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Title:

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Date:

2017-03-01

Citation:

Frey, N., Fisher, D. & Hattie, J. (2017). Surface, Deep, and Transfer? Considering the Role of Content Literacy Instructional Strategies. *Journal of Adolescent and Adult Literacy*, 60 (5), pp.567-575. <https://doi.org/10.1002/jaal.576>.

Persistent Link:

<https://hdl.handle.net/11343/291407>

Received Date : 02-Nov-2015

Revised Date : 28-Apr-2016

Accepted Date : 29-Apr-2016

Article type : Article

Received Date: 02-Nov-2015

Revised Date: 28-Apr-2016

Accepted Date: 29-Apr-2016

FEATURE ARTICLE

Surface, Deep, and Transfer? Considering the Role of Content Literacy Instructional Strategies

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What if we could improve student learning by aligning content literacy instructional approaches with the kind of learning we expect?

Hattie (2012) noted that 95% of the actions teachers take are effective if the expected growth in student learning is zero. In other words, just about anything teachers do in the classroom will cause some student growth when compared with the absence of action. To address this, a

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1002/jaal.576](https://doi.org/10.1002/jaal.576)

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researcher might conduct a comparison of interventions, and the most effective one may be reported as being statistically significant. Yet, significance only rules out whether the growth might be due to chance.

What teachers really want to know is whether a particular intervention or strategy is sufficiently powerful enough to make a difference with regard to a particular learning outcome. The way to know if this is the case is a statistical tool called effect size. Effect sizes allow for relative comparisons of the magnitude of a given action or influence. More formally, effect sizes are tools that measure the strength of a given intervention or action. Unlike tools that rely on statistical significance, effect sizes are independent of sample size. Effect size measures are used in meta-analyses that summarize the findings from a specific area of research (Lipsey & Wilson, 1993) and are represented in statistical notations as a lowercase, italicized d , as in ($d = 0.40$).

Hattie (2009) reviewed thousands of meta-analyses that represent over 250 million students. He calculated effect sizes for a wide range of teacher actions using Cohen's (1988) standardized difference between two groups. Hattie noted that an effect size of 0.40 equated to approximately one year of learning for a year of schooling. In other words, there are specific actions or influences on students' learning that result in at least a year of learning and those that do not. The list of influences that Hattie identified can be found on the Visible Learning website at visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement.

An interesting case for literacy educators is sentence combining, which is teaching students to integrate information from two or more sentences into one. With an average effect size of 0.15, it is reasonable to suggest that this action would not be very useful for students' learning. To demonstrate the difference between effect size and statistical significance, we can review a study conducted by P. Wilkinson and Patty (1993). They studied 65 students, one class of which received sentence-combining instruction while the other did not. The researchers found statistically significant gains on the Stanford Reading Test and suggested that sentence combining "may have enhanced cohesion knowledge and general comprehension" (p. 104). Statistically, sentence combining was better than a placebo treatment, but we don't know if the instruction resulted in growth in writing performance that was worth the time and effort. Our estimates of the effect size from their study show that the size of the effect is far above the usual average for sentence combining (more like 0.3–0.4). The value of meta-analyses is that they

aggregate individual studies and allow for a more comprehensive view of influences and for a comparison based on effect sizes.

Interestingly, many of the influences on Hattie's (2009) list are widely known content area learning strategies. These instructional routines, at least from an effect size perspective, are worthy of consideration for teaching adolescents.

Deepening the Learning

We believe this has profound implications for instructional planning. Students need experiences that allow them to integrate skills and concepts. As Webb (2005) noted, the depth of knowledge needed for a given task rests on prior levels of knowledge. In other words, for students to complete extended thinking tasks such as interpreting results or analyzing multiple texts (level 4), they have to also be able to recall information (level 1), use skills and concepts (level 2), and engage in strategic thinking (level 3). Thus, it seems that a key to student success is to equip them with the right literacy tools to allow them to move from surface to ever-deepening levels of learning.

Look no further for evidence of attention to deep learning than the content standards that have been developed in this decade. Perhaps best known are the Common Core State Standards for History/Social Studies, Science, and Technical Subjects, which feature reading and writing standards tailored for the discipline-specific demands of these subjects (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The Next Generation Science Standards take the concept of deep learning even further, calling for a reduction in the number of topics being taught, while weaving conceptual threads from kindergarten through high school: disciplinary core ideas, science and engineering practices, and crosscutting concepts that transcend science courses (NGSS Lead States, 2013).

Yet, deep learning doesn't just happen. Students first need time to become familiar with the factual or surface knowledge and principles of the discipline before they can consolidate and expand their knowledge. Biggs (1999) noted that teachers must actively facilitate learning processes from surface to deep to transfer. In this model, the first phase of learning is necessarily at the surface level, as students become acquainted with the knowledge base that will be needed in a unit of study. In this initial phase, students' background knowledge is activated, students pose their own questions, and instructional emphasis is placed on acquiring and consolidating knowledge. We certainly make the distinction that surface knowledge is about the facts, the

vocabulary, and the content, and it is not implying that this is superficial or irrelevant. Surface knowledge is a basic building block for then relating and extending the ideas.

Whereas initial surface-level learning is foundational, the second and third phases are where meaningful and lasting learning occur. In the second phase, student knowledge is deepened by enacting tools and processes that shift the responsibility for learning in measured and intentional ways. Importantly, instructional tools must be matched with this phase of learning. Surface learning requires a focus on acquisition and consolidation, primarily through memorization and rehearsal (Hattie, 2012). In other words, repetition is the name of the game.

However, memorization is woefully inadequate if the learning stops there. Instead, memorization is simply the entry point: You need some basic knowledge about a topic, such as facts and principles, before you can go deeper. In order for students to deepen their knowledge after initial surface learning, they need different tools and processes. They need to interact with content and concepts, figuring out how these fit together. The emphasis in the deep phase of learning is on planning, organization, elaboration, and reflection (Hattie, 2012).

Finally, learning becomes transferable. These are the critical takeaways that mark true learning, as they are under the learner's control whether he or she has been prompted to use them or not. A mathematics teacher will tell you that an example of a transfer skill is when a student can perform mathematical calculations outside of the classroom, such as when figuring out which cell phone data plan is the best choice. English teachers want their students to read critically and write convincingly, and history teachers want their students to consider what has occurred in the past as they read the online news outlets. Once again, the tools and processes differ from those used during surface and deep learning phases. At the transfer phase, learners formulate their own questions, understand how to pursue their own inquiries, and direct their own learning. In essence, they become their own teachers (Hattie, 2012).

Not all strategies are effective across the three phases. For example, problem-based learning has a very low effect size overall. However, when the meta-analyses are examined further, the use of problem-based learning for surface learning is problematic, but the effect size increases significantly when problem-based learning is used for deep learning. We wondered if carefully pairing content area literacy instructional strategies with the phase of learning would deepen students' understanding. We hypothesized that properly aligning content literacy instructional approaches to match students' learning profiles—acquiring information (surface

phase of learning) or thinking metacognitively and reflectively to plan and organize (deep phase of learning)—might result in students who are eventually able to apply new knowledge to dissimilar situations (transfer phase of learning). However, to do so, we needed a starting point to guide our research. We determined that what we first needed was a general learning profile to correspond to the unique literacy demands of each of these phases.

Description of the Study

The intent of this proof-of-concept study was to explore a proposed model for articulating an alignment between content literacy strategies with effect sizes of 0.40 or greater and to further place them within three specific phases of learning: surface, deep, and transfer. A proof-of-concept investigation is designed to demonstrate feasibility (Garfinkel, 2003). These investigations are not controlled studies but rather opportunities to collect and analyze data collection that allows for further, more comprehensive examination. Proof-of-concept studies are common in medicine, especially clinical drug studies, as well as technology and business. Essentially, these investigations allow for the testing of ideas. Weiser (1993) defined proof of concept as “the construction of working prototypes of...sufficient quantity to debug the viability of the systems in everyday use” (p. 75).

For this investigation, Nancy and Doug (first and second authors) shared Hattie’s (2009) list, with the associated effect sizes that related to literacy, and discussed the three phases of learning with eight content area teachers who represented English, life sciences, physical sciences, history, mathematics, and career and technical education. We observed these teachers bimonthly from October through April. We collected field notes for each of the 112 observations, noting the strategies that were used and the phase of learning that most students seemed to exhibit. We interviewed each teacher monthly to ask about implementation successes and challenges. In addition, all teachers were invited to participate in focus groups monthly.

The data were recursively analyzed to generate discussion topics for the focus group meetings and the interviews. We were focused on teachers’ perceptions of the strategies, their usefulness in helping students develop content knowledge, and the appropriateness of placement of strategies in a given phase. Again, this was designed as a proof-of-concept investigation with the goal of refining the model for further study. Therefore, the purpose of this study was to develop a learning profile to align effective content literacy approaches to phases of learning to

begin to answer the question, Which instructional strategies from Hattie's (2009) list are better matched with different phases of literacy learning?

Results

The resultant model of content literacy strategies organizes common, but effective, instructional strategies into the phases of surface, deep, and transfer (see Table 1). We included the effect sizes from Hattie's (2009) review of research for each of these content literacy strategies. In the discussion that follows, we share examples from the classroom teachers in the study.

[COMP: Please insert Table 1.]

Tools for Acquiring Surface Knowledge

As students are introduced to a unit of study, their initial focus is on mastering the extensive vocabulary demands, considering what they already know, asking questions, reading texts about the topic with understanding, and successfully engaging in the discussion and writing required of them. Importantly, learners at the initial stage are more focused on failure and therefore more risk averse (Biggs, 1999). In this early stage of learning, rehearsal, memorization, and repetition are critical. The content area literacy skills used in this phase should mirror the needs of surface-level learning. They include the following:

- *Leveraging prior knowledge*: This is an excellent predictor of subsequent reading comprehension of topical texts (McNamara & Kintsch, 1996) and requires teaching with the intention of building on existing knowledge.
- *Vocabulary techniques*: This constellation of techniques (e.g., concept sorts, mnemonics, word cards) allows students to generalize through definitional understanding, apply through usage, recall a breadth of words and terms, and gain precision through examples and nonexamples, and they become increasingly available to students through discussion and writing (Graves, 1986).
- *Reading comprehension instruction in context* (Moje, Stockdill, Kim, & Kim, 2011): These techniques include linking concepts and arguments internally within a document, annotation of texts, monitoring meaning, interpreting a text, and moving forward and backward within a text to regain meaning when it is lost.

- *Wide reading on the topic under study (Elish-Piper, Wold, & Schwingendorf, 2014):* To deepen student knowledge of a single topic, the teacher curates readings that are directly related to the subject being studied so they can build background knowledge.
- *Summarizing (Guthrie & Klauda, 2014):* Through oral and written channels, this technique gives students practice at coalescing and solidifying new knowledge.

Consider the range of career and technical education courses. Some are more academic in nature, whereas others emphasize practical skills. One such course, Introduction to Health Careers, requires that students understand and can perform basic health care skills such as cardiopulmonary resuscitation (CPR). The vocabulary demand is extensive, and the topic is not initially familiar to students who have not been certified in CPR before. They must learn about the concept of beneficence (the principle of doing something good) as it relates to Good Samaritan laws that protect laypersons who render CPR from lawsuits, so students could analyze several cases in which individuals were sued for acting, or not acting, to save a life. Jesse Ramirez (all names are pseudonyms), one of the health sciences instructors, leverages students' prior knowledge by eliciting examples from them about simple acts of assistance that they have performed or witnessed, such as holding the door open for a parent holding a baby in his arms, or comforting a sports teammate who has been injured on the field. "This opening dialogue gives me the chance to get them thinking about how they are beneficent, as well as causing them to think about when they defer to someone else who is more highly skilled," he said. "Like when a teammate gets hurt, they make way for the trainer to provide the hands-on support, because in this case, the trainer is more skilled than they are," he continued. "It also helps them think about situations so that they are ready to read and respond to their assigned case."

The concepts involved were complex as well, and Mr. Ramirez used vocabulary-building techniques to inspire early success. He used mnemonics to teach the sequence of steps for basic life support when administering CPR. Using CAB as a mnemonic, his students learned to begin compressions, then clear the airway and tilt the head back, and then deliver rescue breaths before repeating the cycle. In addition, he created online flashcards for students to use to rehearse and memorize. "They're learning *defibrillator* and *carotid artery pulse*, plus a lot more," he said. "When there's an emergency, you need to be precise in your language."

His students engage in a lot of technical reading with the manual they use, which gives him a platform for providing reading comprehension instruction in context. Mr. Ramirez isn't a reading educator, but he knows that the technical reading in the class is critical. "When I first started teaching this class, I just assumed that everyone knew how to understand the diagrams," he said.

But I learned pretty quickly that if they missed the details, they might not be able to perform the actions accurately. I showed them how I process the meaning of the diagrams. So, if it's a diagram that shows a physical positioning, like using two-finger compressions on an infant, I show them how I make the same gesture, and ask them to do the same. If there's a reference in the text to look at the diagram for further information, we stop the reading and spend time hanging out and discussing what the diagram means.

To rapidly build their knowledge, he has them read a number of short scenarios that involve heart attacks, near drownings, and traumatic injuries.

My goal at the beginning is to get them immersed in the subject so that they can make those early connections between what they're learning and how it is used. Learning how to perform CPR is an early skill in our health services course, but it's a great foundation for what will follow.

Knowing that early learning can be fleeting, Mr. Ramirez has students regularly engage in summarizing their knowledge. In many cases, these are written summaries, although he also asks them to summarize orally. The act of summarizing provides them with additional chances to rehearse new knowledge and refine their use of technical vocabulary. Nearly every class meeting ends with an exit slip, giving his students a chance to formalize their learning through writing:

It's valuable for me because I get to see what they know and are still confused about. That way, I know what needs to be retaught. But I'm also seeing how writing things down is good for them, too. They're tying ideas together.

Tools to Deepen Learning

As students master some of the foundational knowledge associated with a topic of study, they are ready to deepen their knowledge. Teachers have to plan differentiated instruction when some students are ready and others are not. The teacher's role shifts as well. Whereas surface-level knowledge requires more direct instruction, as students deepen their knowledge, the teacher does

more extensive facilitation. Yet, in order for students to deepen their learning, they need opportunities to engage in planning, organization, elaboration, and reflection of conceptual knowledge. These are some content literacy approaches that foster deeper learning:

- *Concept mapping (Moore & Readence, 1984)*: As an intermediate step toward the production of written and oral presentations of knowledge, concept maps and graphic organizers give learners a tool for planning and organizing information for the purposes of elaboration.
- *Discussion and questioning (I.A.G. Wilkinson & Nelson, 2013)*: Students can more fully explore ideas in the company of peers and the teacher. By this, we do not mean teacher interrogation of learner knowledge but rather true discourse that occurs when people wrestle with abstract ideas.
- *Reciprocal teaching (Palincsar & Brown, 1984)*: This is a technique for reading and discussing complex texts within a student-directed group of four. The text is segmented into smaller passages, and the students pause after reading each passage to discuss questions they have, seek clarification on ambiguous material, summarize key ideas, and offer predictions about the next passage, given the information provided thus far.
- *Metacognitive strategies (Flavell, 1979)*: They build the habits of self-reflection and self-monitoring. Students who are deepening their learning are investigating and researching topics and issues. As they plan, organize, and elaborate on what they are learning, they need methods for checking in on their own progress to formulate their next steps.

Notice that the content literacy instructional approaches at the deep phase of learning are quite different from those discussed at the surface level. Although we regard these as vital to learning, based on our own teaching and our observations of teachers in this study, we believe they are sometimes prematurely rolled out when students are still gaining foundational knowledge. In fact, to participate in discussions and reciprocal teaching, readers need to know some things about the subject being studied. Concept maps are another case in point. More often, we see them being used when the knowledge is still new. In fact, students are usually filling out, rather than generating, the content. Although graphical organization of concepts can support the

development of an initial schema, our focus on concept maps is when students are creating them on their own to plan.

One tool to deepen learning was used in Ashlee Roberson's Biology course. Students had been studying the use of growth models to predict how the populations of other species decline, maintain, or expand. Earlier in the unit, Ms. Roberson introduced them to quantitative displays of data, especially in looking at graphs that represent exponential growth (a *J*-curve) as represented through cell division. Students were also introduced to the concept of limiting factors that curb population growth in most species. This is an example of logistical growth, and it represented as an *S*-curve. "These graphs were important for them to understand, as they were also learning about functions in their math classes," said the teacher. "So, already there was some nice synergy there."

As students gained the foundational knowledge needed about graphs, as well as population modeling, she prepared to deepen their learning about the topic of study. Using reciprocal teaching, students collaboratively read and discussed two informational articles about how population growth modeling is used to monitor and make predictions about endangered species. According to Ms. Roberson,

In past years, I would assign these readings to be done independently. I even have assigned these readings earlier in the unit, but then I usually have to explain a lot more. Now I realize that students need some surface knowledge to make the connections. These readings expanded their understanding of how these population techniques are used by scientists. The concept of carrying capacity in an ecosystem is critical, and the articles and discussions helped them see how fragile the balance really is.

Ms. Roberson then turned her students' attention to gather facts on other threatened species, and students worked in pairs to plan how they would proceed. "This isn't a full-blown investigation yet," explained Ms. Roberson. "Right now, they are gathering information to be used later." For example, Kendra and Jamal agreed to find out about the shrinking Great Barrier Reef to later explore the relationships among carrying capacity, limiting factors, and growth modeling used to make predictions about the future of a species, the clownfish.

"We picked it at first because we both liked *Finding Nemo*," said Kendra later. "But I was shocked by what we learned." Using the outline set forth by their teacher, the two students

began by developing a concept map to record what they already knew: “Mostly the stuff Ms. Roberson taught us, like the graphs,” said Jamal. At Kendra’s suggestion, they included a section of the concept map devoted to their questions. “These helped a lot when it came time to do the online research,” Jamal said. Concept maps are one tool that has been used at a variety of different phases of instruction. The teachers in this investigation decided to use them for students to dig deeper. As Ms. Roberson said,

When I used a concept map at the beginning of the unit, it seemed to require more of my support. Sometimes they were just copying me and filling out the tool. At this phase, I don’t give them a specific graphic organizer. They have to think about the information and the best way to organize it. It pushes their understanding deeper, so I think it really belongs in the category most of the time.

As Jamal and Kendra began learning about the Great Barrier Reef, they discovered that one major threat had to do with rising ocean temperatures. Through their investigation, they learned that the clownfish has a symbiotic relationship with the sea anemone. At the end of the class period, the biology teacher had students briefly report on the status of their research and field questions from others about possible routes for investigation. In addition, she posted an interim check-in reflection for students to address through the digital learning management system. “These questioning and reflection check-ins are really just causing metacognition,” explained the teacher. “When they’re in the throes of learning more about their species, it’s helpful to listen to themselves as they consider their responses,” she said. “I see lightbulbs going off when they realize they’re coming up with their own solutions.”

After two class periods dedicated to finding out about their species, students were ready for additional instruction. “They are starting to hit some dilemmas that they don’t know how to address,” said the teacher.

I host a discussion with the entire class, and we settle on what they need to learn about next to fill in the gaps. Mostly, they realize that they thought they understood how to utilize the information they have learned to develop a growth model, but now it’s getting more complicated. When I return to this topic tomorrow, they’ll be much more intentional about their questions. This is when I see the momentum start to pick up again.

Tools That Foster Transfer

No student, no matter how dedicated, is going to recall everything that he or she has ever been taught. True and lasting learning is evidenced in students' ability to synthesize and extend conceptual knowledge such that they can see associations and patterns across seemingly dissimilar content. For example, Ms. Roberson, the biology teacher in the previous passage, anticipated that her students would eventually see the relationship between evaluating a function given a graph in mathematics and the variables that effect populations of species. Years later, her students may need to familiarize themselves again with the details of finding a function mathematically. Yet, what has transferred is a fundamental understanding that there is a relationship between input and output and that increasing or decreasing one is going to affect the other. These transfer skills are what ultimately spur a learner into becoming his or her own teacher. He or she sees relationships and possesses the skills, processes, dispositions, and metacognitive awareness to become a self-directed learner.

None of this is left to chance, of course. Teaching for transfer requires the same kind of intentionality that we bring to surface and deep learning. In this phase, students need opportunities to encounter increasingly disparate and even contradictory information so they can wrestle with ambiguities. They need formal times to engage with peers for extended discourse about what they know and to listen to the ideas of others, especially those who do not agree with them. Students at the transfer learning phase benefit from time to engage in inquiry and investigation (a problem-solving teaching) as they explore a problem and propose solutions. Much of this is expressed through formal and extended composition that mirrors the way information is represented in the discipline.

The more students can evaluate the similarities and differences in the problem or task before they begin the task, the more likely the transfer. When students compare and contrast the differences in tasks previously completed and new tasks, they are likely to transfer.

- Reading across documents provides students with the chance to formulate reasoned conclusions across disparate information as they engage in a series of mental representations that move from understanding texts singly to formulating conclusions drawn from multiple pieces (Perfetti, Rouet, & Britt, 1999). Students focus on the content of a single text and then move to sourcing and contextualizing. They repeat this process with a second piece of text, including rereading and discussion. Now questions are used

to guide student thinking about intertextual processes. Are the documents in agreement with each other? How do they differ? Does the information from one corroborate or expand on the information of the other? Moving forward, students are challenged to form an integrated mental model in which they must decide what information must be discounted or ignored, what information overlaps and is therefore corroborated, and what is unique but credible.

- Problem-solving teaching is driven by learners who possess adequate levels of knowledge such that they can engage in inquiry. To teach inquiry in the absence of knowledge is ineffective, which is why conventional problem-based teaching is ineffective during the surface learning phase ($d = 0.15$). However, its effectiveness increases considerably when students use inquiry in authentic ways because they know something about the topic of investigation.
- Debate and Socratic seminars allow students to discuss texts, explore abstract ideas, and engage in critical inquiry in the presence of peers. As with the other content literacy instructional routines in this section, debate and Socratic seminars are driven by students who possess considerable knowledge about the topic and are seeking not only to understand but also to link knowledge within and across bases.
- Extended composition in the disciplines gives students a forum for representing their formal reasoning, engaging in formal argumentation, and critiquing ideas and events.

As an example of teaching for transfer, the sixth-grade students in Aaron Wisniewski's Ancient History class have been studying the development of Mesopotamia and its contributions to human civilization. They have learned about the emergence of written language and early kingdoms in the region, as well as the many wars and conflicts that occurred during that time. Mr. Wisniewski wants them to come away from this unit with a deep understanding of Hammurabi's Code and its lasting contributions to the order of law even today. Therefore, his students are exploring a unit of study on laws in the ancient world. "The social studies teachers at our school repeatedly return to this major concept as they move through the next three years," he explained. "It is going to show up again next year when they encounter the Magna Carta, as well as the founding documents of some of the world's modern democracies." During this unit, they have read across documents to compare Hammurabi's Code with principles of ancient Greek and

Roman laws and have developed concept maps to visualize the similarities and differences between the two. Later that week, the entire class engaged in a Socratic seminar to discuss the strengths and limitations of each, making further notes about them. As part of their extended writing, they worked in small groups to develop scenarios explaining how a crime, such as stealing money from a landowner, would be addressed under the three different rules of law. “I’m interested in where they take this,” explained Mr. Wisniewski.

They’ll each meet with me to propose an investigation that takes us into our next unit of study. We’re going to be examining the Samurai code in ancient Japan. I want them to examine a completely different set of laws occurring in a different part of the world. My transfer goal of them is to understand that the laws of a society directly influence the way the people in that society live.

When the teachers in this study engaged in conversations about surface, deep, and transfer learning and then tried out specific instructional routines designed to guide students’ learning in that phase, they reported increased student engagement and learning. It seems that the phase model for learning provides teachers with a goal, a new end point that they could use to organize learning experiences.

Conclusion

We aren’t suggesting a discrete stage model, where one day students are taught at the surface level of learning and the next are wholly at the deep level. Rather, students’ ebb and flow between surface and deep learning should be seen as more fluid and organic. It’s really about matching the right instructional routine with the needs of learners (Fisher, Frey, & Hattie, 2016). Deep learning tools aren’t very effective in helping students acquire surface-level learning any more than effective surface-level instruction automatically develops transfer. We want to emphasize that surface-level learning is valuable and important. In fact, we believe that it’s very difficult to develop deep knowledge or transfer skills without surface-level learning. If the right instructional approaches are not used, surface-level learning fails to occur, and students are unable to engage in deeper learning, often frustrating their teachers. If teachers never engage students in deeper learning, then students are at risk for being exposed to the same information over and over, year after year.

In understanding the cognition and metacognition that learners must engage in at each phase of learning, teachers can more ably match content literacy instructional routines to the skills, strategies, and processes students need to master. By equipping students with literacy tools that address their learning needs, teachers in turn teach them how to become increasingly self-directed as they learn on their own, thereby becoming their own teachers. To that end, we have attempted to organize common content area literacy strategies into phases that teachers can use to leverage their impact. This model is based on a proof-of-concept investigation and represents a first step in the conversation that should occur regarding content literacy skills that all students need to develop.

TAKE ACTION!

1. Focus on instructional routines that have a documented impact on student learning, and discontinue using ones that have limited impact. To do so, engage in professional learning about surface, deep, and transfer learning, as well as the appropriateness of strategies for each phase of learning.
2. Determine which phase of learning your students are in. Typically, they are learning at the surface level early in a unit of study and move to deeper learning throughout the unit.
3. Align instructional routines with the appropriate phase. If students aren't getting to deeper learning, consider the instructional approaches that could get them there.
4. Identify transfer goals—three to five expectations that students should master over the course of the year. Align instructional approaches to ensure that students have opportunities to develop their transfer knowledge.

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MORE TO EXPLORE

- Take a look at the effect sizes that Hattie (2012) found for effective actions teachers can take.
- Explore transfer goals: McTighe, J. (2014). *Transfer goals*. Retrieved from jaymctighe.com/wordpress/wp-content/uploads/2013/04/Long-term-Transfer-Goals.pdf
- Compare and contrast surface and deep learning: Atherton, J.S. (2013). *Learning and teaching: Deep and surface learning*. Retrieved from www.learningandteaching.info/learning/deepsurf.htm
- Try the “Using Disciplinary Facets to Deepen Academic Vocabulary Knowledge” lesson plan by Scott Filkins: www.readwritethink.org/professional-development/strategy-guides/using-disciplinary-facets-deepen-31163.html

[COMP: Please hang turnovers in the lists.]

Table 1

A phase-driven learning profile of content literacy instructional routines

Learning phase	Definition	Driving question	Processes	Content literacy routines and effect size (<i>d</i>) from Hattie ^a
Surface	Acquisition and consolidation of initial knowledge base	What are the key facts and principles?	Rehearsal, memorization, and repetition	<ul style="list-style-type: none"> • Leveraging prior knowledge (<i>d</i> = 0.67) • Vocabulary techniques (e.g., sorts, word cards, mnemonics; <i>d</i> = 0.67) • Reading comprehension in context (<i>d</i> = 0.60) • Wide reading on the topic under study (<i>d</i> = 0.42) • Summarizing (<i>d</i> = 0.59)
Deep	Interaction with skills and concepts	How do these facts and principles fit together?	Planning, organization, elaboration, and reflection	<ul style="list-style-type: none"> • Concept mapping (<i>d</i> = 0.60) • Discussion and questioning (<i>d</i> = 0.82) • Reciprocal teaching (<i>d</i> = 0.74) • Metacognitive strategies (<i>d</i> = 0.69)
Transfer	Organizing, synthesizing, and extending conceptual knowledge	How and when do I use this for my own purposes?	Making associations across knowledge bases and application to novel situations	<ul style="list-style-type: none"> • Reading across documents to conceptually organize (<i>d</i> = 0.85) • Problem-solving teaching (<i>d</i> = 0.61) • Formal discussion (e.g., debate, Socratic seminar; <i>d</i> = 0.82) • Extended writing (<i>d</i> = 0.43)

^aHattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York, NY: Routledge.