one assessment method, which could be used after each point, that does not consume much time in order to discover the extent of understanding of students. For example, the teacher can ask a question or display a picture and ask them about it. These assessments help the teacher to see if the students understands and whether the concept has reached them or not, even if the concept has reached them by 75%.” (Line 61-64) | Hamed says, “If I notice that the students have a high level of understanding, I move to the second points in the lesson. After the lesson, I back to the simple part that is not understood; I apply the feedback at the end of class. But if the proportion of students understood very little, I try not to move to the next point, unless the percentage of understanding of the students is higher. For example, I explain the point in a second way because it is possible the explanation method I used was not accepted by the student. So repeat it a second or display it in
| 10. Fahad | Fahad says, “This method is negative because it depends on the teacher, as well as education, depends on the teacher. The teacher used the method of the lecture, and this is wrong on his | Fahad says, “I always use an image and example or worksheet that is distributed to them…. make sure that [the teacher in the vignette] achieved the goals…..A stage | Fahad says, “The example is very good and close to what I suggested because it was based on the student, and I always prefer this method. For example, I give students handouts that include mathematical | Fahad says, “Sometimes the goals are cumulative. For example, the second goal depends on the first, and the third on the second, so before moving from goal to goal, you must be sure to achieve the first goal. At each stage, you must make sure to | Fahad says, “Students need to be followed up to help them achieve their goals. Then leaving the student to reach the goal himself is better.” (Line 90). |
part. But the learning should depend on the student more than the teacher. It is special that the student is possible for the student to be the one who deduces the information and gets it. I do not use lecture because I want learning to depend on the student to get the information by himself.” (Line 47-51) of assessment. In each goal, make sure that the goal is achieved or not. And then it possible at each stage of the lesson make sure of all the goals at the end of the lesson and for example in the whole chapter. I have to make sure that the goals are completely achieved.” (Line 55-66) achieve the goals and then move to the next stage. I always say that even if you are tired in achieving the goal, even if you are late, it is better than you move to a second goal and the previous goal is not achieved. The assessment phase is very important and verified to achieve the objectives.” (Lines 82-85) Bader says, “The method does not achieve the goals because the student must discover the information, but the teacher [in the vignette] here gave him the information, and this is Bader says, “Feedback method. I give them homework, a way that differs from teacher to teacher. It is possible to ask a question that raises curiosity, which benefit from this lesson Bader says, “Similar, I suggest that I give them the question and the materials. I would be like a mentor and supportive to the students, and they get the information by themselves.” (Line 53-54) Bader says, “These are supposed to be at the beginning of the lesson as an entrance to the lesson. [The teacher in the vignette] prepares unsweetened juices and when added to sugar and weight gain and then begins the lesson, and then Bader says, “Identify those who do not understand. For example, for students, I take them to the side of class and give them an activity and let them discover on their own or in groups. And because the groups are discussing the
contrary to active learning, the method now used in Saudi Arabia; active learning, that is, the student looking and learning and explore, the teacher used the method of indoctrination is primitive and old.” (Line 32-34)

by solving this question.” (Line 39-40).

vignette] explains more deeply” (Lines 59-60) However, he gave no indication that he reviewed and analyzed the assessment result.

information, they can understand from a peer more than a teacher.” (Line 65-67).
**Table J-10. Data Summary: The Teachers’ Comments Part 2: Practice of Formative Assessment: A. Response to Formative Assessment**

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<tr>
<th>Teachers/Vignette</th>
<th>Part two: Practice of formative assessment: A. Response to formative assessment</th>
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| Q6: How does what Mr. Ahmed did in his lesson compare to what you were thinking? | Q7: Would this be something you could see yourself doing in a classroom?  
  - IF YES,  
  - How often?  
  - Please briefly describe for me how you have done it. IF NOT, move to next question. |
| Q8: Tell me what you think about the approach Mr. Ahmed took in re-teaching the point that students had trouble with? Why do you think he did what he did? | Q9: What are the pros and cons of taking such an approach? Please explain. |
| Q10: What do you think Mr. Ahmed do next? |

1. Mohammed
   - Mohammed says, “I think what the teacher did is similar to my ideas.” (Line 91)
   - Mohammed says, “Yes, always use it in my teaching….I use an active learning method by displaying a video or applying an activity so that students understand faster and better. I give assessment questions after each part of the lesson to
   - Mohammed says, “Teaching may not be appropriate, such as using traditional methods. This means that students do not understand the lesson and therefore it is best to re-explain using better methods such as classroom activity or a video
   - Mohammed says, “I think the method of the teacher [in the vignette] had one advantage that is student understanding, and I think the time would be the disadvantage of this method.” (Lines 113-115)
   - Mohammed says, “I expect [the teacher in the vignette] should make a summative assessment, such as tests or a short quiz.” (Lines 120-121)
2. **Abdullah**

Abdullah says, “The example suggested by me is homework. In the homework there is possibility that students propose organisms from their environment and their answers may be correct, but it is possible their answers include unclear organisms. I note this problem in the classification of insects and arthropods. Here in showing the lesson. Re-explanation often leads to better access to information.” (Line 98-101)

Abdullah says, “In my point of view, the teacher [in the vignette] gives students different questions again and makes sure that the problem is overtaken by students.” (Line 125)

Abdullah says, “I always try to rely on searching through the Internet with student groups. We have a library in the school with the Internet service. I ask students to search for information through the Internet and then discuss it. Sometimes, during

Abdullah says, “I think the advantage of this method is to improve the students’ understanding and help with achieving learning goals, but it has disadvantages that there is no enough time and a large number of students in the classroom.” (Lines 107-108)

Abdullah says, “One of the advantages of this method is to get the student to know and understand and overcome the problems they face.” (Line 113)

Also, Abdullah says, “As well as the large number of students creates a problem in the
the example you gave me, the teacher [in the vignette way was so good that the teacher discovered the problems faced by students, and therefore I see this way better from my point of view in terms of identifying the problem. It is a lot of students falls into the problem of object classification so that they are interested in shape and not characteristics. Thus, [the teacher in the vignette] was able to identify the problem. The students were then asked a question so that they would answer the question in terms of the characteristics they studied and not the shape. And [the teacher in the vignette] gave the opportunity for students to discuss is important way of teaching because the student sometimes understand from

the same session in the last 10 minutes or at the beginning of the next session, we do a review of the lesson. I set review classes so that at the end of each unit or two units, we spend time reviewing. There will be scientific enrichment. I identify some of the problems in the lessons and ask students to look for it in the curriculum or through the Internet and each group prepares a report of what they found. Then each group's leader present what solution was reached, and the rest of the groups ask him questions to answer or turn the question to his

application of such a way so that there is difficulty in their assessment and return the points they face. Where the problem of the number of students cause a problem.”

(Lines 118-119)
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<td><strong>3. Ahmed</strong></td>
<td>Ahmed says, “Almost similar to what I told you. He checks the answers of the students and then goes on to explain again to the points that the students do not understand” (Lines 72-73)</td>
<td>Ahmed says, “Yes I apply this method in my teaching if time is allowed. This method needs a long time.” (Line 78)</td>
<td>Ahmed says, “The teacher [in the vignette] explains in a different way to help students understand and also focuses on weaknesses and improves students' understanding.” (Lines 82-83)</td>
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<td>Ahmed says, “Pros way these are excellent. So [the teacher in the vignette] uses another method and explains another way to help students to understand. From the advantages the teacher focuses on weaknesses and improves students' understanding more as well as taking into account individual differences.” (Lines 83-84) Also, Ahmed says, “But negative thing is time. This method needs time and because of the large number of students it is”</td>
<td>Ahmed says, “I think that the teacher [in the vignette] should review the whole lesson in general and all points. Also, he would make sure that students understand the lesson, and it is possible that the teacher should give students homework.” (Lines 91-92)</td>
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<td>Salem</td>
<td>Salem. “This is same as what I said” (Line 72-73)</td>
<td>Salem says, “If the lesson helps me to apply it. Most of the time, I apply it in short lessons” (Line 88-89)</td>
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<td>4.</td>
<td>Salem</td>
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<td>5.</td>
<td>Omar</td>
<td>Omar says, “The problem that [the teacher in vignette] has depends on whether the percentage of students who do not understand is low or high. If this percentage is high, [the teacher in vignette] should re-explain the</td>
<td>Omar says, “Of course, I apply it, but the percentage of my application of this method depends on the proportion of students who do not understand. For example, if the</td>
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point. But if the percentage is low, he does not need to re-explain. [The teacher in vignette] could use collaborative learning, for example, to exchange information between student groups, or it is possible to use the search method to answer the question. In general, this is what the teacher can do.” (Lines 78-80)

proportion of students is very low, for example 20%, I do not apply it because of the time. But if the ratio is high, I can apply it in another way.” (Line 91-93)

for example, some students who understood from the first time can help them to remember and memorize information.” (Lines 99-101)

Also, Omar says, “One the disadvantage that this method maybe become boring to the students who understood the information from the first time, so when we return to teach the same point, it will be boring to them.” (Lines 103)

6. Ibrahim

Ibrahim says, “Yes, it is exactly the same as I suggested.” (Line 80)

Ibrahim says, “I apply it if there is a deficiency in the teaching method that I used. I do not use it always because sometimes the method of teaching is

Ibrahim says, “The teacher [in the vignette] found that the method of explaining at first time that is the lecture was good. Here [the teacher in the vignette]

Ibrahim says, “There are many advantages. It is the benefits of this assessment is that after each point shows that the method of teaching is not appropriate

Ibrahim says, “I think homework would be the next step, and in the next class I make sure of the students understanding from their
<p>| 7. Amer | Amer says, “Yes, same as I suggested or close to it” (Lines 78) | Amer says, “I will apply it if there is enough time.” (Line 87) | Amer says, “I feel that the purpose of what the teacher [in the vignette] did is to help students understanding. Also, teacher in vignette did not give the correct answer, but he let the student find the answer.” (Line 92-94) | Amer says, “It helps students to acquire information. It has a disadvantage that the teacher did not solve the problem until the lesson is finished.” (Line 100-101) | Amer says, “He may not move to the next lesson, but [the teacher in the vignette] reviews with students and give them questions to make sure the information is reached. Then [the teacher in the vignette] move to next lesson.” (Line 107) |</p>
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<td>8.</td>
<td>Faris</td>
<td>Faris says, “I feel that it is same as what I said.” (Line 83)</td>
<td>Faris says, “Yes, apply it and try to let the student get the information. And I do not give him the information so that [the teacher in the vignette] concludes the information such as using brainstorming.” (Line 85-86)</td>
<td>Faris says, “The features of this point, for example, the student devises information and the student is running his mind and does not forget the information by moving to the second level or a high level of Bloom's Taxonomy, which are remembering, understanding and comprehension ... etc. So, moving to higher levels that prove the information, so the student will not forget it. As well as linking the lesson and the student's daily life such as the idea of adding sugar on lemon juice.” (Lines 94-97)</td>
<td>Faris” My biggest con in the way this is the time problem.” (Lines 105-109)</td>
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<td>9.</td>
<td>Hamad</td>
<td>Hamad says, “It is clear to me that this method is almost same as the</td>
<td>Hamad says, “I always applies the method.” (Lines</td>
<td>Hamad says, “I think that feedback needs to be more</td>
<td>Hamad says, “I use as this method to explain the concept</td>
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<td>method that I mentioned to you in the previous step. However, it became clear to me from the example that the feedback was not in the same class, but the feedback in the next class, and thus this made a long period between explaining the concept and correcting the concept as well as feedback” (Lines 90-94)</td>
<td>immediate, not in the next class.” (Lines 106-108)</td>
<td>and the students get it correctly. Also, the method is supposed to be used in the teaching process, and not for evaluation.” (Lines 114-118)</td>
<td>make sure the students understand and focus on the students who did not understand.” (Lines 123-125)</td>
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<td>10.</td>
<td>Fahad</td>
<td>Fahad says, “I feel that my idea is same as the example [the vignette].” (Line 108)</td>
<td>Fahad says, “Always use it in every lesson and every time and give students freedom so that I make sure that the goal is achieved or not achieved.” (Line 113-114)</td>
<td>Fahad says, “Not moving to the next lesson until students understand the point and through the practical side in the next class. The student concludes and knows his mistakes by himself.” (Lines 109-110)</td>
<td>Fahad says, “making sure to achieve the goals. That means the goal is not necessary to be achieved at the same time, but it possible in the next class. It is good to use multiple methods.” (Lines 123-124)</td>
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<td>11.</td>
<td>Bader</td>
<td>Bader says, “This way is wrong. [The teacher in the vignette] should give handouts to the students who do not understand” (Line 94)</td>
<td>Bader says, “I use this method in my classes.” (Line 94)</td>
<td>Bader says, “The teacher [in vignette] should re-teach because the students did not understand”</td>
<td>Bader says, &quot;[the teacher in the vignette] would assess the students understanding.”</td>
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the lesson. Also, [the teacher in the vignette] should give those students who understand the lesson additional enrichment information. Therefore, these handouts help students to go deeper into the law of conservation of mass. If I were a teacher I would divide the class into three sections: First, students who did not understand the minimum limit of the lesson. I give them the handouts. And for those who understand, I give them additional enrichment information. And for those who are superior, I give them more difficult things related to the lesson.” (Line 84-86)

the lesson. The reason for the students did not understand the lesson is the teacher’s method at the beginning, because he should let the students search and answer the questions by themselves.” (Line 102-105)

of an appropriate place to apply this method, such as a large and equipped science lab.” (Line 112-114)
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<th>Teachers/Vignette</th>
<th>Part two: Practice of formative assessment: Re-assessment</th>
<th>Conclusion sub-questions</th>
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<td>Q11: How does what Mr. Ahmed did in this part of the lesson compare to what you were thinking?</td>
<td>Q12: If Mr. Ahmed had determined that the students still did not understand the material, what do you think he should do next?</td>
<td>Q13: Overall, what do you think of the formative assessment approach?</td>
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<td>Q14: Can you tell me about a time when you have done something similar? Explain</td>
<td>Q15: If you would like to apply such instruction in your classroom, are there any difficulties or obstacles? IF YES: What do you think the difficulties or obstacles of using such instruction? Explain. What do you see as hindering you from using such instruction? Explain. In your opinion, how could you overcome these difficulties or obstacles?</td>
<td>Q16: Giving this vignette, would you adopt formative assessment in your teaching? IF YES: What extent you would be willing to applying formative assessment in your classroom? If so, how often? What could improve the Saudi teachers to use formative assessment approach in their classrooms? IF NOT: why not?</td>
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<td>Mohammed</td>
<td>Mohammed says, &quot;Here [in the vignette] the teacher only assisted the points&quot;</td>
<td>Mohammed says, &quot;I would review the reason that caused the students to not understand&quot;</td>
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<td>Mohammed says, &quot;I use pre-assessment and formative assessment after&quot;</td>
<td>Mohammed says, &quot;I use pre-assessment and formative assessment after&quot;</td>
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<td>Mohammed says, &quot;Training courses for teachers by preparing them better to use this&quot;</td>
<td>Mohammed says, &quot;Training courses for teachers by preparing them better to use this&quot;</td>
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Table J-11. Data Summary: The Teachers’ Comments Part 2: Practice of Formative Assessment: Re-Assessment and Conclusion Sub-Questions
<p>| 2. Abdullah | Abdullah says, “I think our ideas are same” (Line 134) | Abdullah says, “If the problem persists, the problem may be in the way the lesson is explained. I am Abdullah says, “In my view this method is a very excellent method of formative assessment, but I Abdullah says, “Sometimes, I use this method by asking a student who understand the lesson to re-explain Abdullah says, “First Curriculum. The number of lessons is too many and the information is very large.” Abdullah says, “One of the best ways I see it is to exchange experience between teachers |
| 3. Ahmed | Ahmed says, “I suggested homework, but the teacher used paper work and I think it's a good way” (Lines 101) | Ahmed says, “In more than one way, for example: first, students can be placed in diverse groups that take into account individual differences so that students learn from colleagues. second, focusing on Ahmed says, “It is a well-known and applied method. Its advantage is focusing on students and understanding, but there is a problem with time.” (Line 120). | Ahmed says, “I apply formative assessment, but sometimes I do not apply it because it needs a long time. This method depends on the lesson. In some lessons, I apply it, and it is effective. However, in some Ahmed says, “Solutions, I divide the lesson into parts and distribute the parts to student groups and assess each group.” (Line 134) | Ahmed says, “The teacher must develop himself so that [the teacher in the vignette] can organize time in the classroom and be aware of the individual differences and determined by the students and training courses. There are reciprocal visits between teachers to share experiences and make use of teachers.” (Line 192-194) ** |
|   | Salem | Salem says, “I see what the teacher [in vignette] did is better than my point of view, which is moving on to the next lesson, so that [the teacher in vignette] focused more on the problem and reviewed it.”  (Lines 114) | Salem says, “This method is very excellent after each goal explained by the teacher by asking students to this goal, and this method is very excellent and powerful in the installation of information with students.” (Line 132-133) | Salem says, “I think workshops and self-development by reading could improve teachers to use this method.” (Line 152-153) | 4. Salem | lessons, I do not apply it because it needs a long time.” (Line 122-124) | distribute the work between them. Developing knowledge through reading as well as applying it and learning it through its application several times to be mastered.” (Line 145-147) |</p>
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<td>5.</td>
<td>Omar</td>
<td>Omar says, “I think it is similar to what I suggest that reassessment.” (Lines 121-122)</td>
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<td>Omar says, “The teacher [in the vignette] could ask students who did not understand to search for information about the concept on the Internet, or he could use peer-to-peer learning so that he could put a student who understands the subject with a student who does not understand to benefit from each other.” (Lines 127-131)</td>
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<td>Omar says, “This method is excellent and has its positives.” (Lines 132)</td>
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<td>Omar says, “Yes. It has three advantages, such as the observation of continuous learning of the student, and to make sure that any information and any part of the curriculum is reached to the students. The third point is that it is possible to develop this method of teaching.” (Lines 138-143)</td>
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<td>Omar says, “The disadvantages. I see that the biggest negative is the time when the teacher finds it difficult to find time to diversify in teaching or re-explain in another way. I discovered that the time has been limited to the teacher in the method of evaluation formative and difficult to return in another way.” (Line 146-147) Answer of Q9: Omar says, “But the drawbacks that may become some of the students who received the information from the first time will be to return the point boring them” (Lines 103)</td>
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<td>Omer says, ”By a very large percentage I adopted it” (Line 170)</td>
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<td>6.</td>
<td>Ibrahim</td>
<td>Ibrahim says, “I suggested”</td>
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<td>Ibrahim says, “I explained the”</td>
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<td>Ibrahim says, “I prefer to use”</td>
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<td>Ibrahim says, “For me, I use formative”</td>
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<td>Ibrahim says, “for me to overcome the”</td>
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<td>Ibrahim says,””</td>
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<td>Yes, I always use”</td>
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<td>homework and the teacher used a worksheet. Both methods are correct. The difference between them is that the worksheet can make sure during the class directly that the student dissolved himself individually and not groups then make sure the student has changed the wrong idea about the law of conservation of mass. For homework possible the student uses help, but [the teacher in the vignette] does not mind the latter [the teacher in the vignette] will solve by himself. I prefer to use homework to save time.” (Lines 127-131)</td>
<td>lesson and then give the students handouts, but there are students still do not understand…so I will ask the good students to re-explains to the students who did not understand or I will re-explain to students who do not understand after the class individually.” (Line 138-140)</td>
<td>formative assessment.” (Lines 150)</td>
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<td>7. Amer</td>
<td>Amer says, “I think this method is similar to my idea, but I think the teacher [in the vignette] should give them similar questions that he had already asked while adding new questions.” (Lines 120-121)</td>
<td>Amer says, “My final solution would be to take the students aside in their spare time and re-explain to them.” (Lines 129-130)</td>
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<td>8. Faris</td>
<td>Faris says, “The way the teacher [in vignette] used is different from my own way. I ask one of the students to re-explain, and here the teacher re-assess. What the teacher [in vignette] has done is good but I don't prefer to re-assess the students.” (Lines 125-127).</td>
<td>Faris says, “If the students still did not understand, I will re-explain to them in next class.” (Lines 130).</td>
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<td>Hamad</td>
<td>Hamad says, “His method is excellent and I also mentioned a similar method.” (Lines 141) Hamad was referring to his earlier comment where he described using a similar method to the method that is in the vignette.</td>
<td>Hamad says, “If the students understood the lesson, but I still have students who do not understand. I will focus on the students who did not understand by reviewing the previous lesson that would be at the beginning of the next lesson; my explanation relies on students previous knowledge. I will start with a video, and will use another way to explain the lesson of the previous lesson to make sure the students will understand. After all these steps, if the students don't understand. I will give them, such as, links to enter on YouTube, pictures, or explanation that would be out of the class time.” (Lines 149-154)</td>
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<td>10. Fahad</td>
<td>Fahad says, “I apply a method I call 4, 2, and 1. The last thing I do is individualized instruction. Each student or group to make sure the information reaches 70% of the classroom activity. Finally, I make sure that each student understands through the method of teaching 4, 2, and 1. In the first step, each group of four students is fully engaged. Then I give the students a second question, but now the students are in a group of two students instead of four; each group have two students. Thus, the students understand the information in a better way. In the end, I make sure the information is understood by</td>
<td>Fahad says, “I would re-explain what students did not understand out of class time.” (Lines 158)</td>
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<td></td>
<td>Bader</td>
<td>Bader says, “This method is similar to my suggestion.” (Line 137)</td>
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