Teaching an independent study course is the ultimate service work. Departments typically do not require such a course, yet many faculty offer this experience for undergraduates. For example, our department does not require this course but an average of 15 percent of psychology majors register for it each year. Why then do we as teachers offer undergraduates this type of experience? Reasons vary from fostering enthusiasm for research, preparing students for graduate school, and interacting in an influential one-on-one style (Landrum & Nelson, 2002). So, if teachers choose to offer this experience, how should such they design it?

Unfortunately, there is no empirical consensus on what constitutes a high-quality independent study. However, it is not difficult to find informed opinions on the matter (e.g., Davis, 1999; Lamdin & Worby, 1976; McKeachie, 2002). In general, there is no perfect recipe, but certainly many ways to spoil the broth. Becoming a successful teacher (much like becoming a successful chef), requires developing a personalized style. This personalized style involves discovering what works well for an individual. Independent study is no exception. Given this caveat, this chapter offers a prescriptive opinion on what has worked well in our experience. We offer a conceptual framework in which to view independent thought that is general-process based (e.g., Bitterman, 2000) and hope that it will be effective in providing meaningful learning experiences for students who participate in independent study courses.

A Conceptual Framework

The main goal of any independent study course is to teach students how to think independently. We view independent thought similarly to Halpern's (2003) critical
thinking. Specifically, we view critical thinking as a problem-solving process that occurs through the utilization of cognitive skills. In general, the process is directed and leads to a desirable solution in a particular context. Analogously, independent thought develops as students acquire and fine-tune specific cognitive skills within the independent study context.

In our framework, all students have an ability to solve problems and develop independent thought (Richmond, 1998). Not all students, however, have developed this ability to the same level. Consequently, teachers must create and adopt teaching strategies that address such student variability. A useful aid in developing these strategies is a conceptual framework for independent thought. Specifically, independent thought can be placed on a continuum from low to high with unique student developmental time courses. Figure 22.1 shows hypothetical functions for development of independent thought for three students over the course of a year. From the onset, Student 1 is more advanced relative to the other students. However, the yearly progress of Student 1 is more gradual than Student 2 but slightly faster than Student 3. In this framework, we consider all students qualitatively the same in terms of abilities but quantitatively different with respect to development. Some students may never reach a particular level, which reflects a quantitative difference in independent thought. Thus, this framework stresses skill acquisition as contributing to the development of independent thought regardless of student developmental level.
Independent Study: A Conceptual Framework

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Getting Started

Every semester teachers typically receive several requests from students regarding research opportunities. For instance, "I am interested in doing an independent study with a professor. Do you need any more assistance conducting your research this semester?" (anonymous student, personal communication, Aug. 18, 2004). Should teachers be selective with those undergraduate students with whom they collaborate? Absolutely. If teachers had time to conduct an independent study for each student request, selection would not be problematic. Unfortunately, time is an issue. A common pitfall for inexperienced teachers is the "someone wants to work with me" phenomenon. Although it might boost the ego, the last thing a teacher needs is a nonproductive student when launching a career.

Yet, the question remains, "What is the best way to select students?" In short, there is no best way, but we offer some useful suggestions. Each of the following examples provides a teacher with the opportunity to learn about potential students in some detail. First, require a minimum GPA (e.g., 3.0). Although there are exceptions to every rule, average students in the classroom tend to be average independent study students. Second, have a set of interview questions that addresses the student's seriousness and dedication. What are your career interests? Why do you want to conduct research? What do you want to get out of an independent study experience? Serious students have clear goals. The answers to the interview questions should reflect such goals. Third, if the student is unfamiliar to you, require a reference letter and/or suggest that he or she assist in the laboratory for a semester without earning independent study credit (some students may suggest this on their own). Fourth, remember that these factors might interact. For example, a teacher may prefer a dedicated personable student with a good work ethic and a GPA of 3.1 over an unpleasant 4.0 student with a poor work ethic. A good work ethic and personality can go a long way in creating pleasant experiences for you, the student, and other students who may work alongside you on any particular project.

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Strategies

Our conceptual framework allows for the application of many teaching strategies. Several strategies for teaching independent study courses include discovery instruction, expository instruction, inquiry instruction, and problem-based learning (for reviews, see Coppola, 2002; Domin, 1999). Although teachers often utilize these strategies in large group laboratory settings, teachers may also apply these techniques to small groups. Importantly, teaching strategy choice is dependent largely on the desired level of structure (for tips on adding structure to an independent study course see Horner, Stetter, & McCann, 1998). Teachers may tailor the level of structure to suit a student's individual needs and developmental level.

We prefer a quasi-structured environment for students involved in empirical studies. This environment allows findings from projects on which students are working, as well as student progress, to alter the course of the independent study at any given moment.

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133
Table 22.1: Skills that can be developed in an independent study course

<table>
<thead>
<tr>
<th>Skill</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring area-related vocabulary</td>
<td>Graphing</td>
</tr>
<tr>
<td>Asking research questions</td>
<td>Searching literature</td>
</tr>
<tr>
<td>Collaborating on projects</td>
<td>Presenting orally</td>
</tr>
<tr>
<td>Critically analyzing research</td>
<td>Reading primary literature</td>
</tr>
<tr>
<td>Collecting and analyzing data</td>
<td>Generalizing research findings</td>
</tr>
<tr>
<td>Practicing ethical conduct</td>
<td>Understanding contemporary concepts</td>
</tr>
<tr>
<td>Expressing complex ideas</td>
<td>Understanding research methods</td>
</tr>
<tr>
<td>Formulating hypotheses</td>
<td>Writing (APA format)</td>
</tr>
</tbody>
</table>

Source: Adapted from Kardas, 2000; Landrum & Nelson, 2002.

To foster independent thought, we prefer a discovery-based strategy in which students learn by working on various tasks. This teaching strategy allows students to develop at their own pace. Optimally, they learn how to learn. Students start with a task (or tasks) that they can complete quickly. We instruct them to inform us when they are ready for the next task or when they need assistance in solving a problem.

Task difficulty can (and should) increase sequentially. For example, students start as pilot participants in an experiment. They then learn to analyze and plot their own data. Next, we interactively discuss and interpret their results. The process typically leads to a literature search that helps students place these data and results into a larger research picture. To assist in this process we utilize two techniques that are known to improve conceptual learning across a variety of settings: (a) increase the number of exemplars (e.g., if data graphing is difficult, have the student create more graphs) and (b) increase the amount of time working with one exemplar (e.g., Kaminski, Call, & Fischer, 2004; Katz, Wright, & Bachevalier, 2002; Siegler, 1996; Wright 1997). These two principles are amenable to a multitude of skills (see table 22.1) that teachers may develop in an undergraduate independent study experience (Kardas, 2000; Landrum & Nelson, 2002).

One of the benefits of this strategy is that it prompts students to think and work independently on a topic that they find interesting. Additionally, it allows the teacher to provide guidance and support on technical and professional issues while continuing to tailor the independent study experience to developmental and individual needs of each student. Thus, many students thrive in this environment. They work at a pace that is often accelerated and at times pushes teachers to stay one step ahead of the students. Their independent thought clearly develops over the course of a semester (or semesters) as they begin to wrestle with challenging methodological and conceptual issues. These students often go on to complete honors theses and are ready for the academic challenges that await them in graduate school.

Teacher and Context

An important factor in advancing student independent thought is you, the teacher. If you are the type of teacher who welcomes any undergraduate into your laboratory and
then pawns them off to a graduate or advanced undergraduate student with little (if any) further interaction, perhaps you are part of the problem. In a successful independent study nothing is truly independent. The experience depends on the quality of the teacher–student relationship. Such one-to-one relationships require frequently scheduled interactions (i.e., weekly or daily) to allow for careful and accurate evaluation of student progress.

This relationship does not suggest that graduate and undergraduate students should not be involved in the independent study process. To the contrary, we encourage their involvement. If graduate and advanced undergraduate students are available to contribute to the independent study process, then a hierarchical model of supervision is a viable option. In addition to the one-to-one interaction, a hierarchical model allows teachers to supervise students in directing other students. However, it is extremely important to monitor the progress of each student in the hierarchy. Laboratory meetings can provide one venue in which to monitor this progress.

Another factor that may seem to make a major difference is the type of institution in which you teach the independent study course. To explore this issue we collected undergraduate independent study descriptions from 10 top-tier teaching colleges and 10 top-tier research universities (i.e., universities with graduate programs; US News, 2004). Despite differences in categorical classification, all universities and colleges had relatively similar conceptions of independent study: individualized, self-directed, and self-paced learning focused on facilitating and promoting creative and independent thought. Despite this fact, the two environments are notably different (Freeman, 2002). At research universities students typically become involved in ongoing potentially publishable projects. These students play the role of research assistants. Independent projects often develop after a student has completed an independent study course and then moves to an honors project. In contrast, students at teaching colleges often have the opportunity to begin independent projects without first being a research assistant. However, regardless of student roles within the independent study experience and the context in which you teach, the conceptual framework presented in figure 22.1 remains applicable.

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**Conclusion**

We hope that these comments will help you find the independent study teaching strategy appropriate for your personal style. Forming individual strategies through personal experience is the best way to accomplish this task. We believe these learning experiences are essential to becoming a master teacher. Perhaps William James (1890/1950) expressed it best when he said:

> If he keep faithfully busy each hour of the working-day, he may safely leave the final result to itself. He can with perfect certainty count on waking up some fine morning, to find himself one of the competent ones of his generation, in whatever pursuit he may have singled out. (p. 127)
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