How Professors Develop as Teachers

PETER KUGEL

Boston College, USA

ABSTRACT *Like the learning abilities of their students, the teaching abilities of college professors seem to develop in stages. In this paper I want to offer an account of how this development sometimes, and perhaps often, proceeds. Typically, when they begin their teaching careers, professors focus their concern primarily on their own role in the classroom (stage 1: self). When they have mastered this role, at least to their own satisfaction, the focus of their concern shifts, first to their understanding of the subject matter they teach (stage 2: subject) and then to their students' ability to absorb what they have been taught (stage 3: student). With this last shift comes a more general shift of focus from teaching to learning, that begins, in stage 3, with a focus on helping their students become more absorbent (stage 3: student as receptive). Concern then typically shifts to helping students learn to use what they have been taught (stage 4: student as active) and then to helping them to learn on their own (stage 5: student as independent). My account of this development is based on the informal observation of a few cases and it suggests a framework for thinking about the development of professors as teachers. With further work, it might lead to theories that will describe what does happen and predict what will happen.*

Introduction

The teaching abilities of college professors, like the learning abilities of their students (Perry, 1970), seem to develop in stages. To say that something develops in stages is to say that it grows in two different ways. Sometimes it grows 'more of the same', as a tadpole does when it grows into a bigger tadpole. At other times, it grows into 'something different', as a tadpole does when it grows into a frog. In this paper, I want to offer an account of how the stages in the development of college professors as teachers sometimes, and perhaps often, unfold. Its five stages and two phases are shown in Fig. 1.

My account is based on informal observations. I have looked at my own career and the careers of colleagues. I have talked with college professors, with college students and with people who work with both. I do not believe that my account describes the only way that the development of college professors proceeds, but I believe that it describes a common way. Several people who have read this paper have said something like 'Yes, that is how it was for me'. I am also quite sure that there are some professors whose development it describes badly, if at all. Most cases will probably fall between these two extremes, resembling my account in some respects and differing from it in others.

Dynamics

An account of how professors develop in stages should do two things. It should give an account of what happens *within* each stage, and it should give an account of what happens *between* stages. What happens within a stage, in my account, is that college professors focus

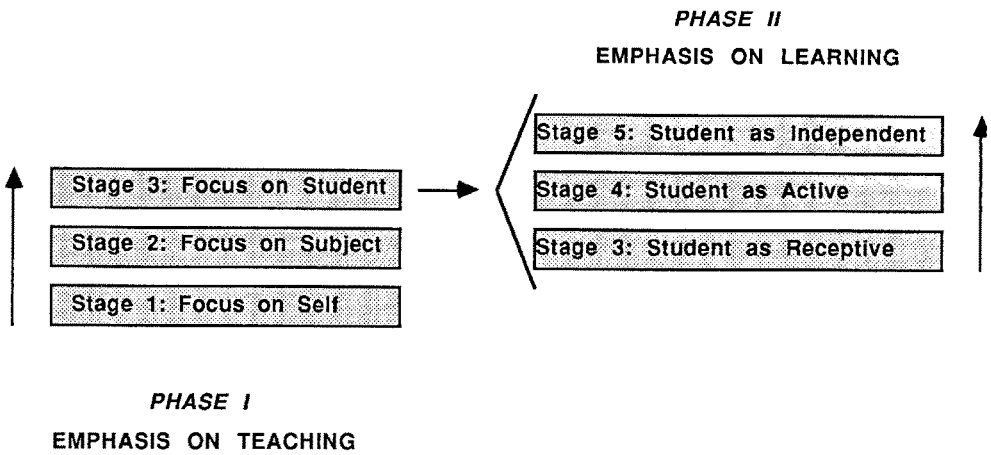

FIG. 1. An overview of my account.

their primary concern on one aspect of teaching. This focus provides them with a conceptual framework that determines how they think about their teaching and what they pay attention to, or 'see'. Like Perry's (1970) developing college students, developing college professors are often unaware of the assumptions of the stage they are in, or even that they are making assumptions at all. When they move from one stage to another, it is as though they put on a new pair of spectacles and see things differently. But they seldom look at the spectacles themselves—at their assumptions.

One might wonder why professors do not try to deal with all the aspects of their teaching at once. It seems to be quite natural, perhaps because it is quite efficient, to work on one aspect at a time. The mind seems to be a bit like a searchlight which illuminates one sector of (say) a prison wall at a time. Although one could make the light more diffuse, and thus illuminate the entire wall surrounding the prison at once, doing this would illuminate each part badly. As focusing a prison searchlight on one part of the wall at a time makes it easier to spot escaping prisoners, so focusing one's professorial concern on one aspect of one's teaching at a time seems to make it easier to deal with.

And, just as there is a natural way to illuminate consecutive segments of the prison wall with a searchlight (by rotating it), so there seems to be a natural way to go through the stages of professorial development. Typically, professors seem to shift their focus to the concerns of another stage when the urgency of the concerns of the stage they are in has diminished because those concerns have been largely dealt with. As a result, concerns about another aspect of teaching then seem more important. Usually, there seems to be a natural next stage, but its naturalness does not make that 'nextness' obligatory. Just as one need not illuminate the sectors of a prison wall in a certain order, so professors need not go through the stages of their development in any particular order. In this respect, professorial development seems to differ from most biological development. A frog must go from egg to tadpole to frog. The order is fixed. That does not seem to be the case with professors.

There is another difference. In biological development, later is generally better. The capabilities of a frog seem, somehow, better (or at least fuller) than those of a tadpole. The capabilities of an adult human seem, somehow, better (or at least fuller) than those of a child. That is because the capabilities developed later build on those developed earlier and incorporate them. That is not always the case in the development of professors.

My account is a story of how a typical professor *might* develop as a teacher. As such, it suggests a framework for thinking about this development and this framework might be

helpful to those (students, administrators and colleagues) who deal with college professors as teachers, as well as to those college professors who wish to reflect on their own development. With further development, it might be turned into a scientific theory that could predict how college professors *will* develop and even into an account that could suggest how college professors *should* develop.

Mine is not the first stage-based account of professorial development and I hope that it will not be the last. Alternative accounts have been offered by Fox (1983), Sherman *et al.* (1987), Grow (1991), Boice (1991) and undoubtedly others. Sprinthall & Thies-Sprinthall (1983) have given a more general account of teacher development.

Stage 1: self

Most college professors begin their teaching careers as teaching assistants while they are still in graduate school. When they first step up to the front of a classroom as its teacher, most of them share a common feeling—abject terror. The question uppermost in their minds is 'Will I survive?' That is not surprising. Beginners in many fields—from dancing to dentistry—fear that they will make fools of themselves when they first perform in public. But the problem is often worse for novice professors because they have seldom been taught much about the skill they are about to perform. They have been taught a lot about the subject they are about to teach, but little about how to teach it. Most of what they have learned, they have learned from watching others and, as they start to do it on their own, they usually wish they had paid more attention to what their professors did as they taught.

As they stand in front of their own class for the first time, they feel out of place. It seems like only yesterday that they were students (and often it was). Today, they stand where their professors stood, and they feel a bit like frauds. They worry that they will be found out. When students address them as 'professor', they look back over their shoulders to see who the student is talking to. When a hand goes up in the back of the room, they feel a jolt of adrenaline. They are afraid that they won't be able to answer the question about to be asked. While they were students, they could hide. Now that they are professors, they cannot. They feel vulnerable. They are surprised at how much more they have to know about a subject to teach it than they had to know to understand somebody else teaching it. They are afraid that they will run out of things to say, or that they will say something foolish.

Although they seldom realize it, their concerns are much like those of their students. Their students also think mainly about themselves and worry about making mistakes. Like their students, professors at this stage tend to assume that their effectiveness depends wholly on what they do, and that it can only be evaluated by others. When they were students, those others were their professors. Now that they are the professors, the only 'others' in the classroom are the students, whose evaluations many of them now take to be the only true measure of their worth. At this stage, most college teachers tend to see their students as applause meters whose readings indicate, presumably correctly, how well they are teaching.

Their concerns are not without justification. Beginning professors often talk too fast or speak unclearly. They cover too much material or too little. They often do not understand the material well. They can be unclear and disorganized. Beginning teachers have a lot to learn about designing courses, writing syllabi, preparing for classes and running them. They have to learn how to develop good assignments and examinations. They have to learn how to grade and how to manage discussions.

Student reactions can make them aware of what isn't working well. Reflection and conversations with colleagues can suggest things to work on. There are many different skills to master. They master some better than others. But eventually, most professors develop a

version of their role that suits them and they begin to feel like 'real' college professors. One day, when a student addresses them as 'professor', they turn and, without a second thought, answer 'Yes?'

The First Transition: self to subject

As many of their doubts about their own legitimacy begin to fade, the few that remain seem to grow in importance. After professors have developed good ways to present their material, they may continue to worry about their mastery of the material they are presenting. Do they know enough? Have they read enough? Are they covering the central ideas? Do they really understand this material? As other worries fade, these worries take on a greater prominence and, as a result, many professors shift the central focus of their concern from *how* they are teaching to *what* they are teaching—from self to subject.

A few do not shift. They continue to polish their teaching skills. Some of these develop them so well that they join the ranks of the campus's most popular teachers. Their students enjoy their classes although a few may wonder how much they are really learning. But most professors, having developed their ability to present the material to their own satisfaction, turn the central focus of their concern from their teaching to their subject—from 'me' to 'it'. Their colleagues may notice that they are spending more time in the library.

Stage 2: subject

In the second, or *subject*, stage, of their development, professors learn much more about their subjects than they ever did as students. They begin to realize how deep and rich it really is. Their lectures become crisper, sharper, and more powerful. And they think of themselves as passing on to their students, their own knowledge, skills and understanding. That makes sense to them. Why make the students figure out what their professors have already figured out for them? Professors at this stage think of the courses they teach much as cooks think about the courses they serve. They lay out the information as attractively and enticingly as they can, hoping that their students will enjoy it and digest it.

Now there is so much to cover that professors who, not long ago, worried about running out of things to say, now worry about running out of the time to say it in. The term is too short to 'cover' the material and the last few weeks of each term are usually spent racing through everything that hasn't been covered yet. For now, teaching is telling and learning is listening.

The subject-intoxicated professor of this second stage sees things differently from the self-intoxicated professor of the first. Now when a hand goes up in the class, it may be seen as an expression of interest, or even excitement, that will allow the professor to probe the material more deeply. Although professors at this stage continue to care how students feel about the subject, they no longer feel that students are the best judges of their teaching. That can now best be judged by somebody who knows the subject well, which the students do not. Only professional colleagues can really tell how good a course is and, of course, they are not taking it. So professors, at this stage, often seem to be teaching to an invisible audience of their peers. That is not all bad. There is important work to be done at this stage, just as there was in the first. Good teaching depends on good understanding of what one is teaching. And learning to understand a subject really well takes time and effort. That's the good news.

But there is also bad news. As professors increase the quantity and the quality of what they teach, the quantity and quality of what the students learn seems to decrease. Professors often attribute this problem to the shortcomings of their students. Perhaps their students are

not working hard enough. Perhaps they are not motivated well enough, or prepared well enough. Perhaps they watch too much television or drink too much beer. During lunch at the faculty club, professors talk about their students' laziness, stupidity, or lack of preparation. Often they laugh at the silly mistakes their students make. They wonder why their students don't learn what they so excellently teach. 'I taught it', they say to themselves. 'But they didn't learn it.' (They seldom stop to wonder what that could possibly mean.)

If they looked at their teaching from their students' point of view, they might be able to see what was going wrong. As they pack more and more into their lectures, their students sit there, trying to write it all down. They have little time to think about what they are writing and make it their own. As they write, they think, 'The professor knows all this, and I don't. I'd better get it all down now because I could never figure this all out for myself'. Learning to figure it out is made more difficult by the fact that professors, at this stage, do all their thinking outside of class (so that it will not waste class time). The students never get to see how the thinking is done. As their professors do more and more of it for them, the students become less and less able to do it for themselves. And the professors wonder 'Why aren't my students thinking?'

What is happening here can happen at any stage. If professors focus too narrowly on the concerns of a single stage, they can shortchange the concerns of others. They are like searchlights looking for escapees in a prison that focus on one part of the wall while the prisoners are escaping over another. And some are so entranced by those concerns that they stay focused on them for the rest of their lives. But just as professors who get stuck in the first stage can enrich the campus, so can those who get stuck in the second. Their erudition inspires students. Their expertise is often sought by their colleagues and by the outside world. They may appear on the evening news. They are consulted by industry and government. And some of them also join the group of 'best teachers' on the campus. Learning more about their subject can be fun. The basic question they ask themselves at this stage is 'Is it clear to me?' And, after a certain amount of hard work, they are able to answer, with some degree of confidence, 'Yes'.

The Second Transition: subject to student

This stage has its surprises and some of them play a role that is very like the role that anomalies play in Kuhn's (1962) account of scientific revolutions. They overthrow their current ideal—that of the subject matter expert disbursing his or her expertise to willing ears. Among such surprises are these:

- The professor finishes a lecture. It was exciting. The students seem interested. A hand goes up in the back of the room. 'Will this be on the exam?' the student asks.
- After another superb lecture, two students are talking excitedly as they leave the room. The professor gets closer to hear what they are saying about the lecture. They are talking about last night's party.
- The professor is grading examinations. There are many errors. The understanding that does show through seems shallow.
- The professor is teaching a course that depends on a prerequisite course. As usual, the students seem to be ill-prepared. They seem not to have learned what they should have been taught in that course. It must be the fault of the professor who taught it. But then our developing professor remembers that he or she was the person who taught it last year.

Why, the professors at this stage may wonder, aren't the students interested? Why aren't they

getting it? 'It's clear to me', thinks the professor. 'So how come it's not clear to them?' 'It's interesting to me. So how come it's not interesting to them?' The material is good. The transmission is good. Could something be wrong at the receiving end? Perhaps. And so, after a while, professors at this stage may begin to shift the focus of their concern to those who, for some reason, are not receiving the material they are sending—their students. Our professors have gone from thinking about 'me', to thinking about 'it', to thinking about 'them'.

Stage 3: student

As their attention shifts to their students, they begin to notice that they are not an undifferentiated mass of identical people. They begin to see that they are individuals with different interests and abilities. And they begin to realize that those differences will have to be dealt with if the material is to get across.

Often professors begin to deal with them by using a *buckshot approach.* Since abilities, learning styles and interests are spread out, the professors spread out their teaching. If some students learn better by being told, others by being shown and still others by doing, then they give all their students a bit of telling, a bit of showing and a bit of doing. They give simple examples and complex ones. They give hard problems and easy ones. They explain theory and practice. They tell stories, give definitions and show pictures. Because they are spreading out their 'shots', it takes them longer to cover the material. But, as seen from the viewpoint of this stage, it's worth it. You may be teaching less, but your students are learning more, remembering it longer and understanding it better.

The buckshot approach can be improved by looking around at where your students are, intellectually and emotionally, and aiming your 'shots' in their direction. Professors can find out where their students are by asking more questions and paying more attention to the questions students ask. Now, when a hand goes up in the back of the room, it may be seen as an opportunity to find out how the students are doing, what they are thinking, and where their difficulties lie. At this stage, the main question that our professors ask themselves has shifted from 'What am I saying?' to 'What are they hearing?' And they experiment with different ways to find out:

- Some come to class early or stay late to talk with their students individually.
- Some use a question box—a box placed in the back of the room into which students can drop questions that they did not ask during class.
- Some use 'minute papers'—informal 1 minute papers that students write at the end of class, answering such questions as 'What was the most interesting, or important, thing you learned in class today?' and 'What are you still confused about, or would you like to learn more about?' (Wilson, 1986). Minute papers, like questions for the question box, usually are not signed or graded.
- Some give short quizzes that allow students to test their learning after each class (Kugel, 1989). Since these quizzes are for the benefit of the student alone, they are usually not graded either.
- Some read their students' examinations more carefully to identify student difficulties so that they can address those difficulties in class or present the material more effectively the next time.
- And some spend more time looking around the class. When they see their students' eyes begin to glaze over, they try to do something about it.

(For a different, but much more extensive and detailed account of techniques for gauging

student understanding and attitudes, see Cross & Angelo [1988]. For what research says about the effectiveness of these ideas, see McKeachie, *et al.* [1986].

It is interesting how, when they were thinking about 'me' and 'it', our developing professors seldom noticed how bored 'they', their students, could get. The stages professors are in do a lot to determine what they see. Now that they can see their students' frequent lack of interest, they not only look for it, but they try to do something about it when they see it. Tailoring your teaching to your students is not easy. Students differ from each other, and from their teacher. Classes differ from each other, and a single class will differ, not only from day to day, but from the beginning of the hour to the end. Professors have to learn how to discover, and kindle, student interests. They have to learn how to nurture them and how to probe and correct student misunderstandings. When professors at this stage meet at the faculty club, they still discuss student errors. But now they are more likely to talk about their causes and cures. And they are more likely to smile than to laugh.

The Phase Transition: focus on teaching to focus on learning

We can think of our first three stages (self, subject, student) as comprising a single *phase* in which professors work on different aspects of teaching, or presenting the material. They may work on these aspects in the order we have described or in a different one. They may work on each aspect only once, or they may switch back and forth between them. After a while, however, they usually master the role of the teacher in the classroom, at least to their own satisfaction. Now they no longer have to think much about how to do it and they can pay more attention to what they are doing it for—their students' learning.

Again, this is something that happens in the development of many professionals. Consider, for example, pianists. Beginning pianists typically worry about hitting the right notes at the right time in the right way—the techniques of piano playing. When they have developed fluency in these techniques, they can think more about the effect that their playing is having on their listeners. Much the same thing can now happen to professors. With better control over the skills of teaching, they can now focus more attention on its purpose.

The Third Transition: student as receptive to student as active

When professors were thinking about the work they had to do to teach, they tended to ignore the work their students had to do to learn. If they thought about their students at all, they often thought of them as primarily passive receivers of what was being taught. If it was not learned, it was up to the teacher to do something about it. If students did not understand one form of presentation, the professors tried another. If the students did not remember something, the professors repeated it. If students did not learn, professors would simply teach harder. Professors were seen as active and students as passive. It was as though the professors thought of themselves as buckets full of knowledge whose job it was to fill their students' minds, which they thought of as being like pails that were waiting to be filled.

This way of looking at education has some merit and many things can, perhaps, be taught by somehow pouring things into students' minds. But some things cannot. Students into whose minds information is poured can often regurgitate what was poured in, especially if their grade depends on it. They remember the facts (but not for long). But they don't see the connections. They can answer the questions on tests if they resemble what they were told in the lectures well enough, but not if they deviate from them in any significant way. What is learned seems narrow and limited. Often it seems as though the facts are there but the connections are not.

At first, this can be discouraging. After a while, it may become a challenge. If connections and understandings cannot be constructed by their professors, perhaps they can be constructed by the students. Perhaps teaching is more like coaching. Perhaps the students' minds are less like pails to be filled than like muscles to be strengthened by exercise. Perhaps learning is something students do rather than something that is done to them.

Stage 4: student as active

Noticing the importance of what the students do to their learning can change the professors' view of their teaching. Many stop feeling that they have to do all the work—that they have to carry the whole educational process on their own shoulders—and they turn more of the work over to their students. Finkel & Monk (1983) refer to this as the "dissolution of the Atlas complex".

Even in traditional lectures, much of what students learn is the result of what they do as they listen, whether they do it in their heads or in their notebooks. The ones who learn best do it by thinking along with their teachers. Some try to figure out what questions the teacher is trying to answer rather than just writing down the answers themselves. Some try to organize what they are writing down conceptually and try to fit it in to what they already know. Some try to think up questions to ask. Some learn by taking part in discussions, by the writing they do in their homework assignments and in examinations. Professors at this stage encourage such activities, believing that they develop their students' minds. Learning is increasingly seen as something that students do because it has to take place in their own minds—where their professors cannot directly reach. Professors help the process but they do not do it all. (One might wonder why they ever thought they could.)

As the focus shifts from teaching to learning, old tools take on new uses. The minute papers that used to be used to find out how things were going, are now assigned to engage the students' minds in reflecting on what happened during class. Discussions, that used to be used to find out whether students were prepared, are now seen as a way to get students to use what they are learning.

As professors begin to see themselves as more like coaches than like experts, things change in subtle ways. There is an interesting difference between the way that coaches and experts see what they do. Coaches tend to be happier when they do less and their players do more. If they want to develop their players' leg muscles, they do not run for them. They let them do the running. In contrast, experts typically do things for you. Physicians seldom ask their patients to diagnose themselves. They make a diagnosis and tell their patients what they have decided. College teachers serve as both experts and teachers. They do some things for their students, and they let them do some things for themselves. Having developed the expert's skills needed to do things for their students, professors are now in a position to develop their coaching skills—their ability to help students do things for themselves.

What students learn only by being told often becomes what Whitehead (1929) called "inert knowledge", accessible only when triggered by situations that are very close to those in which it was learned and, thus, virtually useless in real life. In contrast, students who use what they have learned, whether in writing term papers, writing essays, solving problems, participating in discussions or in some other way, learn to use what they have learned. The knowledge they acquire tends to be more 'active', and better integrated with their other knowledge and skills; in short, more useful and usually more memorable.

There are many ways to let the students do more and professors, at this stage of their development, typically experiment with several until they find those that best suit them, their students and their subjects. Some continue to lecture, but they ask more questions, pause

more often, give more challenging homework, ask for minute papers, or help their students 'think along' with a lecture.

Others do less talking and allow more time for discussion. Discussion, whether it imitates the Socratic model or not, has a serious drawback. Only one person can be talking at a time. The others in the class are still only listening, and often they are listening to somebody who may not be worth listening to. This limitation—based on the fact that in a class discussion, only one person can talk at a time—might be called the *Socratic bottleneck*. There are several ways it can be broken. One is to let the students write. Writing engages the mind almost as much as talking. Like talking, writing produces a product that others can evaluate and all the members of a class can profitably write at the same time. Techniques that use writing to get more students active in the classroom have been developed by the *writing across the curriculum* movement. You do not have to limit what students do to writing to break the Socratic bottleneck. You can divide the class into small groups and let the members of the groups talk to each other. If you have 10 small groups, then 10 people can be talking at once. Ideas for dividing classes into groups have been developed by the *co-operative learning* movement.

These methods, and others, try to increase student 'doing' and, in many parts of the curriculum learning by doing has become standard fare. Students used to learn to speak French by being told how to do it—often in English. Today, students are much more likely to learn to speak French by speaking French. That is, after all, how French children learn to do it and they manage to learn it rather well. It is also how Aristotle (in his *Politics*) said we learn to do things—by doing them.

Getting your students to do things in class—rather than just doing things to them—is not always easy. You have to pay careful attention to what you, the professor, do *not* do. Professors who want their students to do more in class have to practice holding back and to realize that sometimes, in education as in architecture, 'less is more'. But they also have to realize that, as Christensen, *et al.* (1991) suggest, 'less' is not nothing. Professors who want to get their students actively involved in their own learning don't just hold back. They have to work actively as facilitators of their students' learning, doing some telling, some showing, some asking and some encouraging. They have to raise good questions and guide student activity into productive directions. And they have to listen. As Leonard (1991) observes, good listening is not easy and there is more to it than just not talking.

As the professors' views of *how* to teach change, their views of *what* to teach may also change. They may decide that it is more important that students learn *how* to think than that they learn *what* to think. They may worry less about coverage and more about 'uncoverage'. They may respond to student questions with other questions, hoping to encourage their students to figure the answers out for themselves.

This sort of behavior can annoy those students who are convinced that learning is listening. They worry that their notebooks are not filling up and that, therefore, they are not learning very much. When they debate a question, some wonder why the professor doesn't save time and just give them the right answer. Students who persist in these concerns may discourage this kind of 'teaching', and the discrepancies between how teachers at this stage think about learning on the one hand, and how their students think about it on the other, can lead to curious misunderstandings. (See, for example, Perry [1981] and Grow [1991]. Students who are used to having their professors do it all for them, will need help as they are asked to take over more of the work for themselves. If they don't get such help, they may stop paying attention or become disruptive.

How far professors can go in making their students more active (as in our stage 4) and more independent (as in our stage 5) will depend, not only on them, but also on the subjects

they teach and on their students. College professors do not develop alone. They develop along with their students and they cannot go too far beyond them.

The Fourth Transition: student as active to student as independent

At first glance, it may seem as though letting students take a more active role in their own learning should decrease the amount of work their professors have to do. Alas, the professors soon find out that it often does not. True, they can lecture less. But if they let their students carry on separate subgroup discussions in class, they may feel that they have to run around the room monitoring those discussions to keep them on track. If they ask their students to write more papers, or solve more problems, they may feel that they have to grade the additional work. That can take enormous amounts of time. This isn't what they thought was meant by 'Less is more'.

So professors at this stage seem to face a choice. Either they stop monitoring and grading all this work their students are doing, or they stop making them do all this work. Most of them take the first alternative and stop grading everything. Either they let things go ungraded, leaving it up to their students to grade themselves, or they let the students grade each other. Some may let their students *teach* each other. McKeachie (McKeachie *et al.*, 1986) writes: "The best answer to the question, 'What is the best method of teaching?' is that it depends on the goal, the student, the content and the teacher. But the next best answer is 'Students teaching students' ".

And so, what may have begun as a way of getting the work done more easily, ends up as a way of getting a different kind of work done. As students learn to teach others, and to assess the work of others, they also learn to teach themselves and to assess their own work. As students take greater control of their own learning, they notice something that their professors noticed when they first started teaching. You have to understand something better to teach it to somebody else than when somebody else teaches it to you.

Stage 5: student as independent

Turning students into independent learners—letting them learn how to learn on their own—can be extremely difficult (Candy, 1990). Like many educational endeavors, it can fail. It can fail because the students run into difficulties they cannot handle. For example, it may call for more courage than they have because it involves risk. Some students won't try. But some will, and some of those who try will succeed. One who apparently succeeded was John Updike, the American writer, who, writing about his own college education, said: "I had a lot to learn when I came to Harvard, which was fortunate since Harvard had a lot to teach.... [After 4 years] I still had a lot to learn, but I had been given the liberating notion that I could teach myself" (Updike, 1985).

Turning students into independent learners may call for more patience and sensitivity than some professors have. It may call for a broader understanding of the material than some can develop. If students are allowed to control what they learn, they can try to visit corners of a discipline that their professors have not yet visited. While they were lecturing, they could keep their students out of those corners. Now they cannot. Professors who want to give the impression that they know all their subject well, should stick to lecturing.

In spite of these difficulties, some professors seem to become remarkably good at developing independent learners. Thus Moise (1965) attributes the success of R.L. Moore, who students became better research mathematicians than those from more prestigious institutions (Jones, 1977), to the fact that he seldom lectured. Moise claims that he heard

Moore lecture for less than 2 hours during the three and a half years that Moise was his student.

The idea that students should learn how to learn solves an important problem for those college professors who worry about what they should teach. If the purpose of a college education is to teach a student all about a given subject, professors wonder about, and argue about, what parts of (say) biology they should teach. They cannot teach it all and even if they could, the students would soon forget most of it. If they could remember all of it, biology would change over time and what they remembered would no longer be particularly useful. And even if the students remembered everything and the field did not change, they might end up selling toiletries—to which knowledge of biology might not contribute a great deal. If they learn how to learn, they can learn new things and different things that they may need in their lives. That does not mean that students should only learn how to learn. What they learn still matters, but it is not the only thing that matters and, from the viewpoint of this stage, it may not even be what matters most.

There is something poignant about this stage of our college professors' development. They began their teaching careers convinced that everything depended on their ability to prepare and present material. Now, here they are some years later, trying to help their students learn the material without their help. They may feel a bit like parents watching their children become more and more independent of them. But in one way they are different. They get new 'children' every fall.

Summary

There are two stages that we might add to my account—a pre-developmental stage (*stage 0: preparation*) and a post-developmental one (*stage 6: tuning*). The pre-developmental stage (Fig. 2) begins in graduate school, when our professors-to-be are still students and the students they teach have not yet entered the picture. Only the professor-to-be (self) and the subject are on the scene. In this stage, the nascent professors develop their understanding of their discipline in two ways—through their class work, in which they are (typically) told about it, and through their research, in which they try to work within it.

The next stage (stage 1: self) begins when the professors' students enter the picture (Fig. 3). Their presence forces the professors to focus on how they will pass the knowledge that they have acquired to their students. Once professors have developed their ability to do this well enough to satisfy themselves, they discover that their previously acquired knowledge of the discipline requires revision and augmentation, which leads them to learn more about their subject (stage 2 in Fig. 3). Professors enter stage 3 (of Fig. 3) when they realize that what they are trying to convey is not always getting through.

As they realize that, in some sense, what students learn depends on the learner as well as it depends on the teacher, professors begin to try to develop their students' ability to use the ideas of the discipline (stage 4 in Fig. 4) and to learn those ideas on their own (stage 5). Since the professors do not really enter directly into the relationships of these two stages—

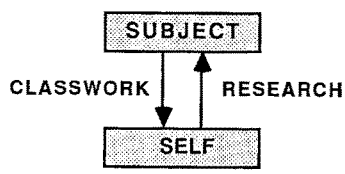

FIG. 2. Stage 0: preparation.

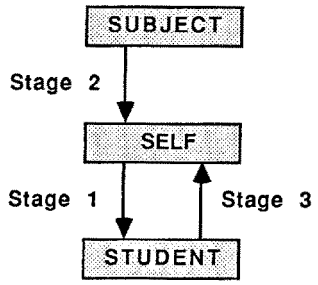

FIG. 3. Phase I: focus on teaching.

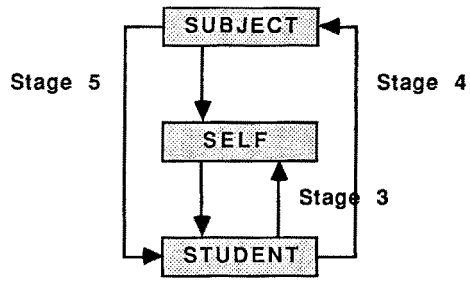

FIG. 4. Phase II: focus on learning.

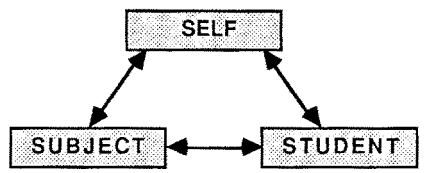

FIG. 5. Stage 6: tuning.

between their students and the subject (as Fig. 4 suggests) they serve more as coaches when they deal with the concerns of these two stages.

Once professors have developed some level of competence in dealing with the relationships between the three main elements of the classroom (self, subject and student), their need to deal with any one of them loses some of its urgency. Professors are now freer to choose the aspect of their teaching they wish to focus on. To return to the analogy of the searchlight scanning the prison walls, it is as though their searchlight had done one tour around the walls and could now be used to focus selectively on areas in which suspicious noises could be heard. At this point, professors enter what we might think of as *stage 6*: *tuning* (See Fig. 5). Their focus can now be shifted as needed. They can now revisit the concerns of each stage and 'tune' each aspect of their teaching as the need arises. They can tune several aspects of their teaching so that they work together in better harmony. And, when they teach a new subject, they may revisit all the stages in the original order.

Is this stage somehow better because it includes all the others? Perhaps. But just as a garden has room for plants that are grown for their roots (such as potatoes), plants that are grown for their leaves (such as lettuce) and still others that are grown for their fruits (such as tomatoes), so the university has room for people who excel in aspects of their teaching, as well as those who are fairly good at them all.

So What?

What is one to make of this account? As I suggested at the beginning of this paper, it can be looked at in several ways. It can be looked at as a story about how professors *might* develop that suggests a framework for thinking about this development. Such stories are not generally true or false. They are useful or useless. They are useful if people find the frameworks they suggest to be useful and useless if people do not.

It can also be looked at as the basis for a scientific theory that describes how professors *do* develop and makes predictions about how professors *will* develop. Used as such a theory, it can be true or false. To find out which it is, we would first have to define its concepts more precisely. Having done that, we could try to develop instruments to determine what stage a professor is in and use those instruments to determine whether professors really do fall into stages, whether those stages really do follow the order I have suggested and so forth. If this account turns out to be accurate, that will not mean, of course, that every professor will, or should, develop the way it says. To say that a theory about college professors is accurate is to say that it applies to some degree to some percentage of the population of college professors. Almost certainly we will find that it applies to some populations better than others. Differences may arise due to the characteristics of the individual professors (nationality, gender and the like), the characteristics of the institution (graduate, undergraduate, public, private and the like) and possibly the characteristics of the administrations and the students.

John Boehrer, of the Kennedy School of Government at Harvard University, and I have done one informal 'experiment' that suggests that at least part of this model may fit the development of a reasonable percentage of college professors. Before we presented parts of the account of this paper to a seminar at the Carroll School of Management at Boston College, we described what we meant by a 'stage', and then asked the participating professors to write an account of the stages they thought they had gone through in their own development as teachers. Most of the accounts they gave matched the account I have given here, at least through the first three stages. As evidence, this is only suggestive. It suggests, but does not really prove, that many college professors develop in the way I have described.

There is a third way this account might be used—as a model for how college professors *should* develop. Developmental accounts are often used in this way because people infer that what comes later must be better. That seems to be what Perry (1970) thought when he described the development of college students. But it is hard to see why this has to be so. Rotten tomatoes develop after ripe ones, but that does not make them better. Green tomatoes are better for some purposes (such as pickling) than ripe ones even though they develop earlier. One danger of the view that later is better is that it might encourage people to hurry through the stages so that they would get to the later stages sooner. But I believe that that would be counter-productive. The work that is done within a stage is important and cannot always be hurried. A tree that decides that it will not waste time growing roots, so that it can get more quickly to the job of growing acorns, might fall over.

There is, however, one guiding principle that my account does seem to suggest quite strongly. Developing is better than not developing. The development of college professors need not come to an end until they do. Teaching skills, like athletic skills, can always be improved or at least better tuned to the situation. While I was writing this paper, a student asked me what I was working on. "A paper about how college professors develop", I replied. "They *do* develop?" she asked. Yes, Julie, they do. And, if they are lucky, they keep on developing.

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Correspondence: Peter Kugel, Computer Science Department, W.E. Carroll School of Management, Boston College, Chestnut Hill, MA 02167, USA.

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