

Workshop

Title: Unlocking Understanding: A Journey through Threshold Concepts

Workshop Overview:

This 60-minute workshop will explore the concept of threshold concepts and their transformative role in learning. Participants will engage in interactive activities designed to identify, understand, and apply threshold concepts in their teaching practice. By the end of the workshop, participants will have a deeper understanding of threshold concepts and practical strategies for integrating them into their teaching.

Workshop Agenda:

1. Introduction (5 minutes) (Appendix A)

- Welcome participants and make introductions.
- Provide an overview of the workshop objectives.
- Explanation of threshold concepts and their significance in teaching and learning.

Threshold concepts play a crucial role in teaching and learning by fostering transformative learning experiences, enhancing understanding, integrating knowledge, facilitating the development of expertise, and guiding curriculum design and instruction. By recognizing and prioritizing these key ideas, educators can support students in mastering essential concepts and skills that are foundational to their success in their academic and professional pursuits.

2. Understanding Threshold Concepts (10 minutes)

- Define what constitutes a threshold concept in learning.
 - A threshold concept is a really important idea that, once you understand it, changes the way you think about a subject in a big way. It's like a lightbulb moment that helps everything make more sense.
 - Invite students to reflect on their own experiences with threshold concepts.
 - You are going to compose a comment in the chat, but you will refrain from hitting send until I give you the go ahead.
 - Think back to your own learning experiences, either as a student or as an educator. **Reflect on a time when you encountered a concept that fundamentally changed your understanding of a subject. What were the characteristics of this concept that made it stand out? How did it challenge your existing beliefs or assumptions?**
 - 4-5 minutes to reflect and compose a response in the chat.
 - 4-5 minutes to read

3. Interactive Activity: Identifying Threshold Concepts (15 minutes)

- Divide students into small groups (depending on the number of attendees)

- Add value: Encourage participants to consider the threshold concepts that students may encounter in their discipline. “Based on your experiences, what are some common stumbling blocks or areas of difficulty for learners in your discipline?”

4. Strategies for overcoming threshold concepts (15 minutes)

- Ask question: How can you effectively identify and address these threshold concepts to support student learning?

5. Application and Action Planning (5 minutes)

- Reflection: What insights have participants gained from the workshop?
- Action planning: Setting goals for integrating threshold concepts into participants' teaching practice.
- Closing remarks: Summary of key takeaways and resources for further exploration.

Appendix

Appendix A

What is a Threshold Concept?

A threshold concept is a fundamental idea or concept within a particular discipline or field of study that is transformative, irreversible, integrative, and troublesome for learners. Coined by Jan Meyer and Ray Land, threshold concepts represent key ideas or principles that, once understood, fundamentally change a learner's perspective, enabling them to think and engage with the subject matter in new and deeper ways.

Characteristics of threshold concepts include:

- Transformative: Understanding a threshold concept leads to a significant shift in a learner's perception or understanding of the subject matter, often challenging their prior assumptions or ways of thinking.
- Irreversible: Once learners grasp a threshold concept, it is difficult to unlearn or revert to previous ways of understanding. It becomes an integral part of their conceptual framework.
- Integrative: Threshold concepts often connect disparate elements or ideas within a discipline, providing a cohesive framework for understanding complex phenomena or relationships.
- Troublesome: Threshold concepts are typically challenging and may initially pose difficulties or confusion for learners. They may require significant effort and reflection to grasp fully.

Examples of threshold concepts vary across disciplines but may include concepts such as equilibrium in chemistry, perspective-taking in psychology, or supply and demand in economics.

These concepts are foundational to the discipline and shape the way learners approach and engage with the subject matter.

An Analogy for Explaining Threshold Concept

One analogy for explaining threshold concepts is the concept of opening a locked door.

Imagine that a learner is faced with a locked door, representing a challenging topic or concept within a discipline. They may have some knowledge or understanding of what lies beyond the door, but they cannot fully access or comprehend it until they unlock it by grasping the threshold concept.

The threshold concept acts as the key to unlocking the door. Once the learner understands this fundamental idea, it opens up new pathways of understanding and insight, allowing them to explore the subject matter in greater depth.

Just as unlocking a door requires effort and persistence, grasping a threshold concept may involve grappling with challenging ideas and confronting misconceptions. However, once the threshold concept is understood, it becomes an integral part of the learner's conceptual framework, shaping their future learning and understanding of the discipline.

Examples of Threshold Concepts

Threshold concepts can vary widely across disciplines, but here are some examples to illustrate the concept:

1. **Equilibrium in Chemistry:** Understanding the concept of equilibrium, where the rates of forward and reverse reactions are equal, is a threshold concept in chemistry. Once students grasp this concept, they can comprehend dynamic chemical systems and phenomena such as Le Chatelier's principle and the behavior of acids and bases.
2. **Natural Selection in Biology:** Natural selection, the mechanism by which organisms with advantageous traits are more likely to survive and reproduce, is a threshold concept in biology. Mastery of this concept transforms students' understanding of evolution and biodiversity, allowing them to analyze and interpret biological phenomena through an evolutionary lens.
3. **Supply and Demand in Economics:** The concept of supply and demand, where the quantity of a good or service demanded by consumers intersects with the quantity supplied by producers, is a threshold concept in economics. Understanding supply and demand enables students to analyze market behavior, pricing mechanisms, and the allocation of resources in a market economy.
4. **Perspective-taking in Psychology:** Perspective-taking, the ability to understand and consider others' viewpoints, emotions, and beliefs, is a threshold concept in psychology. Mastery of this concept enhances students' understanding of social interactions, empathy, and communication skills, leading to deeper insights into human behavior and relationships.
5. **Critical Thinking in Philosophy:** Critical thinking, the ability to analyze, evaluate, and construct arguments and evidence-based reasoning, is a threshold concept in philosophy.

Once students grasp this concept, they can engage critically with philosophical texts, evaluate arguments, and construct well-reasoned positions on complex philosophical issues.

These examples highlight how threshold concepts are fundamental ideas or principles within disciplines that, once understood, fundamentally transform learners' understanding and engagement with the subject matter.

In Health and Human Services

In the field of health and human services, several threshold concepts are fundamental to understanding and addressing the complex needs of individuals and communities. Here are some examples:

1. **Biopsychosocial Model:** The biopsychosocial model is a threshold concept that emphasizes the interconnectedness of biological, psychological, and social factors in health and well-being. Mastery of this concept allows practitioners to recognize the multifaceted nature of health issues and develop holistic interventions that address biological, psychological, and social determinants of health.
2. **Health Equity:** Health equity is a threshold concept that focuses on achieving fairness and justice in health outcomes by addressing social determinants of health and eliminating disparities. Mastery of this concept involves recognizing and addressing systemic barriers to health, advocating for policies that promote equity, and ensuring that all individuals have access to the resources and opportunities needed to achieve optimal health.
3. **Person-Centered Care:** Person-centered care is a threshold concept that prioritizes the individual needs, preferences, and goals of clients in health and human services delivery. Mastery of this concept involves engaging clients as active participants in their care, respecting their autonomy and dignity, and tailoring services to meet their unique needs and preferences.
4. **Interprofessional Collaboration:** Interprofessional collaboration is a threshold concept that emphasizes the importance of teamwork and collaboration among diverse health and human services professionals to achieve optimal outcomes for clients. Mastery of this concept involves effective communication, mutual respect, and shared decision-making among interdisciplinary teams to coordinate care and address complex health and social issues.
5. **Evidence-Based Practice:** Evidence-based practice is a threshold concept that involves integrating the best available evidence with clinical expertise and client values and preferences to inform decision-making in health and human services. Mastery of this concept involves critically appraising research evidence, applying findings to practice, and continuously evaluating and improving interventions to ensure effectiveness and quality of care.

These threshold concepts provide practitioners in health and human services with essential frameworks, perspectives, and principles that guide their practice and inform their interactions with clients, communities, and interdisciplinary teams. Mastery of these concepts is integral to promoting health equity, delivering high-quality care, and addressing the diverse needs of individuals and populations in health and human services settings.

Threshold Concepts in Higher Education

In higher education, several threshold concepts are fundamental to understanding and engaging with the complexities of teaching, learning, and academic development. Here are some examples:

1. **Active Learning:** Active learning is a threshold concept that emphasizes student engagement, participation, and critical thinking in the learning process. Mastery of this concept involves designing and facilitating learning experiences that promote active engagement, reflection, and application of knowledge, rather than passive reception of information.
2. **Constructive Alignment:** Constructive alignment is a threshold concept that aligns learning outcomes, assessment tasks, and teaching methods to ensure coherence and effectiveness in course design. Mastery of this concept involves articulating clear learning outcomes, designing authentic assessments that measure desired outcomes, and selecting teaching methods that support students in achieving those outcomes.
3. **Communities of Practice:** Communities of practice are a threshold concept that fosters collaborative learning and professional development among educators and learners within a shared domain of interest. Mastery of this concept involves creating supportive learning communities where participants can engage in meaningful interactions, share expertise, and co-construct knowledge through dialogue and reflection.
4. **Metacognition:** Metacognition is a threshold concept that involves awareness and regulation of one's own learning processes and strategies. Mastery of this concept involves helping students develop metacognitive skills, such as goal-setting, monitoring, and evaluating their learning, which are essential for becoming self-directed and lifelong learners.
5. **Diversity, Equity, and Inclusion:** Diversity, equity, and inclusion are threshold concepts that recognize and value the diverse backgrounds, experiences, and perspectives of students and educators in higher education. Mastery of these concepts involves creating inclusive learning environments, addressing systemic barriers to access and success, and fostering a culture of belonging where all members of the community can thrive.

These threshold concepts provide educators, administrators, and academic developers in higher education with essential frameworks, perspectives, and principles that inform their practice and guide their efforts to promote student learning, engagement, and success. Mastery of these concepts is integral to advancing teaching and learning excellence and fostering a culture of innovation and continuous improvement in higher education institutions.

When Students do not Understand Threshold Concepts

If students do not understand threshold concepts, it can significantly hinder their progress in several ways:

- **Limited Understanding:** Threshold concepts often represent foundational ideas or perspectives within a discipline that are essential for understanding more advanced topics. If students struggle to grasp these key concepts, their understanding of the subject matter may remain superficial or incomplete, limiting their ability to engage with more complex ideas and topics effectively.

- **Difficulty in Applying Knowledge:** Mastery of threshold concepts is often necessary for applying knowledge in real-world contexts or solving complex problems within the discipline. If students lack a deep understanding of these foundational ideas, they may struggle to transfer their knowledge and skills to new situations or contexts, hindering their ability to succeed in academic or professional settings.
- **Barriers to Critical Thinking:** Threshold concepts are often associated with higher-order thinking skills such as analysis, synthesis, and evaluation. If students do not understand these key ideas, they may struggle to think critically about the subject matter, identify patterns or relationships, and evaluate evidence or arguments effectively, limiting their ability to engage in meaningful inquiry and scholarship.
- **Difficulty in Synthesizing Knowledge:** Mastery of threshold concepts involves integrating knowledge from various sources, disciplines, and perspectives to develop a more comprehensive understanding of the subject matter. If students struggle to grasp these foundational ideas, they may have difficulty synthesizing information from different sources or making connections across diverse topics, impeding their ability to develop a holistic understanding of the discipline.
- **Challenges in Problem-Solving:** Many threshold concepts are central to problem-solving and decision-making within a discipline. If students do not understand these key ideas, they may struggle to identify and define problems, develop effective strategies for solving them, or evaluate the potential outcomes of their actions, hindering their ability to succeed in academic or professional contexts where problem-solving skills are essential.

Overall, a lack of understanding of threshold concepts can pose significant barriers to students' progress and success in their academic studies and beyond. It is essential for educators to identify and address these challenges effectively through targeted instruction, support, and scaffolding to ensure that all students have the opportunity to develop a deep and meaningful understanding of the key concepts within their discipline.

How can a teacher effectively identify and address threshold concepts? How can a teacher notice?

A teacher can notice threshold concepts by observing students' reactions, engagement, and understanding during instruction and learning activities. Here are several ways a teacher can identify threshold concepts in the classroom:

1. **Student Responses:** Pay attention to students' responses to new concepts or ideas introduced in the curriculum. Threshold concepts often provoke deep thinking, reflection, and questioning among students. Look for signs of cognitive struggle, such as puzzled expressions, thoughtful questions, or attempts to reconcile new information with prior knowledge.
2. **Misconceptions:** Notice common misconceptions or misunderstandings that students may have about certain topics. Threshold concepts often challenge students' preconceived notions or assumptions about the subject matter, leading to confusion or cognitive

dissonance. Identifying and addressing these misconceptions can help uncover underlying threshold concepts.

3. **Patterns of Understanding:** Observe patterns in students' understanding and progress over time. Threshold concepts typically represent key turning points in students' learning trajectories, marking significant shifts in their understanding of the subject matter. Look for moments when students demonstrate deeper insight, connections, or conceptual breakthroughs that indicate mastery of threshold concepts.
4. **Student Questions:** Listen for the types of questions students ask during discussions, activities, or assessments. Threshold concepts often prompt students to ask probing questions that delve into the underlying principles, assumptions, or implications of the topic. Encourage students to ask "why" and "how" questions that stimulate critical thinking and exploration of key ideas.
5. **Metacognitive Reflection:** Engage students in metacognitive reflection to help them identify and articulate their understanding of key concepts. Ask students to reflect on their learning process, identify moments of conceptual challenge or growth, and explain how their understanding has evolved over time. Encourage them to recognize and discuss threshold concepts they have encountered.
6. **Formative Assessment:** Use formative assessment techniques to gauge students' understanding of threshold concepts throughout the learning process. Incorporate activities such as concept mapping, peer discussion, think-alouds, or written reflections to elicit students' thinking and provide feedback on their progress toward mastering key ideas.

By actively observing students' responses, addressing misconceptions, tracking patterns of understanding, encouraging metacognitive reflection, and using formative assessment strategies, teachers can effectively notice and respond to threshold concepts in the classroom. This awareness enables teachers to tailor instruction, provide targeted support, and create learning experiences that foster deep conceptual understanding and transformative learning for their students.

Origins of Troublesome Knowledge

Origins of Troublesome Knowledge: Understanding why certain concepts become troublesome for students can shed light on effective teaching strategies to address these challenges. Here are several factors contributing to the development of troublesome knowledge among students:

1. **Pre-existing Misconceptions:** Students often enter the classroom with preconceived notions or misconceptions about certain topics. These misconceptions may stem from prior learning experiences, cultural influences, or incomplete understandings of the subject matter. When confronted with new concepts that challenge these misconceptions, students may struggle to reconcile conflicting ideas, leading to confusion and cognitive dissonance.
2. **Complexity and Ambiguity:** Threshold concepts, by their very nature, tend to be complex and multifaceted. They may involve abstract or counterintuitive principles that are difficult for students to grasp initially. Additionally, the ambiguity inherent in some threshold concepts can further complicate students' understanding, as they grapple with uncertain or unclear aspects of the concept.

3. **Cultural Beliefs and Societal Influences:** Students' understanding of certain concepts may be influenced by cultural beliefs, societal norms, and personal experiences. These external factors can shape students' perceptions and interpretations of the subject matter, leading to variations in understanding and potential misunderstandings. Recognizing and addressing cultural differences can help educators support diverse learners in overcoming barriers to understanding.
4. **Differences in Learning Styles and Backgrounds:** Students come to the classroom with diverse learning styles, backgrounds, and cognitive abilities. Some students may excel in certain areas while struggling in others, leading to variations in comprehension and engagement with threshold concepts. Understanding and accommodating these differences through differentiated instruction and targeted support can help mitigate the impact of individual learning preferences and challenges.
5. **Ineffective Teaching Methods:** The way in which concepts are presented and taught can greatly impact students' understanding and retention. Ineffective teaching methods, such as lecturing without opportunities for active engagement, or using overly complex language or instructional materials, can hinder students' ability to grasp threshold concepts. Clear explanations, hands-on activities, and scaffolding techniques are essential for supporting student learning and addressing troublesome knowledge effectively.

By recognizing the origins of troublesome knowledge, educators can implement targeted instructional strategies to support student understanding and promote deeper learning of threshold concepts. This may involve addressing pre-existing misconceptions, simplifying complex ideas, acknowledging cultural influences, accommodating diverse learning needs, and using effective teaching methods to enhance student comprehension and retention.

Supporting Student Navigating Threshold Concepts

Supporting students in navigating threshold concepts requires a multifaceted approach that addresses their cognitive, affective, and metacognitive needs. Here are several strategies to help students successfully traverse threshold concepts:

- **Pre-Assessment:** Before introducing new concepts, assess students' prior knowledge and identify any misconceptions or gaps in understanding. Tailor instruction to address these pre-existing beliefs and provide scaffolding to support students' learning journey.
- **Explicit Instruction:** Provide clear explanations of threshold concepts, breaking down complex ideas into manageable chunks. Use analogies, examples, and real-world applications to make abstract concepts more concrete and relatable for students.
- **Active Learning:** Engage students in active learning experiences that encourage exploration, inquiry, and critical thinking. Incorporate collaborative activities, problem-solving tasks, and discussions to foster deeper engagement with threshold concepts and promote active construction of knowledge.
- **Metacognitive Reflection:** Encourage metacognitive reflection by prompting students to monitor their own learning process, identify areas of difficulty, and develop strategies for overcoming challenges. Teach metacognitive skills such as self-regulation, goal-setting, and self-assessment to empower students as active agents in their learning.

- **Formative Feedback:** Provide timely and constructive feedback to students throughout the learning process. Offer opportunities for formative assessment, peer review, and self-assessment to help students gauge their progress, identify areas for improvement, and refine their understanding of threshold concepts.
- **Differentiated Instruction:** Recognize and accommodate students' diverse learning needs, preferences, and backgrounds. Offer multiple pathways for accessing and engaging with threshold concepts, such as varied instructional materials, flexible learning activities, and personalized support mechanisms.
- **Supportive Learning Environment:** Foster a supportive and inclusive learning environment where students feel safe to take intellectual risks, ask questions, and express their ideas freely. Cultivate a growth mindset and emphasize the value of perseverance, resilience, and effort in overcoming challenges associated with threshold concepts.
- **Integration Across Curriculum:** Integrate threshold concepts into the broader curriculum, connecting them to related concepts and skills across disciplines. Emphasize interdisciplinary connections and real-world applications to help students see the relevance and interconnectedness of their learning experiences.
- **Ongoing Assessment and Revision:** Continuously assess student understanding of threshold concepts and adjust instruction accordingly. Monitor students' progress, provide additional support as needed, and revisit key concepts to reinforce learning and address persistent misconceptions.

By implementing these strategies, educators can empower students to navigate threshold concepts successfully, fostering deep understanding, critical thinking skills, and lifelong learning habits.

Ideas for Incorporating Threshold Concepts into Lesson Plans

Incorporating threshold concepts into lesson plans or curriculum design involves intentionally integrating these key ideas into instructional activities, assessments, and learning experiences. Here are some ideas for incorporating threshold concepts into lesson plans or curriculum design:

1. **Identify Key Threshold Concepts:** Begin by identifying the key threshold concepts within your discipline or subject area. Consult academic literature, curriculum frameworks, and disciplinary standards to determine which concepts are considered fundamental and transformative.
2. **Introduce Threshold Concepts Explicitly:** Introduce threshold concepts explicitly at the beginning of a unit or course, highlighting their significance and relevance to students' learning. Provide clear definitions, examples, and explanations to help students understand the key ideas and their implications for their study of the subject.
3. **Design Engaging Learning Activities:** Design learning activities that explicitly target threshold concepts and engage students in active exploration, inquiry, and problem-solving. Incorporate hands-on activities, group discussions, case studies, simulations, and real-world applications to promote deeper understanding and engagement with threshold concepts.

4. **Embed Threshold Concepts Across the Curriculum:** Embed threshold concepts across the curriculum by integrating them into various subject areas and disciplines. Identify connections between threshold concepts in different subjects and design interdisciplinary learning experiences that highlight these connections.
5. **Use Formative Assessment Techniques:** Use formative assessment techniques to gauge students' understanding of threshold concepts throughout instruction. Incorporate concept mapping, pre-tests, quizzes, exit tickets, and classroom discussions to assess students' progress and identify misconceptions or areas of confusion.
6. **Provide Opportunities for Reflection:** Provide opportunities for students to reflect on their understanding of threshold concepts and make connections between new ideas and their prior knowledge. Encourage metacognitive awareness by asking students to articulate their thinking processes and evaluate their own learning progress.
7. **Differentiate Instruction:** Differentiate instruction to meet the diverse learning needs of students and address specific misconceptions or gaps in understanding related to threshold concepts. Modify instructional materials, activities, and assessments to accommodate different learning styles, preferences, and abilities.
8. **Promote Application and Transfer:** Promote application and transfer of threshold concepts by providing opportunities for students to apply their understanding in authentic contexts and across different problem-solving tasks. Use case studies, projects, and real-world scenarios to demonstrate how threshold concepts are applied in practice.
9. **Foster Collaborative Learning:** Foster collaborative learning environments where students can engage in peer discussions, collaborative problem-solving, and peer teaching related to threshold concepts. Encourage students to explain concepts to each other, share perspectives, and provide feedback to their peers.
10. **Integrate Technology:** Integrate technology tools and resources to enhance students' engagement with threshold concepts. Use multimedia presentations, interactive simulations, online discussions, and digital resources to provide multiple representations of concepts and facilitate active learning experiences.

By incorporating threshold concepts into lesson plans or curriculum design, educators can foster deeper understanding, critical thinking, and transformative learning experiences among their students.

Reading

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