*Professional Development for Conceptual Knowledge Instructional Strategies*

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**Abstract**

The topic of this applied research project was conceptual knowledge instructional strategies. The identified problem was that teachers expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms, which impacted their ability to guide students to generalize and transfer their knowledge. This led to the research question: how might a professional development program be developed to address the problem of teachers' lack of knowledge to guide students to apply conceptual knowledge to real-world scenarios? Eleven of the researcher's colleagues who were certified teachers at an international school participated in the research utilizing an anonymous Google Form as the data collection instrument. The stakeholders of this project included educators such as teachers, administrators, and curriculum coordinators who utilize or are interested in utilizing a concept-based curriculum in their school districts and classrooms and are involved in professional learning communities with the researcher. Quantitative and qualitative data were collected and analyzed using descriptive statistics and thematic grouping respectively. The research confirmed the researcher's problem statement that teachers at the researcher's school had a lack of knowledge in implementing a concept-based curriculum within their instructional practices. This phenomenon impacted teachers' abilities to guide students to generalize and transfer their conceptual knowledge and occurred because teachers lacked training in this area. These results showed there was a need for professional development on conceptual knowledge instructional strategies.

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# Chapter 1: Topic and Problem

## Research Type

This capstone is an applied research project that develops a professional development program for teachers. The professional development program will be developed to help teachers guide students to apply conceptual knowledge to real-world scenarios.

## Research Topic

The research topic for this capstone is teachers' implementation of a concept-based curriculum within their instructional practices in their classrooms.  This topic is relevant to the field of curriculum and instruction as it is an educational approach focused on students' ability to transfer their knowledge and skills to real-world situations  (Erikson et al. 2014).  "The concept-based teaching approach, employed in concept-based curricula, has existed for more than 50 years and focused on the development of complex thinking" (Farhan, 2020, pg 320). Conceptual understanding is a key component of Curriculum and Instruction because it encourages deep thinking and making connections between topics.

Conceptual thinking is relevant to the field of Curriculum and Instruction as students in the future will encounter ideas and need to solve new problems that do not yet exist.  Rote memorization does not allow students to transfer knowledge from one area or topic to another. When students are instructed more conceptually and are encouraged to generalize to create meaning from their learning, they are more likely to apply the knowledge and skills that they have learned to a new situation.  H. Lynn Erikson's focus on the Structure of Knowledge and conceptual learning to create a three-dimensional curriculum model connecting skills, knowledge, and concepts, rather than just the traditional curriculum model focusing on skills and

knowledge, will prepare students to transfer their learning (Erikson et al. 2017). The application of learning and students' ability to make connections are key to their ability to use the knowledge and skills they have acquired in the future.

## Problem Statement

There is a problem where teachers at the researcher's school have expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms. This phenomenon impacts teachers' abilities to guide students to generalize and transfer their conceptual knowledge to real-world scenarios. This may be occurring because teachers lack the training to guide students to apply conceptual knowledge to real-world scenarios.

The problem statement is relevant to the topic of the implementation of a concept-based curriculum as teachers are struggling with how to approach implementing a concept-based curriculum into their instructional practices in their classrooms. The researcher's school is an International Baccalaureate school and utilizes a concept-based approach throughout the school. As a result, it is important that teachers feel supported and are provided with additional knowledge and skills related to implementing a concept-based curriculum so that they can provide their students with a robust program in their classrooms. An effect of the problem of teachers expressing a lack of knowledge in implementing a concept-based curriculum is that the students could be lacking in instruction and strategies on how to generalize and transfer their knowledge to real-world scenarios.

**Problem Impact and Root Causes**

The problem that teachers have expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms impacts their ability to guide students to generalize and transfer their knowledge to real-world situations.  In a concept-based curriculum, students must be explicitly taught how to generalize to transfer their knowledge (Erikson & Lanning, 2014).  This inquiry-based approach can be challenging for teachers as it encourages students to move from rote memorization to thinking and applying knowledge.  It can help students understand the whole picture of how ideas connect (Hartsell, 2021). This shift from a behaviorist to a constructivist approach is critical for students to apply their conceptual knowledge through transfer to solve new problems (Procaccini et al., 2016).

The root cause of the problem is due to a lack of professional learning opportunities at the researcher's school.  It is not easy for teachers to transition to a new approach to instruction. The shift from a two-dimensional curriculum focused on knowledge and skills to a three-dimensional curriculum looking at knowledge, skills, and concepts require different instructional strategies. This results in a change from teacher-centered to student-centered learning where strategies for promoting student engagement and carefully selecting concepts are key to the implementation in the classroom (Barrett et al., 2023).  Faculty education and development, along with coaching, are key to successful implementation (Procaccini et al., 2016).

**Research Question**

How might a professional development program be developed to address the problem of teachers' lack of knowledge to guide students to apply conceptual knowledge to real-world scenarios?

## Justification

This applied research project addresses the problem of teachers' lack of knowledge to guide students to apply conceptual learning to real-world scenarios by creating a professional development program to provide teachers with the knowledge and skills they need to apply conceptual learning in their classrooms. Due to a lack of previous professional development opportunities, teachers self-report that they need additional support to better address the needs of their students. This project is relevant to meeting those needs and there is a clear justification for the project due to the growing focus of schools using conceptual knowledge as part of their instructional approach. The International Baccalaureate, which is based on a conceptual framework, is a curriculum utilized by over 5,600 schools worldwide. The world is rapidly evolving due to the advances in technology and students need to be prepared to help solve problems that do not yet exist. Providing them with a strong foundation in conceptual learning will enable them to tackle these challenges. This project will be applicable to teachers in schools who are implementing concept-based learning and is designed to provide tactical strategies that teachers can bring back to their classrooms and implement with their students.

# Chapter 2: Review of the Literature

## Introduction to the Literature Review

This study focuses on teachers' lack of knowledge in guiding students to apply conceptual knowledge to real-world scenarios. Concept-based instruction allows students to think critically and apply their learning to new contexts.  This conceptual approach is over 50 years old (Farhan, 2022) and focuses on the transfer of knowledge, conceptual understanding, deep thinking, and personal engagement (Erickson, 2012).  The review of professional literature surrounding concept-based instruction found that two of the main components in ensuring student success were generalization and transfer.  In a concept-based classroom, students are introduced to various case studies and, through an inquiry-based approach, will be asked to create a generalization focused on the big ideas and concepts presented.  Students use their generalizations to create their own meaning from what they have learned to write a statement of understanding to synthesize their learning.  Students can then take those generalizations to transfer their knowledge to new situations.  Generalizations are used to help students transfer their knowledge and are key elements in students' ability to apply what they have learned to real-world situations.

### *Concept-Based Instruction*

Concept-based learning allows students to move beyond the facts into deeper conceptual learning.  This encourages deep thinking and shifts the focus from students simply memorizing facts to thinking and applying knowledge (Barrett et al., 2023; Erickson, 2012; Lanning, 2015, Farhan, 2022; Mitchell & Kramer, 2023). "Concept-based curriculums can support teachers in moving deliberately to idea-centered instruction" (Erickson, 2012, p. 5).  Students are

encouraged to use synergistic thinking centered around knowledge, skills, and concepts to create their own meaning from the world around them, which allows them to transfer their knowledge to new ideas and situations (Erickson, 2012; Farhan, 2022; Lanning & Brown, 2019; Wathall, 2016). Concept-based instruction requires moving from a two- dimensional to a three-dimensional curriculum. A two-dimensional curriculum is based on content and skills (Erickson et al., 2017; Farhan, 2022; McTighe, 2017). A three-dimensional curriculum based on knowledge, skills, and concepts (Erickson et al., 2017; Farhan, 2022; Wiggins & McTighe, 2016). Research has found that students who are taught utilizing a conceptual approach are able to use abstract thinking to internalize information and process it at a much higher level than students using a more traditional approach (Barrett et al., 2023; Dean, 2017; Duncan, 2015; Marschall & French, 2018). Hendricks & Wangerin suggest that concept-based instruction encourages higher-level thinking on Booms Taxonomy (2017).

Lynn Erickson and Lois Lanning's work in this area is instrumental and builds on the work of Hilda Taba (Farhan, 2022). Erickson created the Structure of Knowledge which illustrates the relationships between concepts, facts, topics, and generalizations (Erickson et al., 2017; Farhan, 2022; Marschall & French, 2018; Wathall, 2016). This is a tool that teachers can use to help students make connections between facts, knowledge, and generalizations. The Structure of Knowledge is utilized in knowledge-based subjects such as math, science, and social studies, where the emphasis is on facts (Erickson et al., 2017). Lanning created the Structure of Process to illustrate the connections between concepts, facts, topics, skills and strategies, and generalizations. This is utilized in process-based disciplines like the arts, languages, and physical education, focusing on students' learning skills and strategies (Erickson et al., 2017; Farhan, 2022, Lanning, 2015, Lanning & Brown, 2019; Walker, 2014). Both the Structure of

Knowledge and the Structure of Process are tools that teachers can use while designing learning experiences for students to help make connections between knowledge, skills, concepts, and generalizations to encourage student transfer of ideas (Erickson & Lanning, 2014; Farhan, 2022; Marschall & French, 2018).

Facts don't transfer. They are locked in time, place, and situation. Knowledge transfers through concepts, generalizations, and principles (Erickson, 2012) A concept is an idea that is not locked into a specific time or place. "Concepts facilitate the transfer of knowledge through time, across cultures, and across situations" (Erickson, 2012, p. 6). A common misconception is that in a concept-based approach, facts, knowledge, and skills are not important. Conceptual teaching needs factual knowledge, not only abstract concepts (Erickson et al., 2017; Hendricks & Wangerin, 2017). The research shows that for students to think conceptually, their experiences need to be grounded in factual knowledge, and they need to be explicitly taught the skills to generalize and create meaning from what they have learned to encourage transfer (Anderson & Krathwohl, 2001; Erickson et al., 2017; Farhan, 2022; Marschall & French, 2018; Wathall, 2016).

Diphoorn et al. (2023) discuss the steps learners should take in a concept-based approach. The first step for concept development is disciplinary grounding focusing on learning facts and acquiring knowledge of the topic. The second step is perspective-taking and looking at a problem through the lens of each discipline. The third step is finding common ground for students to use what they know and have perceived to find connections between the knowledge and topics studied. The fourth step is integration, where concepts from one discipline can be applied to another and transferred (Diphoorn et al., 2023). This approach aligns with the work of

Erickson & Lanning (2013) and Marschall & French (2018) and helps to provide a framework for how learners can acquire knowledge and make connections to encourage transfer.

### *Generalizations*

Generalizations encourage knowledge retention without memorization (Higgins & Reid, 2017). They are "miniature theories" (Bal, 2002, p. 22) that can be used to "define themes, problems, and relevant questions" (Diphoorn et al., 2023, p. 5). They can be used to help students create their own understandings and to allow for discourse based on "a common language" (Bal, 2002, p. 22). Thinking conceptually gives students a foundation to create a hypothesis about what the results would be (Chen et al., 2021). Procaccini et al. found that "active learners who are challenged with applying concepts (as opposed to memorizing facts) are more likely to retain information" (2016, p. 4). Students are encouraged to write their own generalizations (Wathall, 2016) as a way to create meaning from ideas and find connections (Khajello & Siegel, 2022). Research shows that if students are asked to write their own generalizations, they have a stronger foundation to draw from in the future and are better able to make connections between prior knowledge and new situations (Erickson & Lanning, 2013; Kastens & Krumhansl, 2017; Khajello & Siegel, 2022; Marschall & French, 2018; McTighe, 2017; Wathall, 2016).

Research has found that learning occurs when new concepts and generalizations are integrated into the learner's "existing frameworks" (Procaccini et al., 2016, p. 7). The goal of creating generalizations is to look at the relationships between variables and make connections that can be drawn upon in the future to encourage the transfer of knowledge (Chen et al., 2021; Marschall & French, 2018). This conceptual thinking allows students to use higher-level

reasoning to find solutions to problems and draw connections between topics. Erickson describes this approach as one that "values and respects the thinking of the individual by "drawing understandings from" rather than "telling understandings to" (Erickson, 2012, p. 8). This implies that generalizations help students to make their own connections and to find their own understandings, which results in greater retention than memorization of facts alone.

An inquiry-based approach is a shift away from the behaviorist approach of focusing on memorization (Procaccini et al., 2016) and, according to research, is a critical part of concept-based instruction surrounding a student's ability to generalize (Erickson & Lanning, 2014; Kastens & Krumhansl, 2017; Khajello & Siegel, 2022; Marschall & French, 2018; McTighe, 2017; Procaccini et al., 2016; Wathall, 2016). Inquiry learning involves investigating open-ended questions where students engage in higher-level thinking to apply subject knowledge to real-world problems (Chen et al., 2021). Inquiry is on a continuum involving various levels of scaffolding. Where teachers should start depends on what the students know about the topic and how comfortable they are with it (Wathall, 2016). A guided approach to inquiry can help students make sense of the world (Kastens & Krumhansl, 2017).

According to research, case studies and real-world examples also play an important role in student's ability to generalize (Erickson et al., 2017; Marschall & French, 2018). Using real-life data to see commonalities and make observations allow students to analyze and create meaning based on the specific case studies and data (Kastens & Krumhansl, 2017). Seeing similarities and differences in concepts is higher-order thinking and allows students to use exemplars to create meaning and see patterns (Higgins & Reid, 2017; Erickson et al., 2017). Concrete examples are key to students' ability to synthesize what they are observing and how they can create meaning from the data (Solheim et al., 2022). These exemplars and case studies

help students learn about concepts (Farhan, 2022) and make connections that can be transferred to other situations.

Strategic questioning is also an important strategy to engage students in problem-solving activities and help them generalize (Walker, 2014). Guiding questions help students generalize with factual questions focusing on what students need to know; conceptual questions connect the facts with the concepts; and debatable or provocative questions help provoke thought or discussion to allow students to apply what they have learned and understood (Erickson et al., 2017; Wathall, 2016). Research shows that strategic questioning helps students to understand the big ideas and can assist students in refining their understanding and correcting any misconceptions (Erickson et al., 2017; McTighe & Silver, 2020; Marschall & French, 2018; Walker, 2014).

Research has found that there are a variety of strategies that teachers can employ in their classrooms to help students learn how to generalize information. Scaffolding information helps students integrate higher-level thinking and improves students' reasoning skills (Belland et al., 2017; Khajello & Siegel). Students need to do more than just listen; they need to actively engage in the learning process to shift from teacher-centered to more student-centered instruction (Barrett et al., 2023; Higgins & Reid, 2017). Active learning strategies are key to helping students organize and apply their thinking (Hendricks & Wangerin, 2017; Kastens & Krumhansl, 2017; Marschall & French, 2018; Solheim et al., 2022). Learning experiences around concepts encourage students to engage with the material and think deeper and open-ended problems allow for greater experimentation and creativity (Marschall & French; Walker, 2014).

*Transfer of Knowledge*

Using concepts enables students and teachers to find a common language and to make connections across disciplines (Bal, 2002; Diphoorn et al., 2023; Kalis, 2023). This is associated with the Constructivist view of learning, which helps students connect prior knowledge to new information (Khajello & Siegel, 2022). In Constructivist learning, students use pre-existing knowledge to make sense of their environment, and the collaborative nature of this approach also adds to the learning (Hartsell, 2021). Identifying relationships between concepts in different courses encourages the transfer of knowledge (Solheim et al., 2022), and using subjects to make analogies and connections with other subjects can help facilitate student understanding (Kalis, 2023). Conceptual understanding helps to link knowledge (Farhan, 2022) and allows students to see patterns and solve real-world problems (Higgins & Reid, 2017).

Identifying the concepts and drawing connections is key to student learning as students find patterns that can then be used to apply to different content (Erickson, 2016; Khajello & Siegel, 2022). The part-to-whole relationship allows students to organize concepts and make connections resulting in greater knowledge and transfer (Farhan, 2022; Khajello & Siegel, 2022). Transfer is important and challenging to teach (Mitchell & Kramer, 2023; Stern et al., 2021). "Transfer requires students to recognize when past learning applies to new situations. While seemingly simple on the surface, transfer is phenomenally complex in practice" (Mitchell & Kramer, 2023, p. 2). Thinking must move from the factual to the conceptual for students to integrate the acquired knowledge and transfer it to new domains (Procaccini et al., 2016; Farhan, 2020; Isecke, H. 2017). When information is organized conceptually, students assimilate new information with prior knowledge more quickly (Bransford et al, 2000; Farhan, 2022), which can encourage transfer. Clear definitions of concepts help encourage transfer and allow students to

make faster connections (Higgins & Reid, 2017; Kalis, 2023).  A concept-based approach helps students see how essential ideas are related (Erickson et al., 2017; Hendricks & Wangerin, 2017).

Research shows that concept mapping can help students make connections by showing the relationships between ideas and encouraging the transfer of knowledge and skills.  Concept mapping can be seen as "as an external representation of one's mental model"  (Khajello & Siegel, 2022, p. 573).  Visual representations of concepts can help students understand the whole picture of how ideas connect (Hartsell, 2021; Procaccini et al., 2016). Content knowledge and disciplinary grounding are key to students' ability to concept map and make connections (Khajello & Siegel, 2022).  Concept mapping is a good activity to assess what students already know and understand (Hartsell, 2021). This helps when there is a large amount of information to break it down and organize it to see the patterns and connections (Hartsell, 2021).  They can be beneficial for teaching complex structures and can help teachers to see students' thinking and correct any misconceptions (Khajello & Siegel, 2022).  Chen et al. (2021) found a correlation between high-quality concept maps and performance on assessments and overall knowledge of a subject.  Hartsell (2021) found that when used collaboratively, concept maps can help students share and collaborate to increase their knowledge and understanding of a topic.  Based on the research, it can be inferred that concept mapping can increase students' ability to transfer and make explicit connections between concepts.

Research shows a variety of effective strategies that teachers can use to help students learn to transfer their knowledge in a concept-based approach.  Scaffolding is key to student growth in this area and increased knowledge and understanding (Khajello & Siegel, 2022; Marschall & French). Flipped Classrooms (Higgins & Reid, 2017) and a task-focused approach allow students to create better connections between the concepts (Chen et al., 2021). Students

communicating collaboratively helps students increase their knowledge and understanding

(Chen et al., 2021) through activities like a data puzzle where the data visualization shows trends

and students answer questions about them, culminating with a student-created insight (Kastens &

Krumhansl, 2017).  Pooling data, where students do individual research and then work

collaboratively to combine what they have learned, can also be effective through comparing and

contrasting; they can see patterns and make inferences to create a generalization using a jigsaw

approach.  This teaches collaborative skills and helps students find patterns (Kastens &

Krumhansl, 2017) they can use to transfer their knowledge. Teachers can also make their own

concept maps to help identify connections they can emphasize when working with their students

on a unit which was found to be more effective than text-based lesson planning in teaching

students to transfer (Cooper & Zimmerman, 2020; Hartsell, 2021).

**Conclusion**

Generalization and transfer are key elements of a student's ability to apply conceptual

learning to real-world situations.  In concept-based education, students are encouraged to create

meaningful connections between knowledge and skills by creating a generalization, or statement

of understanding, to help organize the conceptual information so it will be easier to recall in the

future.  The generalization allows students to connect prior knowledge to transfer their

understanding to a new scenario. The focus of this research into how might a professional

development program be developed to address the problem of teachers' lack of knowledge to

guide students to apply conceptual knowledge to real-world scenarios relates to the themes of

generalization and transfer because they are key components of a concept-based instructional

approach that need to be explicitly taught for students to apply their knowledge and

understanding in and out of the classroom.  The process of generalizing helps students to make connections between concepts which leads to the transfer of knowledge and the ability to apply prior knowledge and skills to real-world scenarios.   Through a professional development program highlighting strategies and approaches to teaching students to generalize and transfer their knowledge, teachers will feel more confident in utilizing these approaches in their classrooms due to increased knowledge of the instructional practices of conceptual teaching and learning.

## Chapter 3: Research Methodology

### Research Question

How might a professional development program be developed to address the problem of teachers' lack of knowledge to guide students to apply conceptual knowledge to real-world scenarios?

### Participants or Stakeholders

To create the applied research project of developing a professional development program to help teachers implement concept-based learning in their classrooms, a survey will be sent out to teachers related to their knowledge and understanding of instructional practices in a concept-based curriculum. The applied research project mixed methods survey will have at least five participants. The participants are the researcher's colleagues and work at the same school. The characteristics of participants in the survey will consist of certified teachers working at an international school. The participants will be teachers using the concept-based International Baccalaureate framework in the Primary Years Program, Middle Years Program, and Diploma Program. The stakeholders in this project will be educators such as teachers, administrators, and curriculum coordinators who utilize or are interested in utilizing a concept-based curriculum in their school districts and classrooms and are involved in professional learning communities with the researcher.

### Data Collection Instrument and Alignment to Research Question

By utilizing a mixed methods approach to gather data, the researcher will be able to analyze both the participant's knowledge and understanding of instructional practices for implementing a concept-based curriculum; they will also learn about the participant's areas of

strengths and weakness in this area and what teachers would like more information about to increase their knowledge and skills.  The combination of qualitative and quantitative data will inform the researcher as they develop a professional development program that will meet the needs of the participants to help teachers implement concept-based learning in their classrooms. This will allow the researcher to include content surrounding concept-based instructional practices where the teachers lack knowledge and clear up any misconceptions, as well as to include practical strategies and skills teachers can use to implement concept-based learning in their classrooms.

The data collection instrument of a survey collecting both qualitative and quantitative data surrounding teachers' knowledge and skills of implementing concept-based learning is aligned to the proposed research project as it will provide the researcher with the data they need to develop the content for a professional development program to meet the needs of teachers implementing concept-based learning in their classrooms.

**Method**

The data collection method for the proposed applied research project of developing a professional development program to help teachers implement concept-based learning in their classrooms will be a mixed-method approach.  The mixed-method approach uses qualitative and quantitative data to find information and draw conclusions.  The quantitative data approach will be used when determining teachers' knowledge and understanding of concept-based instructional practices and the processes for implementing a concept-based curriculum using closed-response questions.  It will also be utilized to analyze teachers' self-reporting of their knowledge and understanding surrounding implementing a concept-based curriculum in their classrooms.  The

qualitative method will be used in the survey by asking open-response questions to the participants to gain a better understanding of teachers' needs related to the implementation of a concept-based curriculum.

**Data Analysis Techniques**

A data analysis technique that will be used to analyze the quantitative data that is collected via the google forms survey of participants will be descriptive statistics.  This data will be analyzed using the central tendency of mean, median, and mode.  The mode will be used to find the most common answer to the question, which appears the most in the data.  The median will be used to find the middle number, and the mean will be used to find the average answer to the questions.  These will be used to find trends in the participants' responses to the questions.

The data analysis technique that will be used to analyze the qualitative data relates to the use of narrative data from the open-response questions on the Google Forms survey of the participants. The data will be read, and the quality of the data will be analyzed. The data will be focused on by question and topic and then categorized into themes and categories based on the analysis of the data. Patterns and connections between categories and themes will be analyzed. Then the researcher will interpret the data and compile the findings that resulted from the analysis of the survey data.

The descriptive statistics will be used in conjunction with the interpretation of the results from the qualitative data to determine the content, knowledge, skills, and strategies teachers need to implement concept-based learning in their classrooms.  This will be used to inform the development of a professional development program to help teachers implement concept-based learning in their classrooms that would meet the needs of the participants from the survey.

**Timeline of Data Collection Activities**

The researcher will first get permission from the administrators at their school to conduct the research project. They would then submit a proposal to get IRB approval for the research study. The data collection instrument of a Google Form, including open and closed response questions to gather qualitative and quantitative data on teachers' instructional practices of concept-based learning, would then be researched and created. The questions would be written, and then the survey would be formatted for the various question types using Google Forms to prepare it for participants. The order of questions would be carefully considered to receive information in a logical order from the participants. An email would then be sent to the faculty at the school to find educators who were willing to participate in the study. The participants would be briefed on the purpose of the research study, the methods and plans for using data, and the participant's informed consent would be gained before engaging in any research. The participants would sign informed consent forms and would then be sent the survey to fill out anonymously via email. The participants would have three days to fill out the survey online using google forms, and the researcher would follow up with any participants who had not responded to see if they still wanted to participate in the study. After the participants had completed the online survey, the researcher would analyze the qualitative and quantitative data. They would then use the data to inform the development of a professional development program to help teachers implement concept-based learning in their classrooms that would meet the needs of the participants from the survey.

**Resources**

The resources needed to complete this study include internet access, a computer, and an email address that will be used to create the data collection instrument and communicate with

participants, stakeholders, and the IRB board.  The email address of the administrators will be required to contact them for approval of conducting the research project. In addition, access to Google Workspace to create the Google form, and a Google sheet for the results of the Google form as the data collection instrument will also be required.  A contact list of email addresses for the faculty at the researcher's school will be used to find participants for the study. Google Docs will be used to create the consent forms and a printer will be needed to print consent forms with pens for the participants to sign the forms.  A Google sheet with the email addresses of willing participants will be needed to send out the Google Form data collection instrument to participants.

## Data Security and Confidentiality

The Google Forms survey will include both qualitative and quantitative data.   The results of the research will exclude identifying information about the participants.   To ensure privacy, all results will be reported honestly and reflect the data collected from all participants. Participants will be made aware that they can withdraw from the study at any time. They can complete the online survey in their own space at any time within the research window and have been instructed they can skip any questions they are not comfortable answering. There will be no audio or video recording or observation of participants.  The administration will approve the study at the researcher's school, and the researcher will receive IBR approval to conduct research.   To ensure confidentiality, the Google Form will not collect email addresses or specific identifying information about the participants. Thus, the results of the survey will remain anonymous.  Any identifying factors, such as years of experience teaching and the name of the

school the teacher works at, will be removed from the individual responses before distributing the research.

The data will be collected using an anonymous Google Form.  The form will not collect email addresses or other identifying information.  The anonymous participants will be assigned a numerical code that will be used for identification purposes when analyzing the data.  The data used will be checked for any identifying information in the open-response qualitative questions, and any data that can identify the participants will be removed prior to the data analysis.  A new Excel sheet with the data that does not include identifiers will be created and utilized for the research.

The original submission form will be downloaded and stored offline using two-factor authentication and will not be available on the Internet. Copies of the informed consent forms will be secured and locked in a safe at the researcher's home, protected by a security system. The code lists and data files will be stored in separate locations, and the original results of the survey will be deleted.  The files will be stored on a computer that is password protected, and the data will be encrypted using two-factor authentication to ensure that it is secure.  After three years, the digital files will be permanently deleted, and the hard copy consent forms will be shredded and properly disposed of.

**Conclusion**

The key elements of the research study include an anonymous Google form survey that will be utilized to gain information about teachers' knowledge and skills surrounding the idea of implementing concept-based instructional practices.  The teachers will be asked to self-report areas of strength and weaknesses and to identify areas they need additional support. Through an

analysis of qualitative and quantitative data from the survey, the researcher will create a professional development program designed to meet the needs of the teachers who were surveyed to provide them with tactical strategies and approaches that can be used in their classrooms.

# Chapter 4: Results

## Summary of Research

This applied research study gathered data utilizing an anonymous google forms survey of certified teachers working at an international school to guide the creation of a professional development program focused on helping teachers guide students to apply conceptual knowledge to real-world scenarios.   The participants of the study were colleagues of the researcher who utilize the concept-based International Baccalaureate framework in the Primary Years Program, Middle Years Program, and Diploma Program.  The survey was designed to answer the question: how might a professional development program be developed to address the problem of teachers' lack of knowledge to guide students to apply conceptual knowledge to real-world scenarios? The survey included both qualitative and quantitative questions relating to participants' previous experiences with concept-based instruction, their knowledge, and understanding, as well as their ability to apply a conceptual framework in their classrooms.   All teachers at the researcher's school were invited to participate, and eleven chose to participate in the three-day survey window.  The teachers came from a cross-section of the school and their demographics were representative of the teaching population at the school.

Analyzing the results of the survey using a mixed methods approach of descriptive statistics and thematic analysis provided a broader understanding of the gaps in teachers' knowledge and areas where they felt they required additional support.  The analysis of the data provided the researcher with targeted areas where additional instruction was needed and recommendations for the types of professional development and approaches that would be helpful to the participants.  This allowed the researcher to create a professional development program that suited the needs of the participants and was able to provide them with the

knowledge, skills, and tools they need to guide students to apply conceptual knowledge to real-world scenarios.

## Summary of Results or Findings

### Mixed Methods Approach

The analysis of the quantitative data utilized descriptive statistics focusing on the mean, median, and mode to draw conclusions based on the data. This data was combined into related groupings to understand better and interpret the results of the teacher survey. The individual questions and responses from the quantitative data from the survey can be seen in Appendix D, supported by graphs and charts. The qualitative data that was collected in the survey were grouped thematically by color to draw conclusions based on the information provided by the teachers.

### Demographics of Survey Participants

| Participant | Number of Years of Teaching Experience | Years of Experience Teaching with a Concept-Based focus | Please list any previous professional development experiences related to concept-based curriculum and instruction. |
|---|---|---|---|
| P1 | 5 | 0 | none |
| P2 | 8 | 3 | none |
| P3 | 8 | 0 | none |
| P4 | 9 | 6 | none |
| P5 | 10 | 5 | I have taken several extensive PYP , MYP and DP trainings |
| P6 | 13 | 13 | My university curriculum instruction was based on Understanding by Design by Wiggins and McTighe and since becoming an IB teacher, I've attended at least one IB workshop (in-person or online) every year. |
| P7 | 13 | 0 | none |
| P8 | 15 | 10 | IB Theory of Knowledge and IB Psychology |
| P9 | 18 | 2 | none |
| P10 | 18 | 6 | Many IB PD sessions |
| P11 | 20 | 15 | IB workshops Cat 2 & 3 |

| Mean | 12.5 | 5.5 |
|---|---|---|
| Median | 13 | 5.5 |
| Mode | 13 | 0 |

*Figure 1: Demographics*

The researcher surveyed eleven teachers at an International Baccalaureate (IB) World School who implemented the Primary Years (PYP), Middle Years (MYP), and Diploma Program (DP) and used a conceptual framework.  Figure 1 shows the demographics of the survey participants. The mean number of years of teaching experience for the survey participants was 12.5 years, with the median and mode as 13 years.  The teacher with the least amount of experience surveyed had five years of experience, and the most experienced teacher had 20 years of experience. However, the mean number of years of experience teaching with a concept-based focus resulted in a mean and median of 5.5 and a mode of zero.  Three teachers had no years of experience teaching with a concept-based focus, whereas the most experienced teacher surveyed had 15 years of experience.  Six teachers had received no professional development experience related to concept-based teaching, and five had experience with IB workshops.  These findings are consistent with the overall makeup of the faculty at the researcher's school and present a representative sampling of the faculty.  Most of the faculty are mid-career teachers with experience in the classroom. Still, many do not have specific training in concept-based instruction, hence the instructional problem where teachers at the researcher's school have expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms.

**Participant Self-Reported Familiarity, Knowledge, and Understanding of Concept-Based Curriculum Implementation**

| Participant | Knowledge of Concept Based Curriculum | Writing Concept Based Units | Implementing Concept Based Curriculum in your Classroom | Using inquiry/ guiding questions | Writing Generalizations | Using inquiry/ guiding questions to help students generalize | Guiding Students to Transfer their Knowledge to other Subjects or Topics | Guiding students to write their own Generalizations | Guiding Students to Transfer their Knowledge to Real World Situations |
|---|---|---|---|---|---|---|---|---|---|
| P1 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 1 | 4 |
| P2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 |
| P3 | 1 | 1 | 1 | 4 | 3 | 3 | 4 | 1 | 4 |
| P4 | 3 | 3 | 3 | 3 | 2 | 4 | 4 | 4 | 4 |
| P5 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 2 | 3 |
| P6 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 5 |
| P7 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 3 | 4 |
| P8 | 3 | 3 | 2 | 4 | 4 | 4 | 4 | 3 | 4 |
| P9 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 4 |
| P10 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| P11 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **Mean** | 2.7 | 2.5 | 2.7 | 3.2 | 3 | 3.2 | 3.4 | 2.4 | 3.8 |
| **Median** | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 |
| **Mode** | 3 | 3 | 3 | 2 | 2 | 4 | 4 | 3 | 4 |

*Figure 2: Descriptive statistics analysis of participants' familiarity based on a 5-point Likert Scale (Additional charts and narrative descriptions can be found in Appendix D)*

Figure 2 showed the survey participants' self-reported familiarity with concept-based curriculum implementation collected using a five-point Likert Scale, with one being a novice or having no knowledge to a five being an expert on the topic and able to teach others. Additional analysis about each of the individual topics can be found in Appendix D. The median score for the majority of categories is a three, with teachers placing themselves at a median score of a four when it comes to transferring knowledge.

Teachers ranked themselves with the least amount of knowledge in terms of guiding students to write their generalizations, with a mean score of 2.4. When guiding students to write

their own generalizations, no participants marked themselves as five, and 9 participants

identified as a three or below. The mean of 2.5, with a median and mode of 3, indicated this is

an area where teachers need more support.

| | ***Do you ask students to write their own generalizations in class to help them better understand the concepts and make connections? Why or why not?*** <br> *Green: Positive    Red: Negative    Orange: Sometimes* |
|---|---|
| **P1** | Not really. Once the students have come up with the final piece of information that I wanted them to acquire, I ask them to write the new concept in their notebooks in whichever way it's easier for them to understand it. I think this could be a generalization but I don't ask them to follow any format or model. |
| **P2** | *no answer* |
| **P3** | Sometimes - it depends on the topic of the lesson (consent/racism/cancel culture/etc). |
| **P4** | Yes - It helps with the language and communication aspect. Students tend to use muscle memory to solve problems but often are unable to explain any hows or whys. This allows them to think deeper about the steps they have taken and understand why they have taken specific steps to solve problems. |
| **P5** | I have never thought to do this, but it is a very interesting idea that I would like to know more about. |
| **P6** | I haven't. We're usually on a very tight timetable and I only have a short period of time for them to get a concept across. It's also something that I've only recently heard much about. I'm intrigued enough to try implementing it sometimes into my curriculum. |
| **P7** | Not often, but I have in the past. It doesn't often come naturally with how we're working day to day. We do this with Crit B and they always struggle, so we're working on it. |
| **P8** | it is part of what students are meant to do in their Critical thinking |
| **P9** | No |
| **P10** | Sometimes |
| **P11** | *no answer* |

*Figure 3: Students writing their own generalizations*

This aligned with the participant's responses to the question that asked participants if they ask

students to write their own generalizations in Figure 3, with six participants indicating that they

don't. Two participants said yes, and three said sometimes. Based on the qualitative and

quantitative data, this is an area that teachers need more knowledge and support to implement

and should be included in the creation of the professional development program.

The mean and median score for knowledge and understanding of writing generalizations in Figure 2 is a 3 with a mode of 2.  Most participants ranked themselves as  2-4 in this category, with only one participant choosing 1 or 5, respectively.  Seven participants ranked themselves as a three or above in this area identifying the majority were more familiar with this topic. They also ranked their knowledge as lower in writing concept-based units, with a mean score of 2.5. Their knowledge of concept-based curriculum and ability to implement it in their classrooms were also identified as areas of need, with both with a 2.7 mean score.  These are all areas that will need to be addressed in the creation of the professional development program as teachers identify them as areas where they have less knowledge.  Participants 5,6, and 11 ranked themselves higher than the other participants on their self-reported knowledge of concept-based curriculum, which aligns with their answers about their prior experience in Figure 1 as they have all had previous professional development on these topics.

The use of inquiry and guiding questions in the class to help students generalize was reported with a mean score of 3.2 (Figure 2). No participants ranked themselves as a 1 or 5, and the majority ranked themselves a 4, identifying they felt more comfortable with this topic but were not at the expert level yet, which means additional instruction to help teachers refine these techniques to mastery can be helpful.  This aligns with Figure 4, which examined the qualitative data on how participants use questioning in their classrooms.

| *How do you use questioning in your classroom?*<br>Purple: Guiding Students   Pink: Start of Unit  Green: Engage Students<br>Red: No Response/ Don't Use Questioning | |
| --- | --- |
| P1 | To guide the students toward the final answer that they need to learn. For instance, if they're learning about conjugation for the first time, I show them several sentences with different subjects and with the same verb and ask them to find out the differences between the sentences. That way, they realize that each subject has a different verb conjugation. |
| P2 | *No Answer* |

| P3 | Questions are usually leading - objective centered and reflective |
|---|---|
| P4 | We talk a lot about how students have arrived at answers and why things work. |
| P5 | I use questioning at the beginning of the unit to help students understand the SOI. Then, I have students do an investigation presentation in which they dig deeper into the SOI and either implicitly or explicitly answer factual, conceptual, and debatable questions within the presentation. |
| P6 | I often will start a new concept or subject with a more generalized question, such as "What if..." or "Have you ever wondered..." to start the process. I then lead them into questions that will help them start to look for patterns and commonalities, or the "big idea." After several instances of practicing this, students will often start the questioning themselves and I can merely act as a guide to make sure they stay somewhat on topic. |
| P7 | Open-ended to see where they can go, but also more targeted to see what they remember. |
| P8 | I ask opinions that prompt questions |
| P9 | To engage, provoke, assess, initiate conversation |
| P10 | To be honest I haven't this year. |
| P11 | All of the time. |

*Figure 4: Use of questioning in the classroom*

One participant didn't answer the question, and another said they hadn't used questioning. Common themes from the other responses included: using questions to guide students to come to a realization on their own, using questions at the start of the unit to provoke discussion, and using questions to engage students in class. The data shows some of the participants could provide meaningful examples of their use of questioning, whereas others provided more general feedback. This is an area of strength for some of the participants, but some participants could use some additional guidance on integrating questioning into their classrooms.

The mean, median, and mode for knowledge transfer between subjects and the real world are ranked as the most proficient by teachers in the areas of concept-based instruction that were surveyed in Figure 2. The participants ranked themselves the highest in this area with no reported 1 or 2 scores and a median score of 3.8 with a median and mode of 4. Eight participants ranked themselves as 4-5 in this area, indicating it is an area of strength. In a similar question asking participants to self-assess their ability to guide students to transfer their knowledge to other

subjects, the mean of 3.5 with a median and mode of 4 with no participants identifying themselves as one shows that many of the participants see this as an area of strength where six ranked themselves as a four or above. However, this self-assessment runs counter to the qualitative data that can be found in Figure 5.

| How do you help students transfer their learning? |
|---|
| *Green: Positive response*     *Red: Negative response or incorrect answer*     *Orange: Question* |

| | |
|---|---|
| **P1** | Rather than transferring their learning, I help them to make connections between their mother tongue and Spanish. There are grammar rules that are similar across several languages and words that are very similar because they share the same linguistic root. |
| **P2** | *no answer* |
| **P3** | Giving them strategies to use in social situations |
| **P4** | *no answer* |
| **P5** | If it fits authentically I may do this, but it is not something that I force or go out of my way to do. In a ceramics unit, we may learn about different civilizations, in a portrait unit we may learn about different cultures, in a landscape unit we may learn about different ecosystems but that is more interdisciplinary than actively guiding them to transfer their learning to another subject area. |
| **P6** | I often ask them to look for patterns or similarities between things. "What else is this like?" "Does this remind you of anything else?" "How could you use this in another way?" Often, those connections will come unprompted. A student will reflect that what we are doing is just like something they've done in another subject, which will lead them to ways to use our new skills in different settings. When you are open to the student's comments and questions leading the learning, they will often help you with this process better than you could have set it up. I will also have them practice the same skills and concepts in different ways throughout the school year. |
| **P7** | Into the real world or from topic to topic? |
| **P8** | Make connections between studies |
| **P9** | Do not |
| **P10** | Show how the math that they learn is actually used in science. |
| **P11** | *no answer* |

*Figure 5: Participant Responses to Learning Transfer*

When asked to give examples of how the participants help students transfer their learning, only two teachers could give concrete examples, with Participant 8 noting they "make connections between studies" and Participant 7 asking a clarifying question. The other participants provided examples that were not examples of transfer, did not answer, or said they did not use this. There

is a discrepancy between the teachers' perceived knowledge of transfer and their ability to implement it.  This misconception can be cleared up with the created Professional Development program and is an area that must be addressed.

**Previous Knowledge of Concept-Based Curriculum & Instructional Practices**

| Question | Number Correct | Number Incorrect |
|---|---|---|
| Macroconcepts | 10 | 1 |
| Microconcepts | 10 | 1 |
| Topics & Facts | 8 | 3 |
| Concepts, Generalizations, Principles | 11 | 0 |
| Factual Questions | 10 | 1 |
| Conceptual Questions | 10 | 1 |
| Debatable Questions | 11 | 0 |

*Figure 6: Participants' responses to multiple choice questions about Concept-Based Curriculum and Instructional Practices*
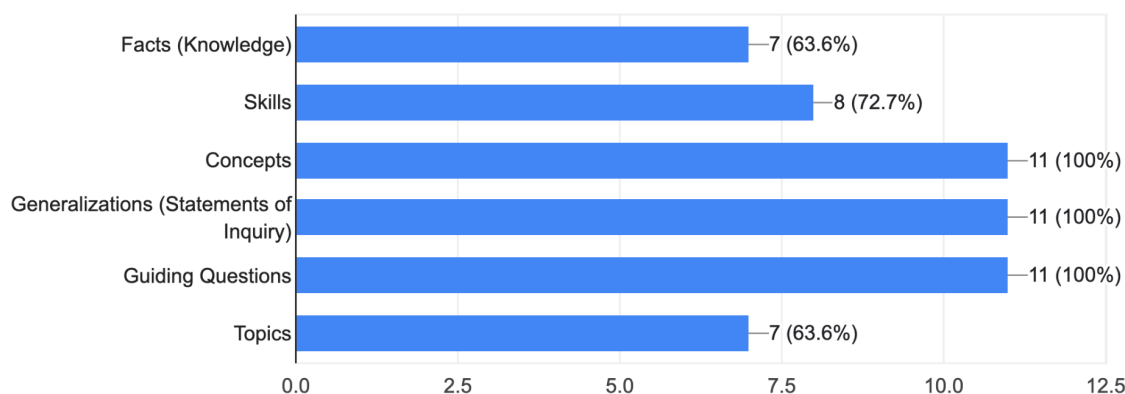*(Additional charts and narrative descriptions are available in Appendix D)*

In general, teachers could correctly answer the multiple choice questions on their previous knowledge of concept-based curriculum and instruction. The multiple choice questions were related to basic knowledge and vocabulary involved in concept-based instruction.  There was some confusion about the difference between macro concepts and micro concepts by one participant.  A different participant misidentified factual vs. conceptual questions.  Three of the participants confused topics and facts.  These are all areas that will need to be reviewed as part of the created professional development program to clear up any misconceptions among the teachers and reinforce these foundational ideas.

**Elements of a Concept-Based Curriculum**



Select all the elements that are essential in a concept-based curriculum
11 responses

- Facts (Knowledge) — 7 (63.6%)
- Skills — 8 (72.7%)
- Concepts — 11 (100%)
- Generalizations (Statements of Inquiry) — 11 (100%)
- Guiding Questions — 11 (100%)
- Topics — 7 (63.6%)

*Figure 7: Participants' Response to the Elements of a Concept-Based Curriculum*

In a concept-based curriculum, all of these elements are important. Participants could all correctly identify that concepts, generalizations, and guiding questions were required. Seven participants correctly identified that facts and knowledge were also crucial, with four participants missing these elements. Eight of the participants also identified skills as essential, with three participants missing this area. Based on the participants' responses, more information on how facts, skills, and topics related to a concept-based curriculum will be needed as the professional development program is created.

**Inductive vs. Deductive Teaching and Learning**

| Question | Number Correct | Number Incorrect |
|---|---|---|
| Inductive vs Deductive | 5 | 6 |

*Figure 8: Teacher responses to inductive vs. deductive teaching*

Figure 8 shows the results of the question about the difference between inductive and deductive teaching. Most participants got the incorrect answer, where six answered incorrectly, and five answered correctly. This aligns with the question about the differences between

inductive and deductive teaching and learning in Figure 9, where 5 participants were unable to answer the question at all.  Some participants identified that an inductive approach takes you from specific to general, starting with case studies and then building generalizations based on the case studies.  There are some misconceptions in the teacher's answers in Figure 9. Based on the data, more information about inductive vs. deductive teaching and learning will be beneficial to add to the created professional development program.

| *What is the difference between inductive and deductive teaching and learning?* *Green: Positive    Red: Negative   Blue: Unsure* | |
|---|---|
| P1 | Inductive: teacher gives the final product students should learn directly to them. Deductive: students find out what the final product is by putting together different clues and guidance questions that the teacher gives them. |
| P2 | ? |
| P3 | I have no idea |
| P4 | Inductive teaching and learning allows students to guide themselves to conclusions. It uses guided questions to help students reach targets and allows for a more hands on based approach. |
| P5 | Inductive starts specific and moves outward, deductive begins with generalizations and becomes more specific. |
| P6 | Inductive starts more specific and then you build into the general from there. In deductive, you start with the more general concepts and ideas and narrow your focus into the specific. |
| P7 | Deductive is where you show the students something and they can find various results based on that. Inductive involves going from the results to an overall understanding |
| P8 | ? |
| P9 | ? |
| P10 | I don't know |
| P11 | Inductive teaching and learning is an umbrella term that encompasses a range of instructional methods, including inquiry learning, problem-based learning and project-based learning. A deductive approach to teaching starts by giving learners rules, then examples, then practice. It is a teacher-centered approach to presenting new content. |

*Figure 9: Participant responses to Questions about Inductive vs. Deductive Teaching*

**Teacher Views on Concept-Based Instruction**

| *Do you feel a concept-based approach is successful in your subject/grade level?  Why or why not?* *Green: Positive    Red: Negative* |
|---|

| | |
|---|---|
| **P1:** I would say that usually yes but as a language acquisition teacher, there are many points in our curriculum that are locked, not open up to any sort of inquiry or reflection. <br> For instance, in Spanish, when you say "I think", you have to conjugate the next verb in indicative, but when you say "I don't think", the next verb has to be conjugated in subjunctive. I try to help the students find out this rule on their own by showing them several sentences and asking them to group them into indicative and subjunctive and find out why some are in one mood and some in another one. <br> However, at the end of the day, the fact is that this grammar rule is just like that, there's nothing we can debate about it. Furthermore, if the students wanted to inquire why it is like that, they should analyze the origin of Spanish (this rules derives from the declinations in Latin) and this goes way beyond our scope of action and what the students need to know to learn the language. | **P7:** I've heard wonderful things about this approach, but don't have a lot of experience with it myself. I teach math, so I definitely do work with students discovering theorems or rules, but normally ultimately show them something so they can use it to discover other things. I struggle with the idea of concept-based because so often I think they need to learn various things to get where we're going. |
| **P4:** Yes and no. My subject is very skills based. It requires strong foundational understandings before getting to more broad conceptual understandings. Without these strong foundations that often come from rote memorization, students often get lost in the actual skills needed while exploring concepts. | **P2:** I do not have much experience in concept-based learning as my subject is not a PYP or MYP subject. |
| **P5:** Yes, very because it is open-ended and allows students to interpret the SOI in various ways, be highly creative and personalize their learning. | **P3:** I don't know enough about it |
| **P6:** Yes. My subject naturally lends itself to viewing subjects through a concept-based lens, particularly because students are asked to apply what they've learned in my subject to all of their other classes. We often make connections between how or why things are structured in the classroom a certain way and how that mirrors or reflects the outside world. | **P10:** It can be tricky to do this in a math class where it is very content driven |
| **P8:** In DP Psychology, Yes and TOK, Yes | |
| **P9:** Yes, to an extent, the inquiry is essential, real-life situations are always there and good to apply concepts to different subject areas. | |
| **P11:** Yes | |

*Figure 10: Participants view on if Concept-Based Approach is successful in their classroom.*

In response to if participants feel a concept-based approach is successful in their classroom in Figure 10, seven participants indicated that it was to varying degrees. Four participants were more enthusiastic in their support for a concept-based approach, with Participant Five indicating the open-ended nature allowed them to be more creative and provide a more personalized experience. Three participants saw positives and negatives to this approach based on their

subject areas, with Participant Four noting that with skills-based classes, it can be hard to work conceptually without the foundational skills.  Three other participants noted they didn't know enough about it or have enough experience to implement conceptual teaching.  Two participants specifically mentioned math as an area where they were struggling to balance the content with the concepts.  Based on this information, it can be concluded that teachers who are not currently teaching conceptually need additional support and specific examples of how to integrate conceptual teaching in their specific subject.

| | *What are the most challenging parts of implementing a concept-based curriculum for you?* | *What are the least challenging parts of implementing a concept-based curriculum for you?* |
|---|---|---|
| | *Purple: Skills, Ideas*    *Red: Unsure/ No Answer* | *Orange: Unit Creation*    *Pink: Time* |
| P1 | Certain parts of the curriculum are purely facts and that don't offer many opportunities for inquiry. Additionally, most of my students don't have a level of Spanish good enough to go beyond the simplest forms of inquiry (e.g., show them a word in Spanish and a set of images connected to its meaning, and ask them to guess what the new word means). | There are very simple ways to introduce some form of inquiry in the classroom (previous explanation of finding out the meaning of a word by putting up clues together) but I'm not sure if that can be truly considered to be part of a concept-based approach to teaching. |
| P2 | *no answer* | *no answer* |
| P3 | I have not tried it. Or maybe I have and just didn't know it? | Not sure |
| P4 | Getting students to also have the skills needed for more challenging topics and having them understand how our subject might be applicable once they leave the classroom. | The beginning of units when we see how the concepts we have previously learned related to the skills in the current unit. |
| P5 | NOT challenging, but it is incredibly time-consuming to create a unit that authentically fits each of the individual strands at least once to practice and twice to assess summatively.<br><br>I would also say that transferring their learning is something I am not as strong in. | Coming up with ideas, there are a limited number of options, and I could teach something different every semester for the rest of my career without repeating. |
| P6 | Collaboration and time. In most schools, there is just not enough time to develop decent concept-driven units in my subject. Instead, the schedule is created for one-stop-shop type teaching, where each lesson is self-contained. There is also no time or training given to help teachers collaborate together and build | Generalizing and making connections to other subjects. |

| | | |
|---|---|---|
| | transdisciplinary connections. | |
| P7 | I'd follow one if I were provided with it and could learn more about how to implement it well, but I hesitate to come up with one on my own. | Probably pretty interesting for the kids. That's how I feel when I give them projects where they can put their knowledge together for something real world. I just don't see how an entire curriculum can be built around that. |
| P8 | amount of content to cover, time | ToK helps draw these connections, it is underused in HS |
| P9 | Creativity/Time to do in its design | Own personal input |
| P10 | Using this method when teaching basic algebra skills | Doing this in science |
| P11 | Getting kids and parents to adapt to this method and accept it instead of me the teacher always in front of the class. | Developing what the students need to learn. |

*Figure 11: Most and least challenges of implementing a concept-based curriculum*

When looking at the most and least challenging parts of implementing a concept-based curriculum in Figure 11, one of the common themes from participants was the lack of time and the ability to design conceptual units. Four participants specifically mentioned not having enough time, and others mentioned the need for creativity or the ability to design units. Two of the participants indicated that they could identify what the students needed to learn, and two others were unsure of how to answer the question, indicating a lack of knowledge. Three participants mentioned they had difficulty using a conceptual approach when teaching skills. Based on the data, it seems that guiding teachers through the process of how to design a conceptual unit and how to teach skills conceptually would be beneficial and should be integrated into the professional development program.

**Classroom Practices & Areas for Support**

Figure 12 shows the areas of self-reported knowledge of concept-based instruction from the area of least proficiency to most proficiency based on the mean scores. This is the same data as Figure 2 reorganized based on mean scores. This aligns with the areas that teachers would like more information and support in Figure 13. Where the teachers reported the lowest mean score

on guiding students to write generalizations and seven participants indicated that was an area

they needed more support.

| | Mean | Median | Mode |
|---|---|---|---|
| **Guiding Students to write their own Generalizations** | **2.4** | **3** | **3** |
| **Writing Concept-Based Units** | **2.5** | **3** | **3** |
| **Knowledge of Concept-Based Curriculum** | **2.7** | **3** | **3** |
| **Implementing Concept-Based Curriculum in your Classroom** | **2.7** | **3** | **3** |
| **Writing Generalizations** | **3** | **3** | **2** |
| **Using inquiry/ guiding questions** | **3.2** | **3** | **2** |
| **Using inquiry/guiding questions to help students generalize** | **3.2** | **3** | **4** |
| **Guiding Students to Transfer their Knowledge to other Subjects or Topics** | **3.4** | **4** | **4** |
| **Guiding Students to Transfer their Knowledge to Real World Situations** | **3.8** | **4** | **4** |

*Figure 12: Self-Reported familiarity of concept-based curriculum implementation*
*Sorted from participants least experience to most experience based on the mean for all survey*
*participants.*

Areas where you would like more information and support

10 responses
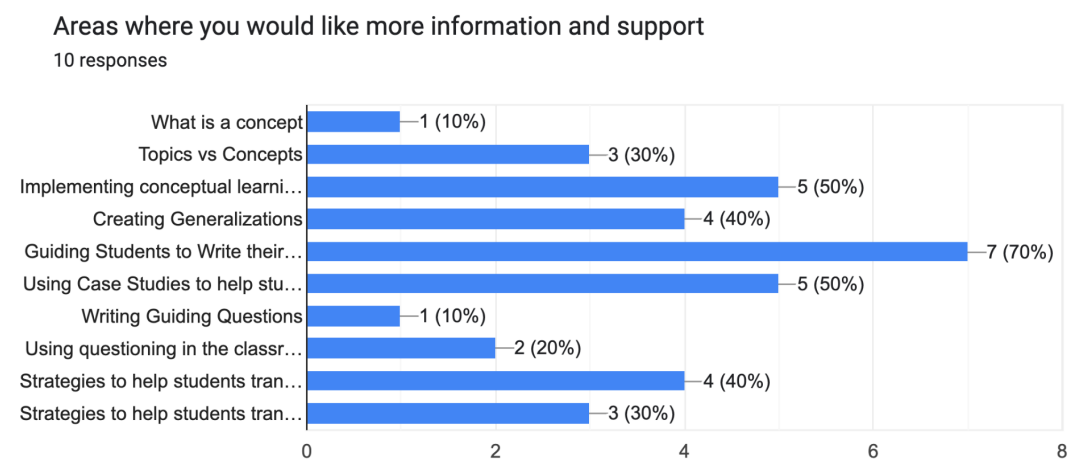


*Figure 13: Teacher-Identified Areas where more support and information are needed*

Figures 12 and 13 can be used in tandem to create a list of topics that should be included in the

created professional development program and include; generalizations, case studies, strategies

for students to transfer their learning, and implementation of concept-based learning in the

classroom.  These topics were reiterated in the qualitative questions looking at areas where

support was needed.

| | *Are there any areas you are struggling with in order to implement a concept-based approach in your classroom?* | *Areas where you would like more information and support* |
|---|---|---|
| | *Pink: Subject-Specific Training     Red:No Answer* | |
| P1 | I think my curriculum in general doesn't offer too many opportunities to implement this type of approach if considering only deeper reflections and inquiries. My students don't even have the words to express simple ideas so I can't ask them to inquire about complex concepts appropriate to their age-level in their new language. I could ask them to do so in English but it's only a very few times in which this can be useful for them to learn Spanish. | Advantages and how to implement this approach in a language acquisition classroom. |
| P2 | *no answer* | *no answer* |
| P3 | I'm not sure | I'm not sure |
| P4 | Since my subject is so skills-based, sometimes it's challenging implementing concept-based lessons when teaching skills. | *no answer* |
| P5 | *no answer* | *no answer* |
| P6 | Often, examples of concept-based are of the fully student-driven huge projects, while more traditional, fact-based teaching is held up as the not concept-driven example. I'd like to have more help with the messy middle. What does it actually look like in practice? More examples across all subject areas. | n/a |
| P7 | Yes, just wrapping my head around how to do it in math in general. | Just implementing it specifically in a math classroom. |
| P8 | Many struggling with actual content | *no answer* |
| P9 | Yes, working with other staff, time, | No |
| P10 | There has been very, very little emphasis or support in terms of MYP this year. So while my class looks very much like an MYP classroom with some of the needed stuff on the walls it does not sound like one. | no |
| P11 | *no answer* | *no answer* |

*Figure 14: Areas of struggle and additional support*

Figure 14 was presented as a follow-up to Figure 13 in the survey to collect additional

areas where participants needed assistance.  It contains participants' responses looking for areas

of struggle and where additional support would be needed.  Participants identified

subject-specific training as an additional area where they need support.

| *Do you feel you have enough support to implement a concept-based approach in your classroom?* | *What could be done for you to feel better supported in implementing a concept-based approach in your classroom?* |
|---|---|
| *Red: No/Unsure/ No Answer    Purple: Need for PD   Orange: Collaboration      Pink: Subject-Specific Training* ||
| **P1** No because that is not my school's priority. The school pays for IB workshops for those teachers who don't have that kind of training but, after that, it's assumed everyone knows how to teach following the IB's philosophy. | I think that having a workshop about how to implement this approach specifically in a language acquisition setting would be useful. Anything less specific than that would not really be very useful to me because my subject cannot be compared with other subjects like History or Maths when it comes to this. |
| **P2** *no answer* | *no answer* |
| **P3** I don't know enough about it...but I am getting clues from this survey. | I'm not sure... |
| **P4** No | More specific training with teachers in my subject area. Many PDs are focused on concepts-based approaches as a whole and are not meant for all subjects. |
| **P5** Luckily, the school I came from did an outstanding job guiding the entire staff on how to do this. This school does not give any support, literally none - so if I was new to this approach I would say no. But at this point I no longer need an abundance of guidance or support. | This is really school-specific and more for teachers who may be newer to this approach. However, there should always be ongoing professional development in this area as education is always evolving. There have been ZERO professional developments in this area this year and maybe 1 in my previous year, but again this is specific to this school. |
| **P6** Not really. I do what I can on my own, but in terms of school-led support, very little time or guidance is given. | Actual collaborative planning time and help with writing units and lessons. |
| **P7** No. | PD specifically on using it in my content area. General isn't really thorough enough for this type of thing in my opinion. |
| **P8** No | Have better access to material, actually have PD for teachers |
| **P9** No | Time, collaboration, leadership |
| **P10** No | Hire an MYP coordinator who knows what they are doing |
| **P11** If the school wants us to use this approach, it needs to be explained correctly to the parents. Many students are used to the old way when the teacher just presents all of the content. | *no answer* |

*Figure 15: Level of support and suggestions for improvement*

This is echoed in Figure 15, where the general themes revolved around subject-specific training,

the need for professional development for teachers, as well as more collaboration time.  Teachers

feel they have overwhelmingly not received enough support to properly implement

concept-based instruction in their classrooms with nine respondents answering they have not had

enough support.

| | **What types of professional development activities would you find beneficial to increase your knowledge of concept-based curriculum and instruction?**<br>*Red: No/Unsure/ No Answer*   *Purple: PD Appraches*   *Orange: Collaboration*   *Pink: Subject Specific Training* |
|---|---|
| **P1** | Workshop led by another language acquisition teacher who can provide meaningful, real-life experiences. Summaries of articles and research on this specific area could be helpful as well. |
| **P2** | *no answer* |
| **P3** | Differentiation (accommodations and modifications in classes) for students with different needs in one classroom |
| **P4** | Subject Specific |
| **P5** | I believe that professional development should come from an expert on the topic and I feel that part lecture/instruction and part practice would be highly beneficial with follow up sessions to further discuss how the ideas have been implemented within our classrooms - these would be most beneficial in subject-specific areas as I (an art teacher) would likely not use the same strategies as someone in math or psychology for example. |
| **P6** | Building a unit from its most base level to a full unit. Experiencing a concept-driven lesson as a student. |
| **P7** | Actually meeting with teachers that have used it successfully in their own schools and classrooms and have specific resources and ideas to share. |
| **P8** | Actual professional development? |
| **P9** | Face to face, with collaborative planning. |
| **P10** | Live in-person PD sessions |
| **P11** | *No answer* |

*Figure 16: Type of professional development to increase knowledge of concert-based instruction*

Figure 16 looks at the recommendations from the participants of kinds of professional

development experiences that would be beneficial to them.  The common themes involved

subject-specific examples and collaborative planning time.  Participants also requested more a

more tactical approach where they work through creating a unit and a mix of lecture and practice

as well as seeing concept-based instruction in action to better understand how they can

implement it in their classrooms.

**Implementation**

This research study was implemented using the data collection instrument of an anonymous Google form. The researcher received permission from the administrators at their school to conduct the research project and submitted a proposal to receive IRB approval for the research study. The data collection instrument of a Google Form, which included open and closed response questions to gather qualitative and quantitative data on teachers' instructional practices of concept-based learning, was researched and created. The questions were written, and then the survey was formatted for the various question types using Google Forms to prepare it for participants. The order of questions was carefully considered to receive information logically from the participants. An email was sent to the faculty at the researcher's school to find educators who were willing to participate in the study. The participants were briefed on the purpose of the research study, the methods and plans for using data, and the participant's informed consent was gained before they engaged in the research. The participants signed informed consent forms and were sent the survey to fill out anonymously via email. The participants had three days to complete the survey online using google forms, and the researcher followed up with any participants who had not responded to see if they still wanted to participate in the study. After the participants completed the online survey, the researcher analyzed the qualitative and quantitative data. They used the data to inform the development of a professional development program to help teachers implement concept-based learning in their classrooms that met the needs of the participants from the survey.

**Answer to the Research Question**

This study was conducted to answer the research question of how might a professional development program be developed to address the problem of teachers' lack of knowledge to guide students to apply conceptual knowledge to real-world scenarios.  Based on the information participants provided in the survey and the data analysis, there are several areas where teachers needed additional knowledge and skills to increase their capacity to support their students in these areas.  These included a focus on helping teachers write generalizations, strategies to guide students to write their own generalizations, how to use case studies, strategies for students to transfer their learning, and implementation of concept-based learning in the classroom.  In addition, the survey found some gaps in participants' knowledge and understanding of some of the key concept-based instructional vocabulary and participants' abilities to integrate knowledge and skills with a conceptual approach.  The participants in the survey overwhelmingly indicated a need for more professional development in these areas. They provided suggestions of types of professional development that would be helpful, including an emphasis on a more hands-on and collaborative approach. These findings were utilized in the creation of the professional development program to help teachers to guide their students to apply conceptual knowledge to real-world scenarios.

**Product**

The applied research product was the creation of a professional development program that addresses the need of teachers in the researcher's school to help them guide their students to apply conceptual knowledge to real-world scenarios.  This product aligned with the problem

statement that teachers at the researcher's school expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms.

Based on the analysis of the survey results, the professional development program was designed to consist of five sessions, each lasting around an hour, with the total time of the professional development program being at least 5 hours. The sessions are designed to address the gaps in knowledge that were identified in the survey as well as the requests from the participants of the survey. The first session is an overview of concept-based instruction, providing participants with the basics of concept-based instruction and clearing up any misconceptions about the importance of knowledge, skills, and content in a concept-based approach.

The second session will have the participants be the students as they are guided through a sample class taught by the instructor using concept-based approaches that can be applied in the classroom. The participants will be treated as if they are middle school students and will work through several activities that the participants can transfer into their own classrooms. This will provide the participants with the opportunity to see concept-based teaching in practice and pick up some helpful tips and tricks they can transfer to their own classroom.

The third- fifth sessions revolve around teachers writing their own concept-based unit. They will be guided through the process so they come out of the PD with a finished unit they can apply in their classroom. The third session focuses on crafting generalizations and unit design. The fourth session focuses on case studies and inquiry questions. The fifth session focuses on guiding students to transfer their learning. These sessions are collaborative, and teachers are seated with other specialists in their subject so they can work collaboratively and help each other in their own discipline.

# Chapter 5: Conclusions

## Overview of Conclusions

The research confirmed the researcher's problem statement that teachers at the researcher's school had expressed a lack of knowledge in implementing a concept-based curriculum within their instructional practices in their classrooms. This phenomenon impacted teachers' abilities to guide students to generalize and transfer their conceptual knowledge to real-world scenarios. It occurred because teachers lacked the training to guide students to apply conceptual knowledge to real-world scenarios.

The eleven participants of the research represented a cross-section of the faculty at the researcher's school. They had professional backgrounds ranging from 5 to over 20 years of teaching experience, with six of the eleven participants having had no prior experience or professional development on this topic. The participants identified writing concept-based units, knowledge of concept-based curriculum, implementing concept-based curriculum, and guiding students to generalize as areas where they needed additional support based on their mean responses on a 5-point Likert Scale that asked them to rank themselves based on their current knowledge and understanding. They specifically identified these areas along with case studies and strategies for students to transfer their learning where they would like additional support through qualitative and quantitative questioning on a google forms survey.

The survey provided information on the participant's current levels of knowledge by asking qualitative and quantitative questions about the elements that make up a concept-based curriculum. While most participants were able to answer the multiple-choice questions about the elements of a concept-based curriculum correctly, the majority were not able to provide concrete examples of how they use questioning, generalizations, and transfer in their classrooms. This

shows that while participants are familiar with some of the elements, they have difficulty implementing them. Only two participants could give concrete examples of how they have students transfer their learning. In contrast, the other participants provided examples that were not transfer, declined to answer, or said they did not use this approach. This showed that this was an area that needed to be addressed. There were a few misconceptions that also needed to be addressed in the professional development program, including deductive vs. inductive teaching methods and that facts, knowledge, and skills are all important in a concept-based curriculum to ensure that the participants have a fuller understanding of how to use conceptual learning to help their students to apply conceptual knowledge to real-world scenarios.

These findings were echoed by the participants in their qualitative responses, where the common themes included needing more time, collaboration, and training in these areas. Participants identified unit creation, creative ideas for units, and subject-specific training as common themes where they needed more support. The participants also requested that the professional development program contain a more hands-on approach to working through the process of creating a unit and a chance to see concept-based instruction in practice; both of these elements were included in creating the professional development program to meet the needs of the participants.

The research had an impact on the educational environment by giving participants a voice in the areas of support that they needed to be successful in learning how to guide students to apply conceptual knowledge to real-world scenarios. The results of the google forms survey allowed the researcher to create a professional development program that was tailored to the needs of the participants to ensure that they could be successful in the classroom. It was clear from the responses to the qualitative survey questions about support that the teachers did not feel

supported in these areas and that there was a real need for training, collaboration, and time to learn about how to best guide students in conceptual learning. After this professional development program is delivered to teachers, they should feel more confident in this instructional approach and have tools they can utilize to help their students succeed in their ability to apply their conceptual knowledge to real-world scenarios.

## Strengths and Weaknesses of Methodology

The data collection instrument, utilizing an anonymous Google form, was a strength of this research. The anonymous nature of the form allowed participants to be far more candid than they would have been regarding areas where they needed additional support and recommendations for improvement. The participants provided strong information on what was working and were very clear about areas where the school struggled.

The structure of the form was also a strength. The use of both qualitative and quantitative questions allowed the researcher to see a broader view of the areas where participants needed additional support in these areas. By asking teachers to rank themselves on a Likert scale related to their knowledge of topics followed by quantitative questions about elements of a conceptual approach and asking for qualitative data on how they used that approach, the researcher was able to identify areas where participants thought they had more knowledge than they did in reality. By asking for similar information through different approaches, the researcher was able to create a fuller understanding of the needs of the participants.

A weakness of the research is that it would have been interesting to see what division of the school teachers worked in to see if there was a difference in knowledge between the primary and secondary teachers. This would have provided the opportunity to see if one division had

more difficulty than the other or if there were common, school-wide problems.  That could have been added to the demographics section to add an element to the research.

Another weakness is that there could have been more time allotted to participants to fill out the survey.  Out of 50 teachers at the school, eleven responded, which is approximately one-fifth of the population.  By allowing for more days to complete the survey, there may have been more responses to the survey.

**Influential Factors**

The survey was conducted in May, near the end of the school year.  This may have impacted the results and levels of participation in the survey.  Teachers at the researcher's school have had a difficult year transitioning out of the pandemic and getting "back to normal."  This may have impacted the number of teachers who chose to participate in the survey as they were busy with all the end-of-the-year activities and duties and may not have had time to fill it out. There were also quite a few new teachers this year who have expressed concerns about the lack of information they received in their onboarding at the beginning of the year.  There was a complete administrative change at the beginning of the school year, and due to this, many of the teachers have expressed unhappiness with some of the changes that have been made.  The new administration has struggled with the transition. These factors may have slanted some of the participants' responses about levels of support for implementing a conceptual approach in the classroom.

## Recommendations for Further Investigation

The area of conceptual instruction is a burgeoning area of academic research. There is a significant amount of research related to using a conceptual approach in nursing and medical education. Still, there is less data on the approach with primary and secondary students. The work of Dr. H. Lynn Erickson and Dr. Lois Lanning is instrumental in this area in terms of how concept-based instruction can be implemented in the classroom. More research can be done on the effects of this method of instruction on younger students. In addition, based on the survey data conducted by the researcher, participants in knowledge-based disciplines tended to have an easier time guiding students to transfer their knowledge than in process-based disciplines. It appears that teachers of process-based and skill-heavy subjects need additional support, and this is an area that can be researched further to help teachers better guide their students to transfer both knowledge and skills to real-world scenarios.

## Barriers or Limitations to Drawing Conclusions

Barriers or limitations to drawing conclusions based on the data collected included the number of participants in the survey and the lack of differentiation between primary and secondary school responses. Approximately 20% of teachers at the researcher's school responded to the survey. While the teachers who did respond represented a range of experience levels, there were not enough participants to create a complete picture of the instructional needs. The research participants identified specific areas where they needed additional support, and these were thematically grouped. However, there may be additional areas of concern not represented by the participants. As the survey responses were a mix of both primary and secondary teachers, it was not possible to identify if problems or concerns were division-specific

or school-wide. These two factors impacted the conclusions and the creation of the professional development program.

## Implications of Research on Educational Practice

This research should result in a positive change to educational practice at the researcher's school. Based on the results of analyzing the data from the survey, participants overwhelmingly felt they need additional support and professional development in guiding students to apply conceptual knowledge to real-world scenarios. The participants identified generalizations, case studies, transfer, inquiry questions, and implementing conceptual learning strategies as areas in which they wanted additional training. The professional development program was designed to walk teachers through the process of creating a unit as well as to provide them with a demonstration of what guiding students to apply conceptual knowledge looks like in practice. By providing participants with the ability to answer questions both qualitatively and quantitatively in the survey, the researcher was able to develop a professional development program that meets the needs of the participants at the researcher's school and will provide educators with the tools they need to successfully guide students to transfer their learning and result in a greater depth of understanding.

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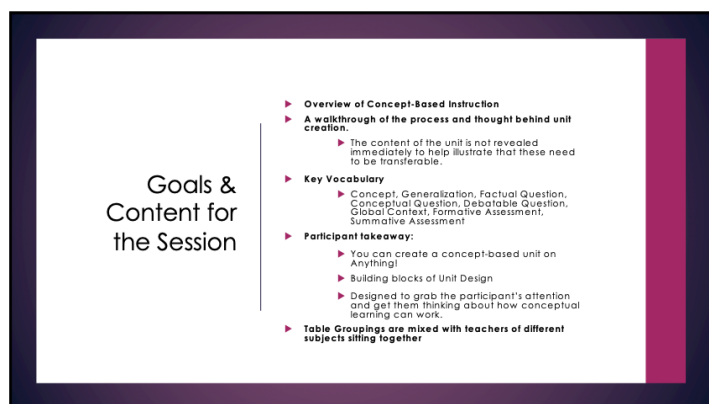Wiggins, G., and McTighe, J. (2016). *The understanding by design guide to creating high-quality units*. ASCD.
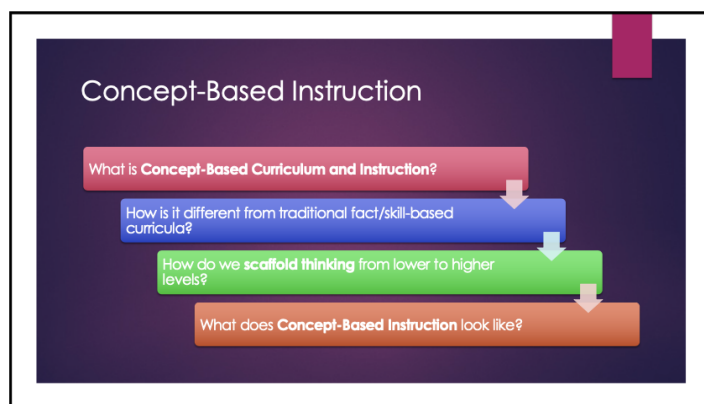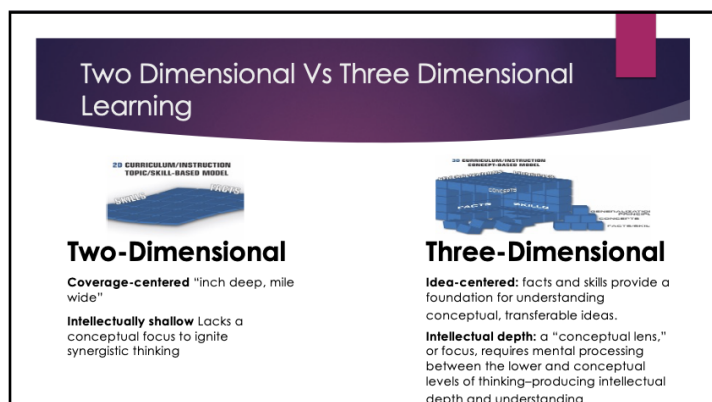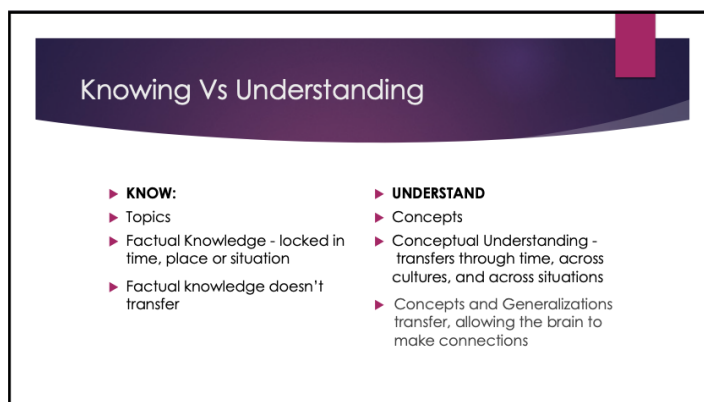
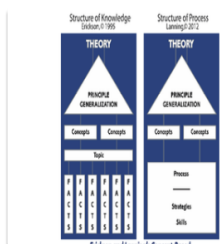# Appendix A



1



2



3



4



5



6

## Slide 7

### The Structure of Knowledge and the Structure of Process

- ▶ Look at these two models from the bottom up
- ▶ Keep in mind that knowledge has an inherent structure
- ▶ Structure of Knowledge developed by Dr. Erikson
- ▶ Structure of Process was developed later by Dr. Lanning as a complementary model.

7

## Slide 8

### The Structure of Knowledge and the Structure of Process
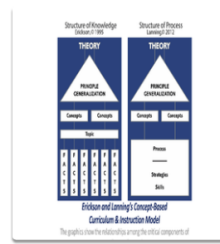
- ▶ When we look back at the two models
- ▶ Important to note we don't generalize from a single fact.
- ▶ We do generalize from a topic but need a variety of facts
- ▶ However, We can generalize about an individual process, strategy or a skill

8

## Slide 9

### Inductive vs. Deductive Teaching

AS A TABLE GROUP DISCUSS THE DIFFERENCES BETWEEN THESE APPROACHES

WHICH WORKS BETTER FOR CONCEPT-BASED TEACHING AND LEARNING?

WHY?

9

## Slide 10

### Inductive vs Deductive Approach

In inductive teaching and learning, students construct their own meaning and draw connections between what they have learned through case studies and examples to generalize and consolidate their knowledge.

In deductive teaching and learning, the teacher would provide the generalization at the beginning of the unit or the lesson and the students would investigate it.

Inductive teaching and learning can be more effective, as students will retain the content and concepts for a longer period of time if they have to synthesize the information themselves, rather than have it handed to them. It also enables them to transfer the ideas to new situations.

10

## Slide 11

### The Process to Create a Unit

Topic/Content (Syllabus)

Global Context Brainstorming

Key and Related Concepts

Factual, Conceptual, and Debatable questions

Summative Tasks (hitting different criteria)

Formative Tasks (Scaffolding knowledge to help succeed in the summative, also a check for understanding to see if more scaffolding is needed)

11

## Slide 12

### What is a Generalization?

ESSENTIAL OR ENDURING UNDERSTANDING, STATEMENT OF INQUIRY OR CENTRAL IDEA

TWO OR MORE CONCEPTS IN A RELATIONSHIP

12

## Success depends on perspective.

The generalization for our unit.

**13**

## What is a Concept?

**CONCEPTS** ARE THE BUILDING BLOCKS FOR DEEP UNDERSTANDING AND THEY SUPPORT THE **TRANSFER** OF IDEAS THROUGH TIME, ACROSS CULTURES AND ACROSS SITUATIONS.

**MACROCONCEPTS** CAN BE SO BIG THAT THEY TRANSCEND DISCIPLINES

AND/OR THEY MAY BE THE BROADEST CONCEPTS WITHIN A DISCIPLINE THAT FRAME MANY **MICROCONCEPTS.**

**14**

## Concept

# Perspective

**15**

## Related Concepts

# Audience
# Role

**16**

## Key Concepts and Related Concepts

- Make sure students **understand the vocabulary**
- **Explicitly define the words** and discuss what they mean in different contexts
  - Ex: **Composition** means different things in Drama, Art, Music, Writing
- **Use the terminology** in class
- Students are able to **draw connections between subjects** using common concepts

**17**

## Global context

- It's the LENS you use to view the unit
- Plan a series of questions that address the global context AND how it relates to the unit
- A different global context can change the direction of your unit.

**18**

**Slide 19**

What Global Context would you choose for our unit and why?

GLOBAL CONTEXTS

Identities and Relationships
Orientation in Space and time
Personal and Cultural Expression
Scientific and Technical Innovation
Globalization and Sustainability
Fairness and Development

Who am I? Who are we? What does it mean to be human?
What is the meaning of "where" and "when"?
What is the nature and purpose of creative expression?
How do we understand the world in which we live?
How is everything connected?
What are the consequences of our common humanity?

Success depends on perspective.

Turn to your table group and discuss

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**Slide 20**

Global Context

# Identities and Relationships

20

**Slide 21**

Global Context: Identities and Relationships

- What is dignity?
- What does it mean to compete? What's at stake? When do we go too far?
- How do we form our identity?
- How does who we think we are affect how we feel about ourselves?
- What motivates us to be the same? To be different?
- How do others affect my happiness? Who is in control of my happiness? Why?

21

**Slide 22**

What subject areas or content could be used in this unit?

**Generalization:** Success depends on perspective.

**Global Context:** Identities and Relationships

**Key Concept:** Perspective

**Related Concepts:** Audience, Role

Turn to your table group and discuss

22

**Slide 23**

Unit Content

The BACHELOR

23

**Slide 24**

Inquiry Questions

**Factual:**
- Set the foundation for conceptual questions
- Focus thinking on a particular point
- Locked in time, place, or situation
- Can provide substantiation for responses to conceptual questions

**Conceptual:**
- Ask about conceptual relationships, which forces linking
- Delve deeper and require more sophisticated level of cognitive processing and thinking
- Are transferable across multiple examples and situations

**Debatable:**
- No right or wrong, but the answer must be defended
- Require an analysis and synthesis of different sources and perspectives
- 1 - 2 per unit

24

## Designing inquiry questions

**Factual** — **Can use starter "What…"** Open questions that students might be able to Google but find several variations

**Conceptual** — **Can use starter "How.." or "Why..."** Open ended questions which unpack a concept or a relationship between concepts

**Debatable** — **Can use starters that provoke debate: "Do…" "Can…" "Should…" "Is…"** Debatable questions should provoke discussion

25

## The Bachelor (or any of the spin-offs)

**Generalization:** Success depends on perspective.

**Global Context:** Identities and Relationships

**Key Concept:** Perspective

**Related Concepts:** Audience, Role

**Create at least one Factual, Conceptual & Debatable Question with your Table Group**

26

## Factual Questions

- What is reality television?
- Who is involved in the show?
- What are the events that will take place?

27

## Conceptual Questions

- How is the winner chosen?
- For what reasons would someone participate in this show (in any role)?

28

## Debatable Questions

- Is there really a winner?
- Is this worth watching?
- Is this an accurate representation of relationships?

29

## Assessment

**Reflect the most important Understand (Generalizations), Know (Factual Knowledge), and able to Do (Skills) of the unit.**

**Student Performances are the assessment evidence of mastery.**

**Performance Tasks are not simple "activities."**

**Task Planner**

**[What]** Investigate…. (unit title or key topic)

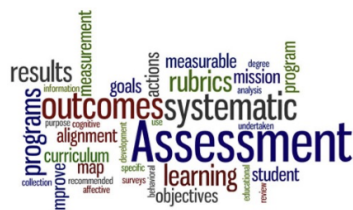**[Why]** in order to understand that… (generalization)

**[How]** (performance task/engaging scenario for students)

30

## Assessment

- Be creative
- Doesn't have to be a test
- Project-based learning
- Use technology
- Vlog, Podcast etc...

## Summative Assessment

1) Identify the various roles of the participants **(Criterion A: Knowing and Understanding)**
2) Create an entry/candidate video (1-2 minutes) about why you would be a good contestant for a particular role **(Criterion B: Developing Skills)**
3) Write and present a pitch for your own reality television show **(Criterion C: Thinking Creatively)**
4) Explore both sides of one of the following debatable questions **(Criterion D: responding)**
   a) Is there really a winner on this show?
   b) Is this worth watching? Be sure to consider the idea of "worth" in terms of what you can gain personally.
   c) Is this an accurate representation of love and relationships?

**31**

**32**

## Formative Assessment

- Backwards Planning
- Includes ATL's and Learner Profile Traits
- Informing ourselves and students about whether we are on track to fly

## Process to Create this Unit

1) Topic/Content (Syllabus)
2) Global Context Brainstorming
3) Key and Related Concepts
4) Factual, Conceptual, and Debatable questions
5) Summative Tasks (hitting different criteria)
6) Formative Tasks (not really…)

**33**

**34**

## Creating the Unit Continued….

At the end, we looked back at what we had created and...SOI.
   a) Write it six times
   b) Delete it six times
   c) Change the Key Concept from Aesthetics to Perspective because we didn't have a clear idea until after we wrote the tasks
   d) High five when you get the one that is just right.
   e) Change it a little one more time.

## Some Advice...

- Work in Google Doc's first then move to ManageBac
- It's all about backwards design… you need to know where you are going
- It's ok to tweak or change things while you are planning
- Ask for help, it's much easier to work with a colleague to brainstorm and talk through your ideas

**35**

**36**

**37**

Session 2:
Concept-Based
Inquiry in Action

CREATED BY RACHEL DAMON

---

**38**

Goals & Content for the Session

▶ **A Concept-Based Classroom in Action**
  ▶ This section is designed to model what a conceptual approach, generalizations, and transfer look like in practice. The participants become students in a Grade 6 drama class and participate in activities encouraging transfer and writing generalizations. The participants look at activities from different parts of the unit to see how they scaffold into a full unit.
▶ **Participant takeaways**
  ▶ Tips and Tricks that can be applied in the classroom
  ▶ Activities and approaches that transfer to other subjects
  ▶ A better understanding of how this works in reality.
▶ **Table Groupings are mixed with teachers of different subjects sitting together**

---

**39**

## Introduction to Unit : Grade 6 Class

**Unit Title:** Creating Drama from A Given Stimulus

**Content:** Drama Strategies and Story Structure

**Key Concept:** Communication

**Related Concepts:** Structure, Composition

**Global Context:** Personal and Cultural Expression

**ATL Skills:** Social, Communication, Working Effectively with Others

---

**40**

Concept Mapping Activity

WORK COLLABORATIVELY AS A SMALL GROUP TO CREATE A MIND MAP OF THE ELEMENTS OF DRAMA.

---

**41**

Factual Inquiry Questions

What are the main components of an effective drama?

What is the ideal structure of a drama?

What techniques can be used to enhance a performance?

*These are used as questions at the beginning of class to start a discussion*

---

**42**

Devised Scene Activity

Work collaboratively in groups to brainstorm, a scene based on a fairytale.

You need to change one element of the story to make it your own.

Rehearse and perform your scene for the class

Receive feedback on what went well and even better ifs

## Conceptual Inquiry Questions

How can you communicate your ideas clearly to an audience?

Can drama techniques improve dramatic work?

*These are used as questions to provoke thought and ideas. Usually used after a presentation to dial into what students have learned.*

43

## Devised Scene Activity Part Two

Review List of Drama Strategies and Techniques

As a group, brainstorm which elements you could include

Practice and Present a Scene Including the new strategies

Feedback from audience on what went well and even better ifs

44

## Debatable Inquiry Questions

Can you always be sure that your audience will interpret your ideas in the way you would like them to?

Is it possible to use too many drama techniques?

*These are used as questions to provoke discussion and encourage students to think deeper.*

45

## Write a Generalization

Based on your work today, write a generalization of what you have learned.

*Use the word bank and/or other drama concepts to create at least one generalization based on your understanding of this lesson.*

Word Bank: Sequence, Structure, Character, Audience, Role, Communication, Composition

Sentence Starter: I understand that…

46

## Debrief

Debrief the Lesson

In table groups discuss what you noticed, what can you take away

Whole group discussion on strategies

Questions on approach or process?

47

## Session 3: Generalizations

CREATED BY RACHEL DAMON

48

**Slide 49**

## Goals & Content for the Session

- **Begin the Process of Creating a Unit**
  - This section is designed to focus on identifying key content and skills for unit creation and writing generalizations.
- **Key Vocabulary**
  - Topics, Content, Concepts, Generalizations
- **Participant takeaway:**
  - Begin writing their unit
  - Identify key content and skills
  - Identify Concepts
  - Write Generalizations
- **Table Groupings are by subject, with teachers sitting with their departments.**

49

**Slide 50**

## Knowledge AND Process

- It is important to ground students' understanding with knowledge of the topic or content you are trying to cover.
- Students need to have a case study or other factual knowledge to use to organize or see patterns in the information, which is needed to understand the concepts to form a generalization.
- Process is also key to students understanding. They need to be taught specific skills in order to apply the strategies to their work.
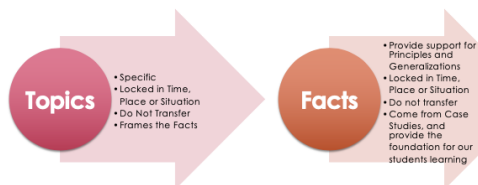- The process helps students to take action to synthesize their learning.
- Used in tandem, knowledge, and process allow students to practice synergistic thinking as part of a three-dimensional curriculum focused on knowledge, skills, and concepts.

50

**Slide 51**

## Topics and Facts

**Topics**
- Specific
- Locked in Time, Place or Situation
- Do Not Transfer
- Frames the Facts

**Facts**
- Provide support for Principles and Generalizations
- Locked in Time, Place or Situation
- Do not transfer
- Come from Case Studies, and provide the foundation for our students learning

51

**Slide 52**

## Concepts

- Mental constructs that frame a set of examples sharing common attributes.
- Concepts transfer
- 1 or 2 words or a small phrase,
- Timeless
- Universal
- Abstract to different degrees.
- Concepts are used to form a generalization.

52

**Slide 53**

## Principles and Generalizations

**GENERALIZATION:**
- Two or more concepts stated in a relationship connected with a strong verb
- Transfer through time across cultures and across situations.
- Supported by evidence.

**PRINCIPLE:**
- A generalization that is considered a foundational truth for a discipline.
- Does not use qualifiers,
- e.g. Science Laws (Newton's first law of motion).

**When teaching the unit, you don't need to differentiate between Principle and Generalization**
- But it's good to know when writing the curriculum

53

**Slide 54**

## Theory

- At the top of the structure of knowledge is a Theory.
  - A Supposition
  - Set of Conceptual Ideas
  - Used to explain a phenomenon or practice
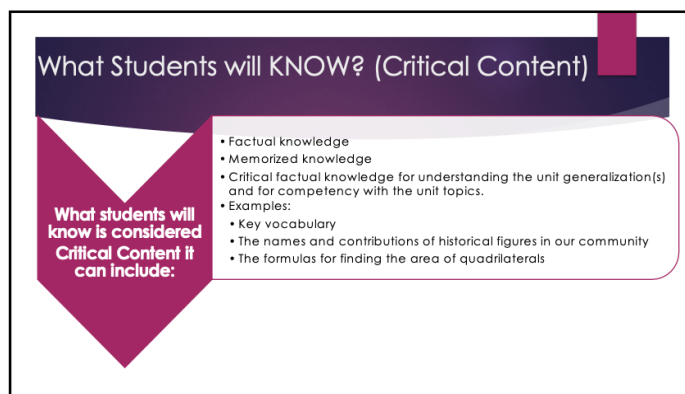- Doesn't tend to come in until high school or college level
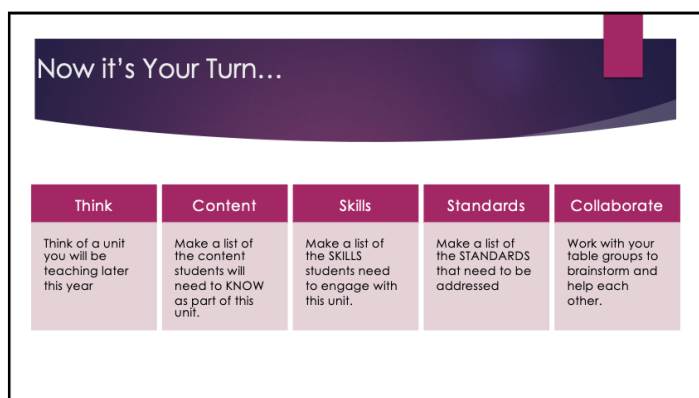- Most of the time you will be looking at principles and generalizations
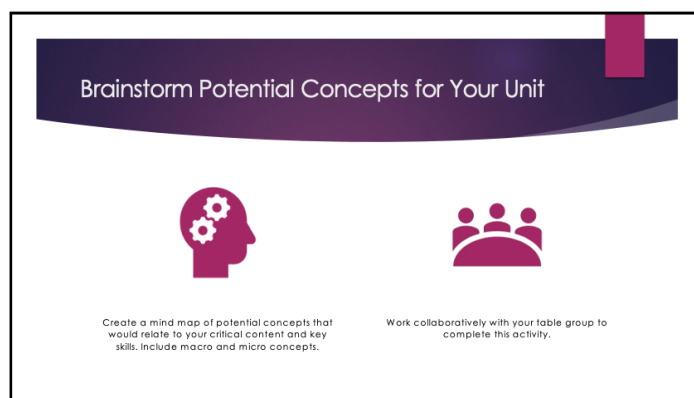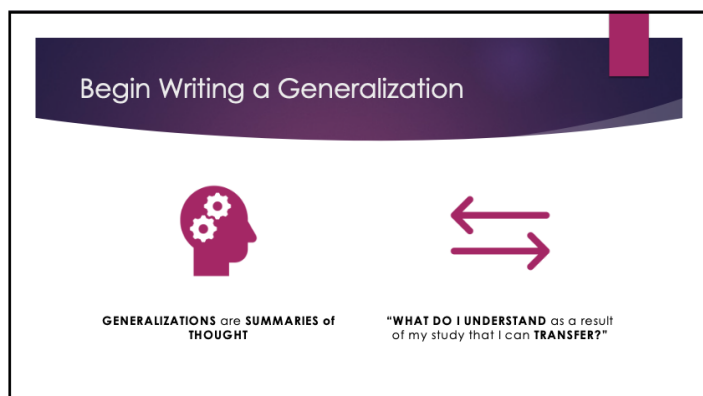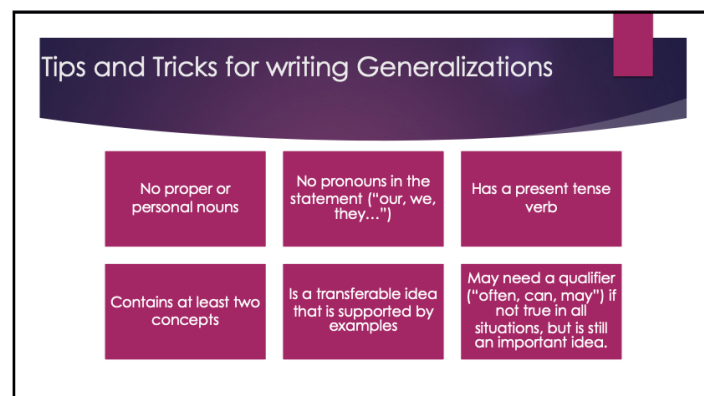
54

**Slide 55**

## Process

| | |
|---|---|
| What do you want students to be able to do? | |
| What is the process? | Broadest Area<br>Actions that produce a result and move through stages<br>It Defines what needs to be done |
| What are the skills and strategies they need to successfully complete the process? | |
| Strategies | Systematic plans that learners adopt and monitor to support and achieve the intended result |
| Skills | Smaller pieces that allow the strategies to work. |

55

**Slide 56**

## What Students will KNOW? (Critical Content)

**What students will know is considered Critical Content it can include:**

- Factual knowledge
- Memorized knowledge
- Critical factual knowledge for understanding the unit generalization(s) and for competency with the unit topics.
- Examples:
  - Key vocabulary
  - The names and contributions of historical figures in our community
  - The formulas for finding the area of quadrilaterals

56

**Slide 57**

## Now it's Your Turn…

| Think | Content | Skills | Standards | Collaborate |
|---|---|---|---|---|
| Think of a unit you will be teaching later this year | Make a list of the content students will need to KNOW as part of this unit. | Make a list of the SKILLS students need to engage with this unit. | Make a list of the STANDARDS that need to be addressed | Work with your table groups to brainstorm and help each other. |

57

**Slide 58**

## Brainstorm Potential Concepts for Your Unit

Create a mind map of potential concepts that would relate to your critical content and key skills. Include macro and micro concepts.

Work collaboratively with your table group to complete this activity.

58

**Slide 59**

## Begin Writing a Generalization

**GENERALIZATIONS** are **SUMMARIES of THOUGHT**

**"WHAT DO I UNDERSTAND** as a result of my study that I can **TRANSFER?"**

59

**Slide 60**

## Tips and Tricks for writing Generalizations

| No proper or personal nouns | No pronouns in the statement ("our, we, they…") | Has a present tense verb |
|---|---|---|
| Contains at least two concepts | Is a transferable idea that is supported by examples | May need a qualifier ("often, can, may") if not true in all situations, but is still an important idea. |

60

## The Structure of Knowledge

THEORY

PRINCIPLE
GENERALIZATION

Concepts | Concepts

Topic

FACTS FACTS FACTS FACTS FACTS FACTS

H. Lynn Erickson ©1995

THE STUDENT UNDERSTANDS THAT . . .
3. _____
_____

2.

1.

61

## The Structure of Process

Structure of Process
Lanning,© 2012

THEORY

PRINCIPLE
GENERALIZATION

Concepts | Concepts

Process
_____
Strategies
Skills

THE STUDENT UNDERSTANDS THAT . . .
3. _____
_____

2.

1. Unit Title:

62

## Collaborative Planning

▶ Work with your table group to write at least one generalization for each unit at your table.

63

## Sharing Time

EACH TABLE GROUP SHARES AT LEAST ONE GENERALIZATION THEY CREATED.

FEEDBACK FROM THE OTHER GROUPS.

64

## Questions?

NOW IS THE TIME TO ASK ANY BURNING QUESTIONS YOU MAY HAVE ABOUT THIS SESSION.

65

## Session 4: Guiding Questions & Case Studies

CREATED BY RACHEL DAMON

66

### Goals & Content for the Session

- **Continue the Process of Creating a Unit**
  - This section focuses on identifying case studies for the unit and writing guiding questions.
- **Key Vocabulary**
  - Case Study, Factual Question, Conceptual Question, Debatable Question
- **Participant takeaways**
  - Continue writing their unit
  - Write Factual, Conceptual, and Debatable Inquiry Questions
  - Identify case studies that can be used
- **Table Groupings are by subject, with teachers sitting with their departments.**

67

### Guiding Questions

- Guiding questions are designed to spark the student's interest and to guide them through their inquiry to form a generalization.
- Students are more engaged through a questioning approach.
- The factual questions usually ground the students in the content or processes and are connected to the case studies.
- The conceptual questions allow students to dig deeper into the concepts to create meaning,
- The debatable questions are designed to be provocative and encourage the students to think, they have no right or wrong answer and could be factual or conceptual.

68

### Factual Questions

- Set the foundation for conceptual questions
- Focus thinking on a particular point
- Locked in time, place, or situation
- Can provide substantiation for responses to conceptual questions
- Open questions that students might be able to Google but find several variations
- Can use the starter "What…"

69

### Write your own Factual Questions

Using the unit you started in the previous session. Write 3-5 factual questions based on the content for your unit.

Feel free to collaborate with another person to help each other

Share your ideas with your table groups to help refine your ideas

70

### Conceptual Questions

- Ask about conceptual relationships, which forces linking
- Delve deeper and require more sophisticated levels of cognitive processing and thinking
- Are transferable across multiple examples and situations
- Open ended questions which unpack a concept or a relationship between concepts
- Can use starter "How.." or "Why…"

71

### Write your own Conceptual Questions

USING THE UNIT YOU STARTED IN THE PREVIOUS SESSION. WRITE 2-4 CONCEPTUAL QUESTIONS BASED ON THE CONTENT FOR YOUR UNIT.

FEEL FREE TO COLLABORATE WITH ANOTHER PERSON TO HELP EACH OTHER

SHARE YOUR IDEAS WITH YOUR TABLE GROUPS TO HELP REFINE YOUR IDEAS

72

## Debatable Questions

- No right or wrong, but the answer must be defended
- Require an analysis and synthesis of different sources and perspectives
- 1 - 2 per unit
- Debatable questions should provoke discussion
- Can use starters that provoke debate: "Do…" "Can…" "Should…" "Is…"

73

## Write your own Debatable Questions

Using the unit you started in the previous session. Write1-2 debatable questions based on the content for your unit.

Feel free to collaborate with another person to help each other

Share your ideas with your table groups to help refine your ideas

74

## Case Studies

| Designed to provide knowledge to students | Examples students can use to draw conclusions to create generalizations | Books | Articles | Historical Figures |

| Knowledge or Skills Based Approaches | Formal or Informal | Examples | Lab Experiments |

75

## Find your case studies

Based on your unit, create a list of potential case studies you can use to help students generalize.

You want to provide a variety of examples from different contexts and cultures so that students are able to use the case studies to write a generalization.

The generalization can be used to transfer their learning to new situations.

Feel free to work collaboratively with your table group of subject specialists.

76

## Collaborative Sharing

- Table groups share some of their favorite inquiry questions, and case study ideas with the rest of the group to get feedback on their ideas.
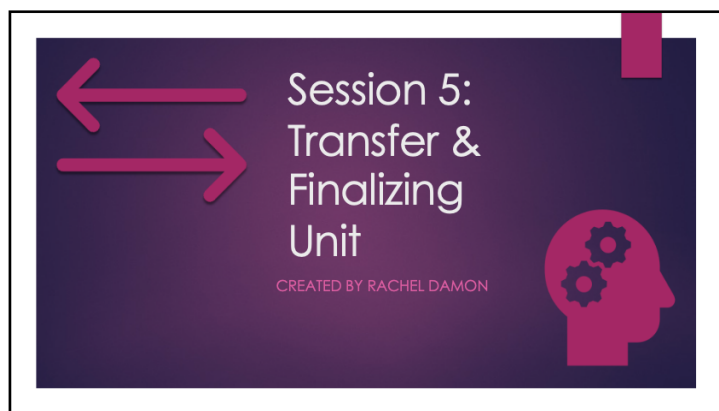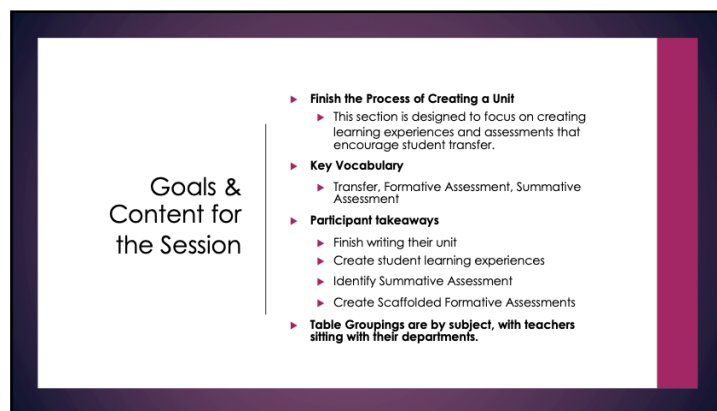
77

## Questions?

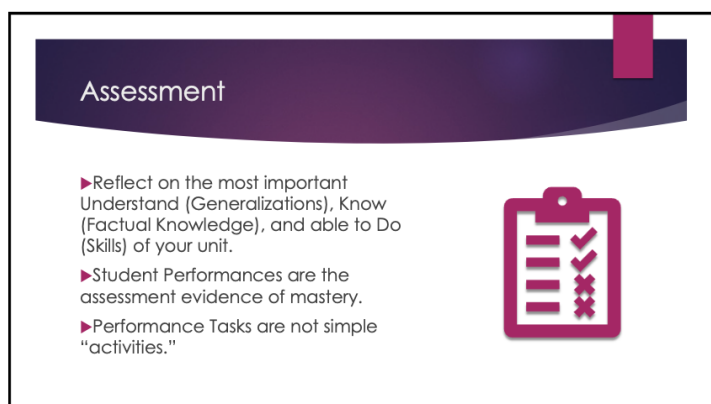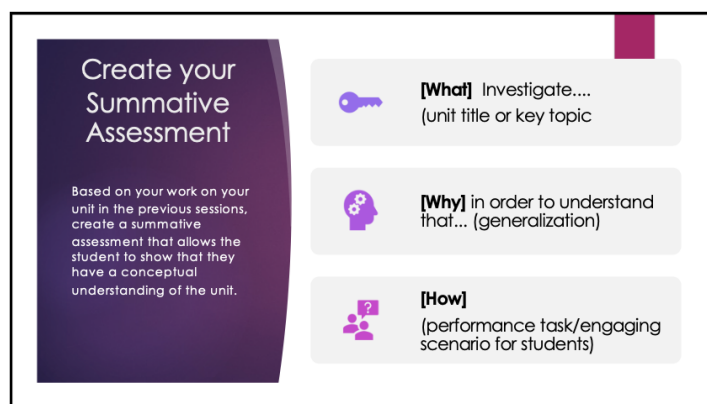NOW IS THE TIME TO ASK ANY BURNING QUESTIONS YOU MAY HAVE ABOUT THIS SESSION.

78

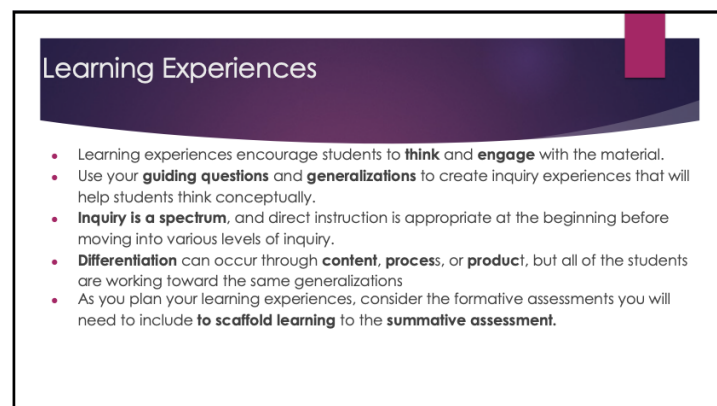## Session 5: Transfer & Finalizing Unit

CREATED BY RACHEL DAMON

79

## Goals & Content for the Session

► **Finish the Process of Creating a Unit**
  ► This section is designed to focus on creating learning experiences and assessments that encourage student transfer.
► **Key Vocabulary**
  ► Transfer, Formative Assessment, Summative Assessment
► **Participant takeaways**
  ► Finish writing their unit
  ► Create student learning experiences
  ► Identify Summative Assessment
  ► Create Scaffolded Formative Assessments
► **Table Groupings are by subject, with teachers sitting with their departments.**

80

## Assessment

►Reflect on the most important Understand (Generalizations), Know (Factual Knowledge), and able to Do (Skills) of your unit.

►Student Performances are the assessment evidence of mastery.

►Performance Tasks are not simple "activities."

81

## Create your Summative Assessment

Based on your work on your unit in the previous sessions, create a summative assessment that allows the student to show that they have a conceptual understanding of the unit.

**[What]** Investigate....
(unit title or key topic

**[Why]** in order to understand that... (generalization)

**[How]**
(performance task/engaging scenario for students)

82

## Collaborative Planning

Work with your table groups or teachers from other subjects to fine tune your summative assessment.

Make sure it is in line with your generalizations and inquiry questions.

It should provide students the ability to achieve at the highest level.

It should provide a differentiated approach for students.

83

## Learning Experiences

- Learning experiences encourage students to **think** and **engage** with the material.
- Use your **guiding questions** and **generalizations** to create inquiry experiences that will help students think conceptually.
- **Inquiry is a spectrum**, and direct instruction is appropriate at the beginning before moving into various levels of inquiry.
- **Differentiation** can occur through **content**, **process**, or **product**, but all of the students are working toward the same generalizations
- As you plan your learning experiences, consider the formative assessments you will need to include **to scaffold learning** to the **summative assessment.**

84

## Planning Learning Experiences

**Think through the criteria in the checklist below:**
- ❑ The learning experiences reflect a gradual release model, transitioning the responsibility from teacher to student.
- ❑ The learning experiences require students to reason their way through the work. E.g., The tasks necessitate students' intellectual engagement in "figuring things out," integrating thinking, and ongoing reflection and self-assessment.
- ❑ The guiding questions, paired with the texts, tasks, and/or examples students are investigating, lead to and exemplify the target generalization.
- ❑ The learning experiences help students to begin to uncover and link patterns across different examples.
- ❑ The assigned work represents an authentic, meaningful context (as much as possible) and is relevant to future learning.
- ❑ The learning experiences often require peer collaboration.
- ❑ The learning experiences ensure equitable access for all learners...
  - ❑ by providing multiple points of entry into the concepts under study
  - ❑ by how students are grouped, by making sure the materials (e.g. text) are at an appropriate level
  - ❑ by the complexity of the learning experience
  - ❑ by the amount of teacher guidance and scaffolding provided,
  - ❑ by providing opportunities for student voice and choice

85

## Collaborative Planning

Work with teachers at your table group to design learning experiences in line with the guiding questions and generalizations.

Consider the formative assessments you will need to scaffold to your summative.

The order of the learning experiences is critical, so information and skills build upon each other.

86

## Collaborative Sharing

TABLE GROUPS SHARE SOME OF THEIR FAVORITE LEARNING EXPERIENCES AND ASSESSMENT IDEAS WITH THE REST OF THE GROUP TO GET FEEDBACK ON THEIR IDEAS.

87

## Questions?

▶ NOW IS THE TIME TO ASK ANY BURNING QUESTIONS YOU MAY HAVE ABOUT THIS SESSION.

88

**Appendix B**
*Data Gathering Instrument: Google Form*

# Concept-Based Curriculum Teacher Survey

Sign in to Google to save your progress. Learn more

Number of Years of Teaching Experience

Your answer

Years of Experience Teaching with a Concept-Based focus

Your answer

Please list any previous professional development experiences related to concept-based curriculum and instruction.

Your answer
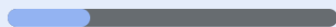
Next                              Page 1 of 4                    Clear form

# Concept-Based Curriculum Teacher Survey

Sign in to Google to save your progress. Learn more

**Section 2: Familiarity with Concept-Based Curriculum & Instructional Practices**

Please rate the following on a scale of 1-5, with a one as no knowledge (novice) and a five as the ability to teach others (Expert)

Knowledge of Concept-Based Curriculum

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Writing Concept-Based Units

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Implementing Concept-Based Curriculum in your Classroom

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Using inquiry/ guiding questions

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Writing Generalizations (also known as Statements of Understanding or Statements of Inquiry)

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Using inquiry/guiding questions to help students generalize

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Guiding Students to Transfer their Knowledge to other Subjects or Topics

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Guiding students to write their own Generalizations

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Guiding Students to Transfer their Knowledge to Real World Situations

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Novice | ○ | ○ | ○ | ○ | ○ | Expert |

Back | Next | Page 2 of 4 | Clear form

# Concept-Based Curriculum Teacher Survey

Sign in to Google to save your progress. Learn more

**Section 3: Previous Knowledge of Concept-Based Curriculum & Instructional Practices**

Please don't google the answers, but respond based on your own experiences.

---

Select all the elements that are essential in a concept-based curriculum

- [ ] Facts (Knowledge)
- [ ] Skills
- [ ] Concepts
- [ ] Generalizations (Statements of Inquiry)
- [ ] Guiding Questions
- [ ] Topics

---

Macroconcepts

- ○ Provide a depth of understanding
- ○ Provide a breadth of understanding

---

Topics and Facts

- ○ Transfer across time, place and situation
- ○ Are locked in time, place, and situation

---

Microconcepts

- ○ Provide a depth of understanding
- ○ Provide a breadth of understanding

---

Concepts, Generalizations and Principles

- ○ Transfer across time, place and situation
- ○ Are locked in time, place, and situation

---

Inductive and Deductive Teaching and Learning

---

A concept based curriculum is usually

- ○ Inductive
- ○ Deductive

---

What is the difference between inductive and deductive teaching and learning?

Your answer

---

Guiding Questions

---

Guiding Questions (select all that apply)

- [ ] Should have yes or no answers
- [ ] Help scaffold thinking
- [ ] Are designed to confuse students
- [ ] Create a bridge between facts and skills and conceptual understanding
- [ ] Help engage students in their learning

---

Factual questions

- ○ Ground the students in the content or processes and are connected to the case studies
- ○ Allow students to dig deeper into the concepts to create meaning
- ○ Are designed to be provocative and encourage the students to think

---

Conceptual questions

- ○ Are designed to be provocative and encourage the students to think
- ○ Allow students to dig deeper into the concepts to create meaning
- ○ Ground the students in the content or processes and are connected to the case studies

---

Debatable questions

- ○ Allow students to dig deeper into the concepts to create meaning
- ○ Ground the students in the content or processes and are connected to the case studies
- ○ Are designed to be provocative and encourage the students to think

---

Back    Next    ▬▬▬▬▬▬ Page 3 of 4    Clear form

# Concept-Based Curriculum Teacher Survey

Sign in to Google to save your progress. Learn more

**Section 4: Classroom Practices & Areas for Support**

Please answer the questions based on your current classroom practices. Feel free to give examples or elaborate on your thoughts.

Do you feel a concept-based approach is successful in your subject/grade level? Why or why not?

Your answer

What are the most challenging parts of implementing a concept-based curriculum for you?

Your answer

What are the least challenging parts of implementing a concept-based curriculum for you?

Your answer

How do you use questioning in your classroom?

Your answer

How do you help students transfer their learning?

Your answer

Do you ask students to write their own generalizations in class to help them better understand the concepts and make connections? Why or why not?

Your answer

Are there any areas you are struggling with in order to implement a concept-based approach in your classroom?

Your answer

Do you feel you have enough support to implement a concept-based approach in your classroom?

Your answer

What could be done for you to feel better supported in implementing a concept-based approach in your classroom?

Your answer

Areas where you would like more information and support

☐ What is a concept

☐ Topics vs Concepts

☐ Implementing conceptual learning in the classroom

☐ Creating Generalizations

☐ Guiding Students to Write their Own Generalizations

☐ Using Case Studies to help students write their own generalizations

☐ Writing Guiding Questions

☐ Using questioning in the classroom

☐ Strategies to help students transfer their knowledge to different topics or content areas

☐ Strategies to help students transfer their knowledge to real-life situations

Are there any other areas you would like more knowledge and/or instructional strategies for implementing concept based curriculum in your classroom?

Your answer

What types of professional development activities would you find beneficial to increase your knowledge of concept-based curriculum and instruction?

Your answer

Is there anything else related to concept-based curriculum and instruction you would like to add?

Your answer

Back    Submit    ▬▬▬▬▬▬▬  Page 4 of 4    Clear form

# **Appendix C**
*Informed Consent Form*

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|
## **Informed Consent Form**

Reminder: The Informed Consent Form is used only for adult participants and the language must be comprehensible and understandable at the reading grade level expected for the target population. Please remove highlighted and instructional content to prepare final form.

You are invited to participate in a Capstone Research Project entitled *Professional Development for Conceptual Knowledge Instructional Strategies*. You were selected as a potential participant due to your role as a teacher at an international school utilizing a concept-based curriculum in your classroom. Please read this form and ask any questions you may have before acting on this invitation to participate in the project. This research project is being conducted by Rachel Damon at Western Governors University and determined to be exempt research by the WGU Institutional Review Board (IRB).

**Background Information:** The purpose of this research project is to determine the participant's knowledge and understanding of instructional practices for implementing a concept-based curriculum and identify the areas that the participant feels they need additional support to help successfully guide students to apply conceptual knowledge to real-world scenarios.

. The project will involve approximately 5 participants.

**Inclusion Criteria:** You can participate in this project if you:

- Are a certified teacher at an international school
- Utilize a concept-based curriculum in your classroom
-

**Procedures:** If you agree to be in this project, you will be asked to complete an anonymous google form with a combination of multiple choice and short answer questions taking approximately 15 minutes to complete.

**Voluntary Nature of the Project:** Your participation in this project is strictly voluntary. Your decision on whether or not to participate will not affect your current or future relations with _____ If you initially decide to participate, you are free to withdraw at any time later without affecting those relationships.

**Risks and Benefits of Participation:** There is *no more than minimal risk* associated with participating in this project, and there is no individual benefit to participation in the project. However, project findings may provide the overall benefit of providing further information on concept-based curriculum and instructional approaches and strategies you can apply to your classroom instructional practices.

In the event you experience stress or anxiety during your participation in the project, you may terminate your participation at any time. You may refuse to answer any questions you consider invasive or stressful and can end the survey at any time.

**Compensation:** There will be no compensation provided for your participation in this project.

**Recording:** I understand my participation involves completing one google form and will not involve any audio or video recording nor any classroom observations.

**Confidentiality:** Any data or records gathered from your participation will be kept private. Any identifiable data gathered will be coded to protect your identity. The Google Form will be set to not require an email address or any identifying information and your responses will be anonymous. In any report of this project that might be published, the researcher will not include any information that will make it possible to identify you. Research records will be securely stored and only accessible to the Student Investigator.

**Contacts and Questions:** You may ask any questions you have related to the consent to participation. Contact the Student Investigator, Rachel Damon at _____@wgu.edu. If you have questions about exempt research or have any concerns related to this project, contact the WGU IRB at IRB@WGU.EDU.

**WGU | TEACHERS COLLEGE**

**Documentation**

I have read the above information, have been given adequate time to consider the information, and understand I may stop participation in the project at any point. I have asked questions and received answers. I consent to take part in this project. You will be offered a copy of this signed form from the Student Investigator.

Typed Name of
Participant                                                                                    [Date]
_____

Participant
Signature                                                                                      [Date]

  X_____

_____

Signature of
Student Investigator                                                                      [Date]

  X_____

_____

*Site Authorization Form*

May 11, 2023

Dear Rachel Damon,

[                    ] has reviewed your Capstone Research request for a study titled *Professional Development for Conceptual Knowledge Instructional Strategies*, and we agree to support collaboration efforts toward your collection of data in accordance with your description:

Requesting to survey volunteer [                    ] faculty via Google Form to determine the participant's knowledge and understanding of instructional practices for implementing a concept-based curriculum and identify the areas the faculty feel that they need additional support to help successfully guide students to apply conceptual knowledge to real-world scenarios.

The extended invitation to conduct the above-described study will occur between May 15 to June 2, 2023.

Sincerely,

*Middle School & High School Principal*

# Appendix D

*Participant Survey Responses:*
*Additional Graphic Representations and Narrative Descriptions*

### Participant Self-Reported Familiarity, Knowledge, and Understanding of Concept-Based Curriculum Implementation

**Knowledge of Concept-Based Curriculum**
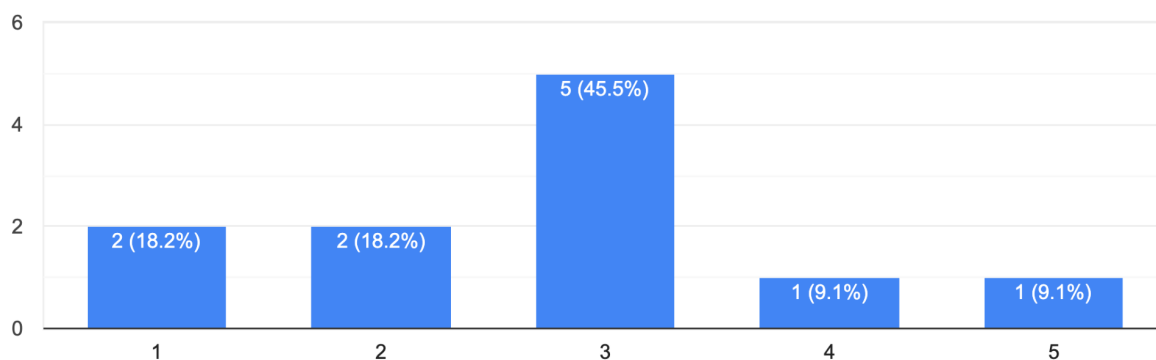
11 responses



*Mean: 2.7     Median: 3     Mode: 3*

Of the eleven participants, the majority (9) ranked themselves as a three or below on the Likert scale, with a three being the most common response. The median and mode for this data set were the same with the mean being 2.7 showing that on average, the participants rank themselves slightly below average in their knowledge of the concept-based curriculum.

**Writing Concept-Based Units**

11 responses
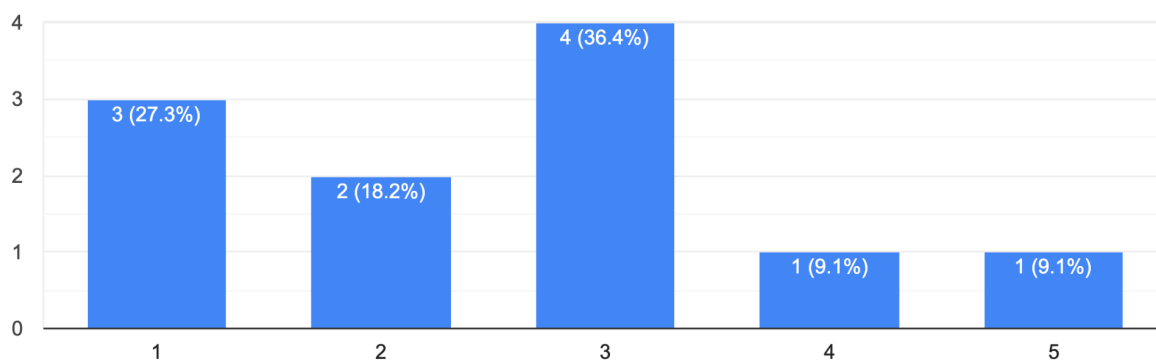
*Mean: 2.5     Median: 3     Mode: 3*

In terms of their knowledge and understanding of writing concept-based units, the participants' mean score on the Likert scale was 2.5, with a median and mode of 3.  Only two participants ranked themselves higher than three, with 9 ranking themselves as three or below.  This shows that this is an area where teachers need additional support.

**Implementing Concept-Based Curriculum in your Classroom**
11 responses
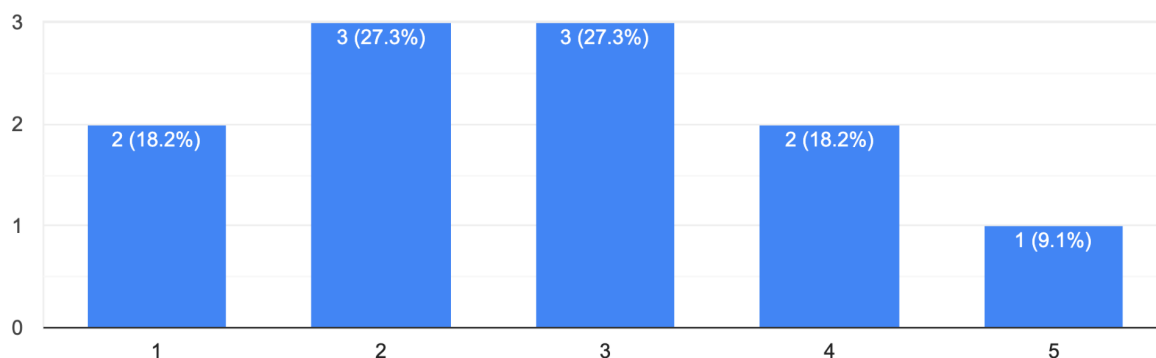


*Mean: 2.7     Median: 3     Mode: 3*

The mean score from participants was 2.7 regarding their ability to implement a concept-based curriculum in their classroom.  The median and mode score was a 3. Three participants scored themselves as a four or above, with the remaining eight participants scoring themselves a three or below.  Five participants ranked themselves a 1 or 2 so this is an area that participants identify as needing more support.

**Using inquiry/ guiding questions**
11 responses
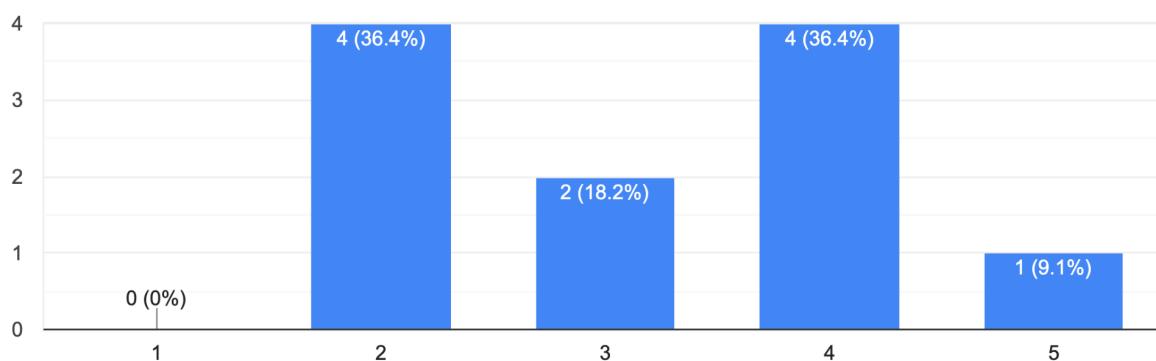


*Mean: 3.1     Median: 3     Mode: 2*

Some participants seem to be more comfortable using inquiry and guiding questions, with five participants ranking themselves as a four or above and no participants ranking themselves as a 1. The mean score is 3.1 with the median a 3 and the mode a 2. Due to the mode as a 2, it shows there are still teachers who need additional support with this topic with four ranking themselves a 2, and this is an area that should be addressed in the professional development.

**Writing Generalizations (also known as Statements of Understanding or Statements of Inquiry)**
11 responses
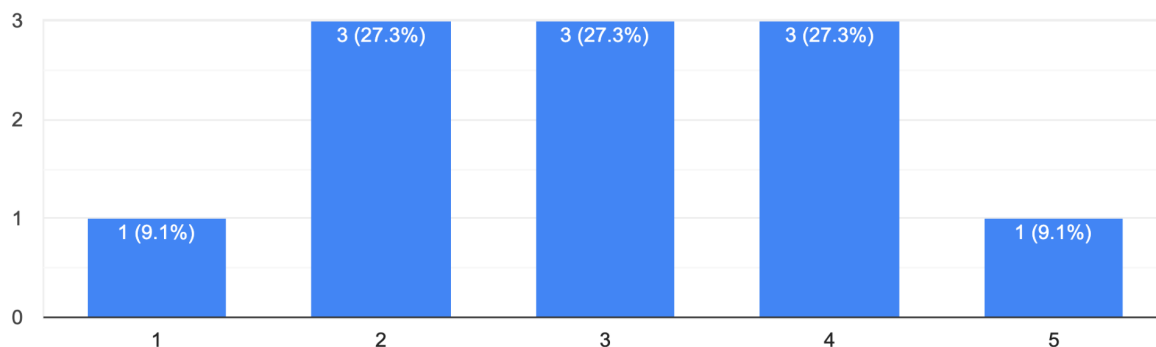


*Mean: 3        Median: 3      Mode: 2*

The mean and median score for knowledge and understanding of writing generalizations is 3 with a mode of 2. The majority of participants ranked themselves as 2-4 in this category with only one participant choosing 1 or 5 respectively. Seven participants ranked themselves as a three or above in this area identifying the majority were more familiar with this topic.

**Using inquiry/guiding questions to help students generalize**
11 responses
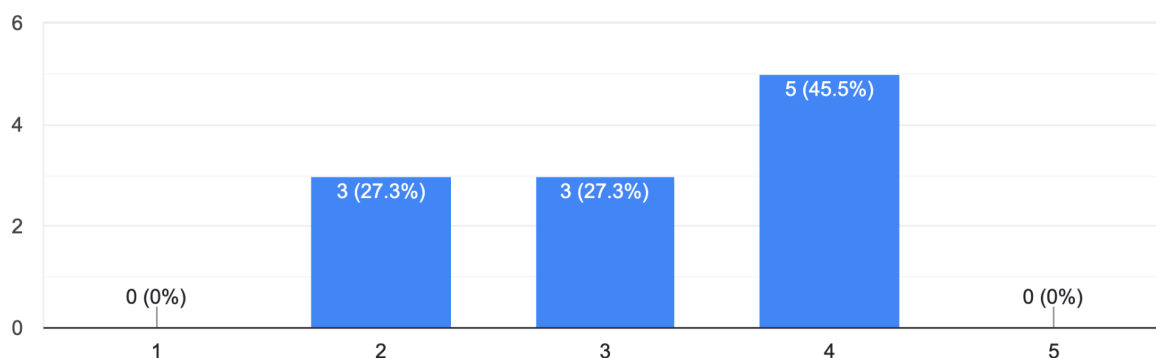


*Mean: 3.18     Median: 3     Mode: 4*

In terms of using inquiry and guiding questions to help students generalize, no participants ranked themselves as a 1 or 5 and the majority ranked themselves a 4, identifying they felt more

comfortable with this topic but were not at the expert level yet which means additional instruction to help teachers refine these techniques to mastery can be helpful.

**Guiding Students to Transfer their Knowledge to other Subjects or Topics**
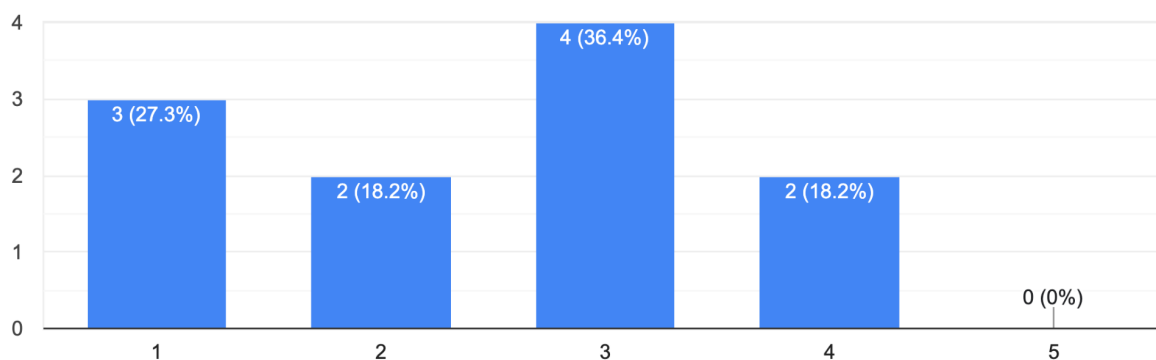11 responses
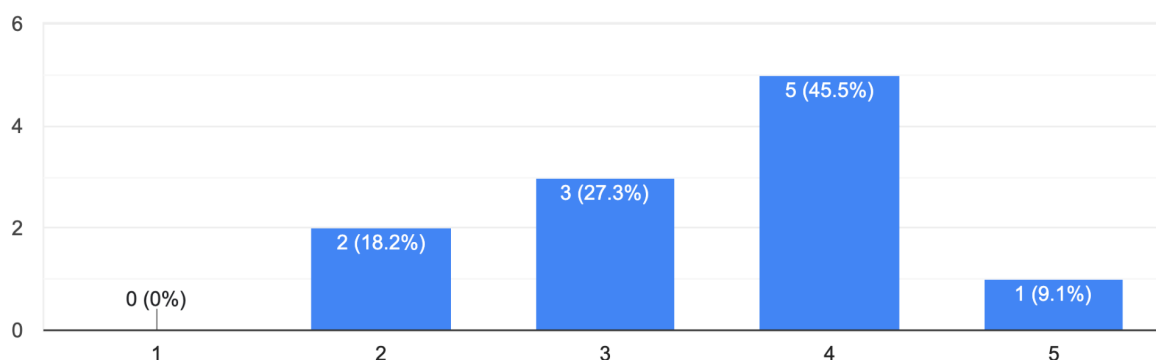


*Mean: 3.5     Median: 4     Mode: 4*

The mean of 3.5 with a median and mode of 4 with no participants identifying themselves as a 1 in guiding students to transfer their knowledge shows that many of the participants see this as an area of strength with six ranking themselves as a 4 or above.

**Guiding students to write their own Generalizations**
11 responses



*Mean: 2.5     Median: 3     Mode: 3*

When guiding students to write their own generalizations, no participants marked themselves as a five, and 9 participants identified as a three or below. The mean of 2.5, with a median and mode of 3, indicates this is an area where teachers need more support.

Guiding Students to Transfer their Knowledge to Real World Situations

11 responses
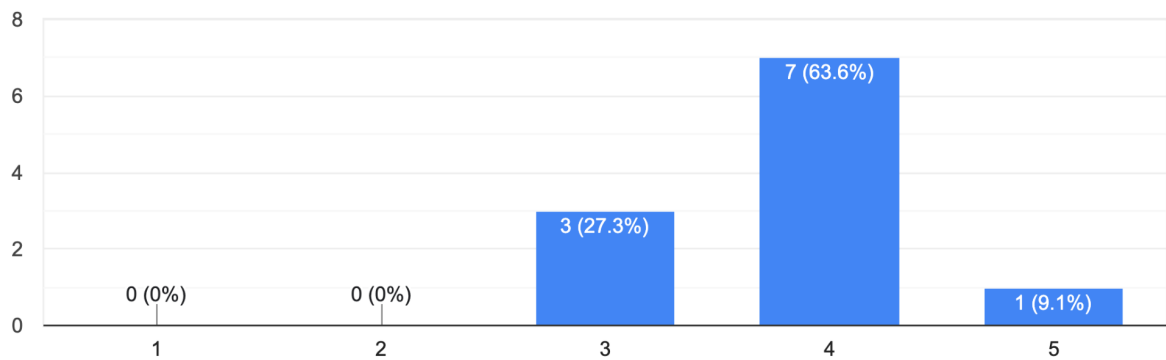


*Mean: 3.8      Median: 4      Mode: 4*

The participants ranked themselves the highest in this area with no reported 1 or 2 scores and a median score of 3.8 with a median and mode of 4.  Eight participants ranked themselves as 4-5 in this area, indicating it is an area of strength.

***Previous Knowledge of Concept-Based Curriculum & Instructional Practices***

## Topics and Facts
11 responses



● Transfer across time, place and situation
● Are locked in time, place, and situation
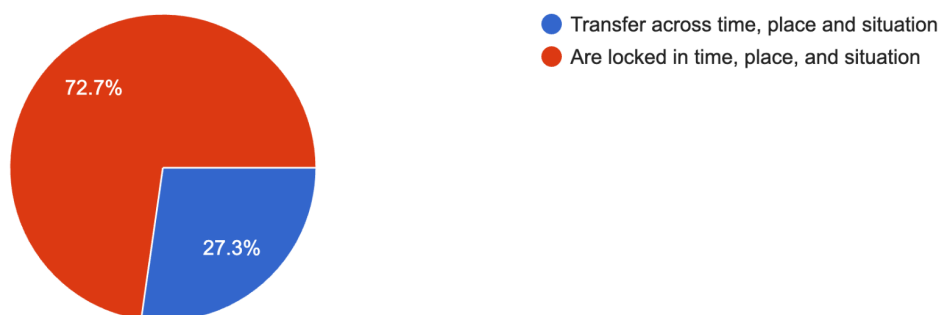
Three participants identified the definition of topics and facts incorrectly in this question with seven providing the correct answer. The correct answer is that they are locked in time, place, and situation.

## Concepts, Generalizations and Principles
11 responses



● Transfer across time, place and situation
● Are locked in time, place, and situation
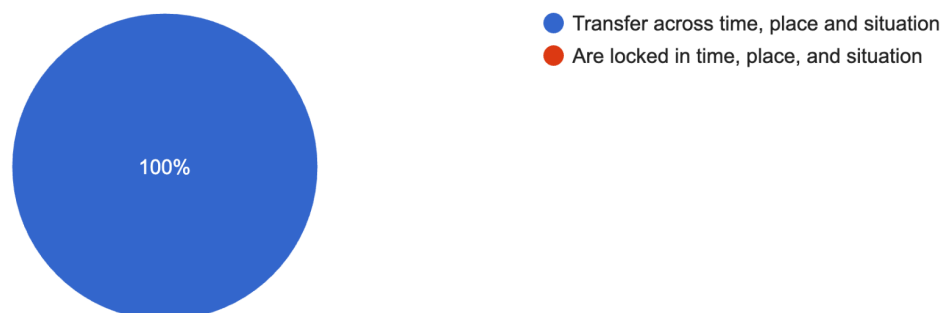
However, all participants identified concepts correctly.  This shows that there are some misconceptions about the difference between concepts, generalizations, and principles vs topics and facts.   This will need to be addressed in the professional development program.
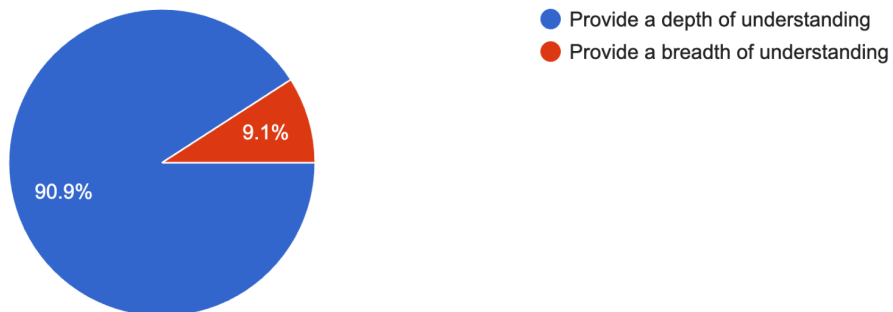
## Macroconcepts

11 responses



- Provide a depth of understanding
- Provide a breadth of understanding
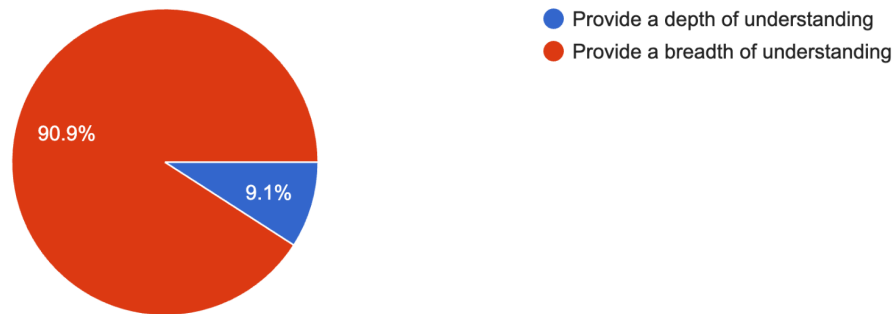
One participant answered this question incorrectly. The correct answer is red: provide a breadth of understanding.

## Microconcepts

11 responses



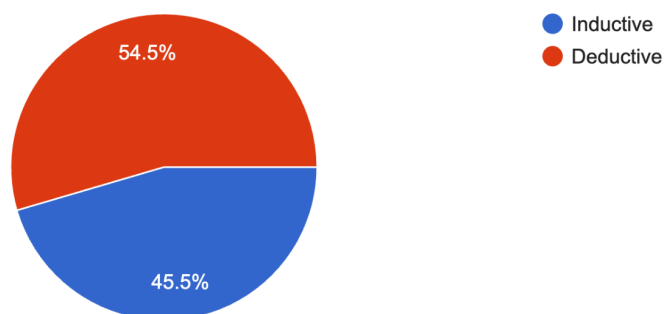- Provide a depth of understanding
- Provide a breadth of understanding

The same participant also answered this question incorrectly and appears to have mixed up the definitions of macro and micro concepts. The correct answer is blue: provide a depth of understanding.
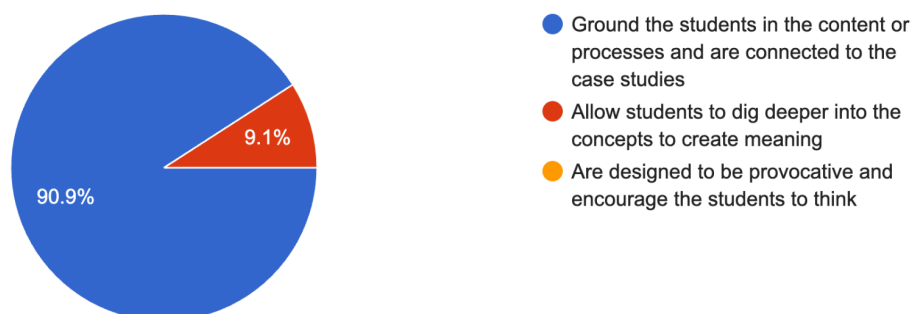
## A concept based curriculum is usually
11 responses



- ● Inductive
- ● Deductive

54.5%

45.5%

The correct answer to this question is blue, inductive. Five participants responded correctly, and six responded incorrectly. This is an area that has been identified as needing to be addressed in the professional development program.
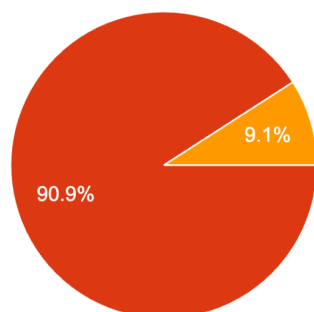
## Factual questions
11 responses



- ● Ground the students in the content or processes and are connected to the case studies
- ● Allow students to dig deeper into the concepts to create meaning
- ● Are designed to be provocative and encourage the students to think

9.1%

90.9%

One participant answered incorrectly with 10 finding the correct answer of blue: ground students in the content or processes and are connected to case studies.
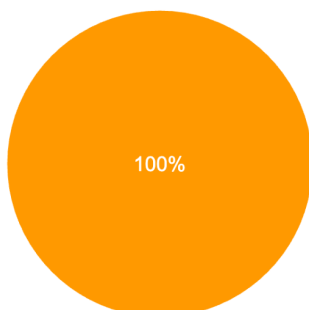
## Conceptual questions

11 responses



- Are designed to be provocative and encourage the students to think
- Allow students to dig deeper into the concepts to create meaning
- Ground the students in the content or processes and are connected to the case studies

9.1%

90.9%

One participant answered this question incorrectly with the correct answer being red where they allow students to dig deeper into the concepts to create meaning.

## Debatable questions

11 responses



- Allow students to dig deeper into the concepts to create meaning
- Ground the students in the content or processes and are connected to the case studies
- Are designed to be provocative and encourage the students to think

100%

All participants correctly answered this question.