Moving Beyond Knowledge: Fostering Conceptual Understanding in Student Learning
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In education, there is a significant distinction between knowledge and conceptual understanding. Both are crucial for learning, yet they differ in shaping a student's ability to process, apply, and retain information (Chi, 2009). Knowledge refers to accumulating facts, definitions, and information within a domain, while conceptual understanding involves a deeper grasp of relationships between facts and ideas, enabling students to organize and connect information within a broader framework (Kirschner et al., 2006; Wiggins & McTighe, 2007). This distinction is critical in education because knowledge alone may not be sufficient for students to effectively apply what they have learned in novel or complex situations (Chi, 2009).

Bridging Knowledge and Conceptual Understanding in Real-World Contexts

As an educator in radiologic technology, I aim to foster both knowledge and conceptual understanding in my students. This approach is essential for preparing them to succeed in real-world applications where they must synthesize information, think critically, and adapt to various scenarios. In fields such as radiologic technology, students need more than technical expertise—they must also understand the principles underlying image acquisition, exposure, and patient care. Conceptual understanding enables them to make informed decisions and solve problems effectively within clinical settings.

Active Learning Strategies

Active learning emphasizes the learner's role in constructing knowledge, often through interactive and participatory methods (Freeman et al., 2014). In my teaching, I have found that incorporating active learning strategies such as collaborative, problem-based, and reflective learning, encourage students' active participation and helps them to connect theoretical knowledge with practical application, fostering a deeper conceptual understanding. Below, I discuss some of the active learning strategies I use in teaching my radiologic technology courses and the methods I employ to evaluate their effectiveness.

1. *Collaborative Learning*

In collaborative learning, students tackle problems or explore topics together, promoting diverse perspectives (Johnson et al., 2007). For example, in my radiology classroom, students analyze case studies or critique sample images in groups, allowing them to articulate their knowledge, confront misunderstandings, and refine their understanding.

To assess collaborative learning, I use observation checklists to evaluate group interactions, focusing on factors such as participation, communication, and problem-solving. I also incorporate peer evaluation forms, where students assess each other's contributions. This dual-layered assessment ensures that group dynamics are productive and individual accountability is maintained. In addition, I conduct in-person meetings with each group to assess their collaborative learning. During these one-to-group sessions, I clarify concepts, answer questions, and evaluate the group's progress. These sessions provide a valuable opportunity to observe how students work together in real time, address any challenges they may encounter, and offer guidance to enhance their understanding. By integrating these strategies, I create a supportive environment that fosters collaboration and helps students deepen their understanding of key concepts, make connections between ideas, and apply their knowledge effectively, thereby achieving conceptual growth.

2. Problem-Based Learning (PBL)

Problem-based learning (PBL) engages students with real-world challenges that demand critical thinking and applying knowledge (Hmelo-Silver, 2004). PBL encourages students to actively engage with content, drawing on prior knowledge and new information to address challenges (Hmelo-Silver, 2004). For instance, clinical scenarios in my classroom require students to determine appropriate imaging techniques or adjust exposure settings based on patient needs or pathological conditions, bridging theoretical knowledge and practical application.

To assess PBL activities, I use a direct, interactive approach to present students with problems and observe their reasoning as they propose solutions. During these sessions, I provide guidance, ask probing questions to challenge their thought processes and clarify concepts as needed. This hands-on method allows me to assess their critical thinking and understanding in real time while reinforcing connections between theory and practice. Additionally, I incorporate mini-quizzes and reviews to evaluate students' comprehension of key concepts and their ability to apply them to similar problems. These assessments help identify areas where students may need further support and ensures they build the skills necessary for clinical decision-making.

3. Reflective Practice

Reflection allows students to integrate new insights with prior knowledge and evaluate how their learning aligns with professional standards (Kolb & Kolb, 2005). Encouraging reflective practice deepens students' understanding by prompting them to think about the relevance of concepts to their future professional roles (Kolb & Kolb, 2005). For example, in my radiology courses, I ask students to write and document their reflections on their progress and development in areas such as technical factor selection and radiation safety practices. These assignments also prompt students to evaluate the work culture at their clinical sites, helping them identify how their experiences align with professional expectations and standards.

To assess reflective practice, I review these written reflections to evaluate the depth of their insights, their connections to prior learning, and their ability to identify areas for growth. While I do not use formal rubrics, I provide personalized feedback that highlights strengths, addresses areas for improvement, and encourages deeper critical thinking. This feedback reinforces the importance of reflection, as a tool for self-awareness and professional growth, making the process more meaningful and impactful for students.

Conclusion

Fostering knowledge and conceptual understanding is essential for preparing students to excel in professional settings. From an assessment perspective, it is crucial to design evaluations beyond rote memorization, focusing instead on measuring students' ability to connect, apply, and extend what they have learned. By incorporating active learning strategies, such as collaboration, problem-solving, and reflection, into my teaching practice, I encourage students to engage deeply with the material and develop skills that support meaningful, long-term learning.

Through assessment practices that include direct observation, one-to-group meetings, interactive questioning, and personalized feedback, I ensure that students are evaluated on their performance and supported in their learning journey. Likewise, these approaches empower students to take ownership of their education, helping them connect theoretical knowledge with real-world applications. As educators, our role is to create environments where students feel challenged, supported, and inspired to grow.

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Information Literacy Assessment
Raymond Galinski, Dean, Office of Institutional Effectiveness

Information literacy (IL) is one of several competencies identified by BCC's Academic Assessment Council as being a critical component of the college's General Education (Pathways) curriculum. The council defined IL as "the ability to know when there is a need for information, to be able to identify, locate, and effectively use and share that information for the problem at hand."

In fall 2024, the college's first systematic, organized assessment of IL was conducted using artifacts gathered from courses in the Biological Sciences, History, and Social Sciences departments. Students enrolled in sections selected by the department's chair and assessment coordinator were randomly chosen mid-way through the semester. At the end of the semester, artifacts from these students were submitted by instructors to the Office of Institutional Effectiveness which anonymized the documents. Eight faculty raters, using a rubric designed by the council, scored the artifacts. A total of 160 documents were reviewed: 17 from Biological Sciences, 80 from History, and 63 from Social Sciences.

Results

The average total score across all four criteria was 10.7 (*SD*=3.9) out of a maximum potential score of 16. This places the average level of achievement between rubric's "Achieving" level (Level 2), and "Competent" level (Level 3). Figure 1 below displays the distribution of scores for all 160 artifacts. Each bar in the figure represents the percentage of students who achieved the total score indicated by the number on the x-axis.
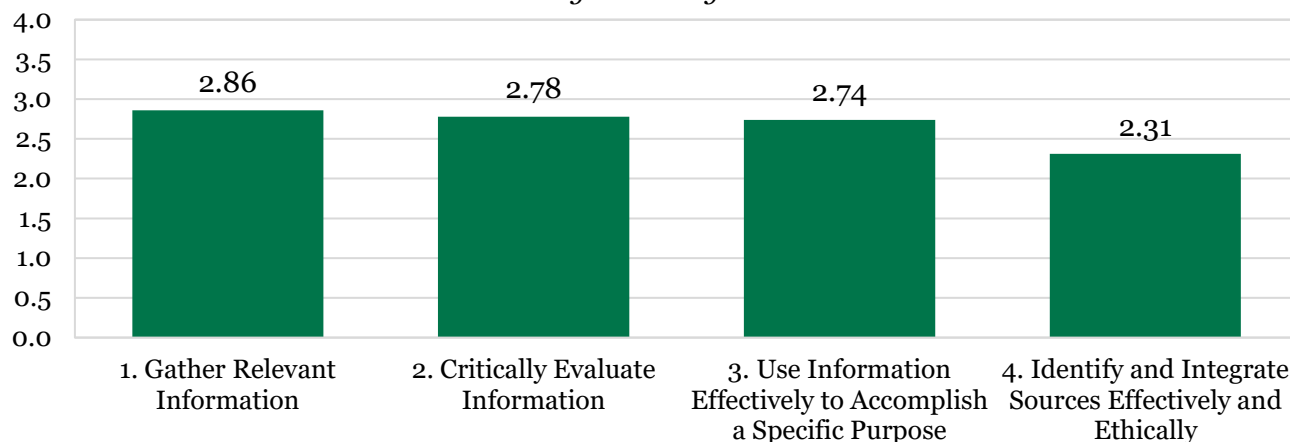
Figure 1
Distibution of Scores (%)
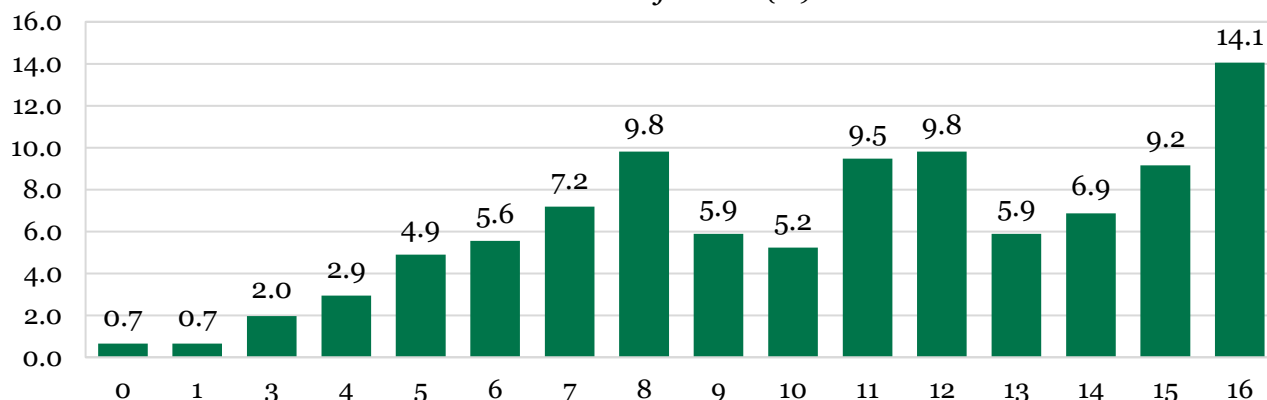
Average Scores by Criteria

Figure 2 displays the average score for each criterion on the rubric. Students scored highest on the first criterion, 'Gather Relevant Information' (2.86), followed closely by 'Critically Evaluate Information' (2.78), and 'Use Information Effectively to Accomplish a Specific Purpose' (2.74). Averages for these criteria were near the "Competent" level (Level 3) on the rubric. Students had more difficulty with 'Identify and Integrate Sources Effectively and Ethically' (2.31).

Figure 2
Average Score by Criteria

Students enrolled in Biology courses outperformed their History and Social Sciences counterparts on all four criteria (Figure 3). Performance in Social Sciences courses was noticeably weaker, particular related to Criterion 4: Identify and Integrate Sources Effectively and Ethically.

Figure 3
Average Score by Criteria and Discipline
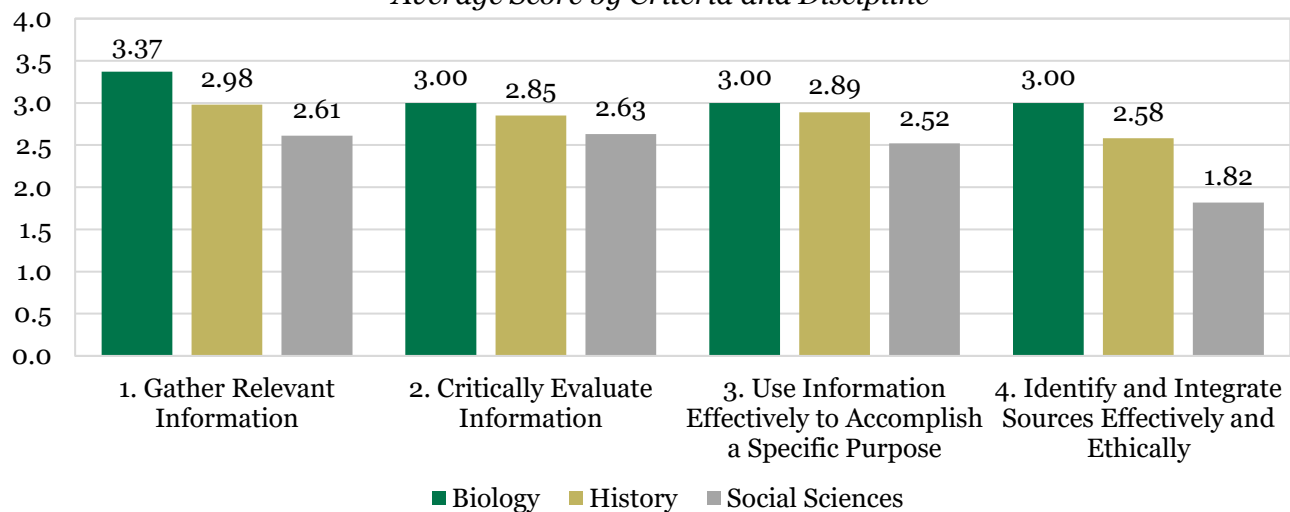
Initial Discussion and Next Steps

Preliminary results from the assessment were shared with the Academic Assessment Council at its December 2024 meeting. Among initial observations of the council's members, which also included several IL raters, were that in many cases, assignment prompts did not elicit the responses needed to sufficiently assess information literacy. For example, some of the assignments did not require the writers to cite sources, which made it difficult for raters to score students on the last criterion. Moreover, the types of assignments used to assess information literacy varied widely. In some cases, the assignments were short discussion board posts, while in other classes instructors required lengthy essays. Again, this made it challenging for the raters to assess students' work consistently.

Other observations centered around the use of artificial intelligence (AI) in aiding students with their writing. The use of AI tools like ChatGPT is increasingly common in academia, making it challenging to determine the authenticity of students' work. For example, AI tools sometimes create "phantom" references that appear to be accurate, but upon close inspection, are erroneous or non-existent.

The council agreed to revisit the results of the assessment at its February 2025 meeting. Members also suggested sharing the results with academic department chairs. The Academic Assessment Council plans to invite several chairs to its first meeting in 2025 to discuss the implications of the results and to develop new strategies for addressing information literacy.

Active Learning as an Element of Formative Assessment
Mervan Agovic, Associate Professor, Department of Biological Sciences

Formative assessment is crucial for effective teaching and learning. It helps educators identify misconceptions or areas where students need additional support, allowing them to adapt instruction accordingly. Unlike summative assessment, which evaluates learning at the end of an instructional unit, formative assessment occurs during the learning process to monitor progress, provide feedback, and guide teaching in real-time.

Active learning offers one of the most effective ways to implement formative assessment. This approach transforms assessment from a simple evaluation tool into a dynamic process that fosters student engagement, critical thinking, problem-solving, and continuous improvement. Instructors can incorporate various active learning methods into formative assessment, including interactive questioning and discussion, collaborative activities, technology-enhanced implements, reflective practices, and simulations. These active learning methods adapt well to online teaching. For instance, instructors can use BrightSpace Discussions for interactive questioning that encourages critical thinking. Digital learning tools like McGraw-Hill Connect provide a reading library (digital textbook) and self-assessment capabilities, allowing students to track their progress while enabling instructors to collect data on student understanding and adjust their teaching accordingly.

Active learning particularly benefits English language learners, who often feel isolated in traditional learning environments. Traditional science teaching—which typically relies on lecture-based fact delivery and extensive specialized vocabulary—frequently results in poor content retention, underdeveloped scientific skills, and difficulty applying concepts. I compared traditional teaching methods with active learning worksheets in an Anatomy & Physiology course in a recent multi-semester study. The results showed that students using active learning worksheets achieved higher pass rates and more C+ grades or above. These students also reported greater enjoyment and perceived learning. This improvement demonstrates how active learning enhances student engagement, comprehension, and academic success in this challenging course.

Active learning worksheets, while not a new concept, play a vital role in formative assessment. Here's how they work: After a brief lecture on key concepts, students collaborate in small groups with a set time to complete an activity aligned with student learning outcomes. The instructor then leads a class review, encouraging students to share their answers while identifying misconceptions. Rather than penalizing student errors, these mistakes serve as valuable learning opportunities, allowing instructors to address misunderstandings while the material is still fresh in students' minds.

In summary, formative assessment is essential for improving student learning. Combined with active learning strategies, it creates a more engaging and effective learning environment. While active learning presents some challenges—particularly in instructor preparation—the outcomes are well worth the effort.

Further reading:

Agovic, M.S. (2024). An Assessment of the Active Learning Worksheets in an Undergraduate Human Anatomy and Physiology Course. *HETS Online Journal*.

Preparing for BCC's Re-Accreditation: Middle States Self-Study Process

Raymond Galinski, Dean, Office of Institutional Effectiveness

BCC started its Middle States Commission on Higher Education (MSCHE) re-accreditation process this fall. This comprehensive two-year process will culminate in an on-site peer evaluation visit in spring 2027. To reach this important milestone, the college will undertake a thorough self-study where we will assess our educational quality, evaluate how well we are fulfilling our mission, identify areas for growth, and gather evidence to prove that we are meeting the Commission's rigorous quality standards.

IMPORTANT DATES

2024-25

- Steering Committee formed
- Working Groups organized
- Self-Study Design due
- MSCHE Liaison visit
- BCC's MSCHE web page launch

2025-26

- College-wide kick-off
- Steering Committee and working groups meet regularly
- Evidence gathering
- Working-group draft reports due

2026-27

- Self-study draft written and circulated
- College-wide town-halls
- Self-study report submitted
- Three-day peer evaluation visit
- MSCHE Re-accreditation decision announced

In November, the college took the first step in this process by appointing a Self-study Steering Committee. The committee, comprised of faculty and staff, is co-chaired by Seher Atamturktur and Sahidha Odige and will be supported by Raymond Galinski. The Committee will be responsible for overseeing the work and progress of seven working groups, one for each of the MSCHE standards. Working groups are led by two co-chairs – one faculty member and one staff member. An invitation to participate in a working group will be sent to the college community in February. In addition to demonstrating compliance with MSCHE's standards, the working groups will assess BCC's strengths and weaknesses, recommend areas for improvement and innovation, and produce a draft report of their findings.

In spring 2025 the college will submit our self-study design to MSCHE, which will serve as a blueprint for the self-study process over the next two years. This submission will be followed by a site visit by our MSCHE liaison in March, who will meet with the Steering Committee, executive staff, faculty, and staff to review the design and further explain the accreditation process.

Beginning next fall, our self-study work will be in full swing. Throughout the 2025-26 academic year, the Steering Committee and working groups will meet regularly to gather evidence, identify gaps, reflect on our progress, and draft reports related to each of the seven standards. This work will be supplemented by an evidence and compliance committee whose role will be to collect and organize relevant documents, policies, and other critical information that will serve as evidence for each of the seven MSCHE standards.

The self-study process will culminate in 2026-27. In fall 2026, input from the college community will be solicited before the final report is submitted to the Commission for review in February 2027. In March or April of the spring 2027 semester, a team of peer reviewers will visit the campus for three days to interview key stakeholder groups and validate the information contained in the report. At the end of their visit, they will make a recommendation to the Commission regarding BCC's accreditation status. The Middle States Commission will issue their final determination in June 2027.

If you would like to contribute to a future edition of Assessment Avenue, please contact Handan Hizmetli in the Office of Institutional Effectiveness (handan.hizmetli@bcc.cuny.edu). **Happy Holidays!**