PROMOTING TRANSFER OF LEARNING: CONNECTING GENERAL EDUCATION COURSES

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General education programs may consist of a series of core courses or a selection of courses from different areas. Regardless of the structure of a general education program, the underlying assumption is that students will transfer what they learn in these general education courses to their discipline-based courses and, eventually, to their careers. However, it is not clear that this assumption is sufficiently supported by students’ experiences. Professors encounter students who have taken these courses but seem unable to either apply or sometimes even recall what they learned in previous courses. In these cases, students are not appearing to transfer what they learn. They either (a) have never learned the material, which seems unlikely given that they passed their previous classes; (b) do not perceive the connections; (c) are unable to use the material in meaningful ways later in other contexts; or (d) are prevented from transferring by how faculty communicate the original or the later material. Any of these situations may be happening, and it is important for the success of any series of courses, especially those involved in a general education program, to actively promote transfer.

In response to this concern about transfer, several faculty at our college formed a multidisciplinary faculty learning community focused on this issue. We uncovered a rich literature full of suggestions for enhancing transfer. The following strategies outlined here stem from our study of transfer and our experiences in the classroom. We learned that transfer is not automatic, and in fact, lab studies have shown it is quite rare (Barnett & Ceci, 2002; De Corte, 2003). Simply grading students for having rich integrated ideas and complex understanding of how fields fit together can be an exercise in futility if the context of this understanding is limited to a given course. The relationships among courses as well as the way
courses are delivered must be designed to facilitate transfer. This article outlines some of the ways that the participants in our learning community have changed how they teach as a result of learning more about the field of transfer of learning.

**Classroom Experiences With Transfer**

One faculty member in our learning community examined transfer in a biology sequence. At the beginning of Biology II, students were given a pretest covering Biology I material and reflected on what they were bringing into the course. After the course, the students reflected on how they could transfer what they learned beyond the course. Students who had taken the previous course with the instructor dramatically outscored (79.5%) other students (52.5%) on the Biology II pretest, suggesting that the instructor may create a powerful context that facilitates transfer. Students reported that content from chemistry, biology, and psychology would help them in the current class. They also listed skills such as writing, math, study strategies, and critical thinking that would help them succeed. Several students were unable to list anything that they brought from other courses that would help their current performance.

At the end of the course, students were asked what they had learned in this course that would help them in other courses. They listed content such as biology and chemistry, further classes in their program’s sequence, and skills such as studying, self-regulation, and critical thinking. They also reported that they thought they could apply concepts to everyday life or that the course would help them “appreciate life.” These comments illustrate that students can recognize examples of transfer and leave the course with an awareness that the content is useful. By incorporating reflective writings in a course, we can communicate our expectations about knowledge extending beyond the borders of one class and build students’ habits of thinking about other uses of the material. Additionally, the initial transfer reflection question shows that it is important to give students more explanation about the pedagogical decisions of the instructor, explaining how students can build on concepts and skills that they have already learned.
Pretests and reflections were also incorporated into a math sequence to examine ways to increase transfer beyond rote formula use. Of the students who scored in the top third on the pretest covering material from the previous course in the sequence, all of them earned a C or better in the course. Of the middle third on the pretest, 69% of students earned a C or better in the course, and of the lowest scoring third, only 43% earned a C or better in the course. Clearly, arriving in the classes with knowledge that transferred from their previous classes was critical to performance. Given the relationship of pretest scores to course performance, the instructor incorporates frequent reviews of prerequisite material. Furthermore, consistent with the findings from biology, the individual professor seems to have a strong effect; more students who had the same professor for the sequence earned a C or better than students who had multiple professors.

Even in a math course where students frequently complain about the applicability of skills to real life, at the end of the course students were able to supply examples of how the material would be useful beyond the classroom. They listed content areas such as accounting, chemistry, biology, and physics. They listed specific math skills such as exponentials/logs and zeros of equations; job or career references such as navigation and engineering; and everyday uses such as interest rates and satellite dishes. In this math class, the professor works to make the connections with other disciplines explicit and have students write about the applications of the material they have learned, which, not surprisingly, students cited when asked how the information would transfer beyond the math classroom. Through this reflective assignment, the professor helps students place their learning of these tasks in a new context (e.g., Alexander & Murphy, 1999).

Reflective writings in an English composition sequence were examined to understand the transfer of writing skills. In this classroom study, the instructor looked at two samples of reflective writing from a class of English Composition I students. Students were asked to write a reflective essay on their learning experiences in the course at week 5 and week 10 of a 10-week quarter. The essays were scored according to a rubric that measured concrete skills such as grammar, documentation style, and incorporation of sources. They were also scored for more abstract, higher-order skills such as critical thinking, audience accommodation, and organization of content. Salomon and
Perkins (1989) discuss these different levels of skills as “high-road” and “low-road” transfer. High-road transfer involves “intentional, mindful abstraction,” and low-road transfer involves “automatic triggering of well-learned behavior” (Salomon & Perkins, 1989, p. 113).

In the two samples of student writing over a 10-week course, students had been explicitly learning the six skills outlined above in the context of formal summaries and research reports. The reflective writing assignments were a radically different type of writing assignment from the focus of the course. In these writings, students consistently improved their low-road skills, grammar and punctuation, documentation format, and citation. However, the results of the comparison of critical thinking, audience accommodation, and organization over time were much more uneven, with high standard deviations. The difference between the relative success of the low-road transfer and the contrasting mixed success of the high-road transfer suggests that an instructor needs to work more explicitly with high-road skills and, in the interest of time, give less emphasis to low-road skills as they may transfer sufficiently without as much coaching.

In a review of the content of students’ reflections on their learning in English Composition, they offered their own perceptions of transfer. Similar to the findings from the analysis of their writing, they felt confident transferring low-road skills such as editing, formatting, and citation format. Students commented, “I feel learning to refer to the text this quarter will help me in my paraphrasing and citing.” Another student commented, “The most valuable experience was peer editing. It really helped me communicate my ideas better.” However, students rarely referred to high-road transfer. In some cases they did seem to make a connection between critical thinking in composition and in other classes. For example, one student wrote,

I have to go to the art museum and pull ideas from actually looking at the art, so when we looked at the text, and pulled ideas from the text, it is going to help me pull ideas from the art.

Nevertheless, many students perceived no connection between their previous English Composition course and the one they were currently attending. One student summarized this situation, writing, “There was no connection [between Composition I and II]: I used my own
experience, [current course] articles, and fact.” Specific course strategies that students cited as helping them transfer their learning from one course to the next included class discussions and peer review.

Another issue of transfer is near versus far transfer across several context and content domains (Barnet & Ceci, 2002). Near transfer is when previous knowledge is applied to a new context that is relatively similar to the old context. Far transfer is when previous knowledge is transferred to a new context that has little reference to the old context. In a first-year Spanish course, this element of transfer was highlighted. The Spanish instructor gave exams on the same eight grammatical structures that students learned in the first quarter throughout the 30 weeks of three quarters. She found that by the end of the course, students had full control (using the structure correctly at least 80% of the time) of Spanish grammatical structures that are similar to English. However, after 30 weeks of study, these same students had only partial control (correct usage 50–79% of the time) of structures that are quite different from English, such as the verb gustar or irregular present verbs. These results suggest that ideas that are quite different from the target language, far transfer, need to be emphasized, whereas ideas that are relatively similar to a students’ previous learning, near transfer, may not need as much support to transfer to the new context. In this way, observations from our classes show the need for an awareness of the far transfer expectations we have for our students and instruction designed to address students’ transfer difficulties.

As a result of this faculty learning community’s classroom action research, we have changed how we teach. The following are the most significant changes we have made. These changes seem to have made a difference in how much students are able to articulate their previous knowledge, apply what they learn to new situations, and generalize their skills for other courses.

**Recommendations to Teach for Transfer**

*Explicit Expectations*

Make transfer expectations explicit. In a survey about transfer expectations, both for sequential courses within a discipline and for
courses in different disciplines, faculty said that the material was more overlapping and that they expect transfer more than students realized (Lightner, Benander, & Kramer, 2005). Although it would be nice if students automatically recognized that the material from previous courses can go along with current content, without prompts and direction, they do not seem to assume it is possible. Reminding them that transfer is expected can go a long way to promoting transfer. Explicitly talking about these expectations in class, especially for first-year students, can help students know that they need to think more broadly and use retrieval cues for similar information that they have encountered elsewhere. These explicit references to transfer also communicate that students are expected to use previous knowledge, integrate what they know, and get beyond the mode of memorizing and reciting the facts from lecture.

**Advising**

In advising, encourage students to take courses in sequence and similar courses at the same time. Another finding from our experiences examining the success of students in series of courses is that students who take sequential courses very far apart, or out of order altogether, struggle more than students who take the classes in the order prescribed by the program. This finding is consistent with research that shows that near transfer is easier and more likely to occur than far transfer across a longer time or more dissimilar contexts (e.g., Haskell, 2001). The finding is not surprising in this light; however, in our experience, many students procrastinate taking required English composition, natural sciences, and math sequences that are highly cumulative. Success in these classes is dependent on building from an accessible foundation of knowledge. The increased swirl of students entering, leaving, and reentering their programs in many community and state colleges will make transfer of learning even more difficult, as instructors will be even less able to assume that their students have just recently been exposed to concepts (e.g., McCormick, 2003). Additionally, online self-advising can pose problems where students who are unaware of the rationale behind course sequencing in a program choose classes without appropriate regard to how the content builds and interconnects. Advising with
concern for transfer, careful consideration of prerequisites, and communicating sequencing rationales are important for student success with transferring material across courses.

**Course Design**

Decide what students really need to take with them to another course and spend the most time on that. Include in the syllabus specific goals and objectives that state the skills or ideas you want students to take with them at the end of the course. For example, in an English composition course that serves as a service course for psychology, we found that analyzing literature was not a good goal to emphasize. In this course, analysis of scholarly journal articles helped teach skills the students needed to transfer. In contrast, an English composition course that is intended to prepare students to go on to literature courses spends more time on that skill. So, rather than using textbook organization, favorite activities, or topics to organize the design of a course, taking into account what students will need in other courses, and using these ideas to organize the course, might facilitate the transfer of that knowledge.

**Modeling**

If we demonstrate that transfer is not only expected but also practiced, students will become more aware of how interesting and useful it can be. One way to model transfer is to ask guest lecturers from other relevant disciplines to come speak on the topic of your class. For example, a math colleague noted that students do not see math transferring to courses beyond other math courses and maybe chemistry. As a result of this observation, a psychology professor invited this math professor in to talk about statistical analyses in Introduction to Psychology I. Another way to model transfer is to make references to topics in other disciplines, current events, and life outside of class. The modeling can extend to asking students to make these connections themselves by asking what courses they are currently taking and if they have learned anything in that class that could contribute to the current discussion.
Develop Metacognitive Skills

Much research in writing and in the psychology of learning indicates that being aware of how one thinks and learns can help with the application of those skills in other contexts (e.g., Perry, 2002). Sometimes when specific skills will not transfer, bigger concepts of how to learn will still transfer, or vice versa. Helping students learn how to reflect on process and monitor their own progress will help them transfer processes and ideas learned in one class to another. An instructor can assign reflective writing on how students did a task or can require a journal that monitors progress on that task as well as learning strategies, such as mnemonics, that help them learn best (Plack, Driscoll, & Blissett, 2004). Students have commented in course evaluations that having the research process made explicit in one class helped them do research papers for other classes.

Varied Practice

Because learning is often context dependent, it is important to help students practice new information often and in different ways (e.g., Halpern & Hakel, 2003). Combining a multiple-choice quiz, a reflective writing assignment, and a spoken presentation helps a student practice important knowledge in different modes of expression and styles of thinking. A good way to start a course that assumes transfer from a previous course is to give the final exam of the previous course as a pretest for the next course. This way, you get a picture of what previous knowledge the students have access to build on, you communicate the expectation of transfer from the previous course, and they get more practice with the content they are expected to be transferring.

A successful general education program relies on the assumption that learning is transferred from one context to another to create a broad, integrated educational experience. For such a general education to be successful, faculty must see their individual courses as elements of this larger experience. Studying transfer in our own classes, we have come to change our perspective of our course content from working through a list of topics to presenting ideas that are explicitly connected to learning within general education programs.
This shift of orientation from the classroom to the institution requires us to think of our courses as pieces of a larger experience for our students. This general education orientation requires us to communicate our individual expectations not only to the students but also to our colleagues. This process is a key element of the scholarship of teaching and learning. Making our teaching public in this way connects the content of our courses for our students as well as enriches our own teaching.

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References


