Curriculum and Conversions of Capital in the Acquisition of Disciplinary Knowledge

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Bourdieu (1986) suggests that students' social skills and cultural orientations are forms of 'capital' that can be converted into other forms of capital, such as high school of college performance or educational credentials. The argument developed in this paper is that within educational institutions curricular structures create pressures and constraints on such conversions of capital, in particular, on conversions of social capital into academic capital. The focus will be two undergraduate programmes—physics and management—at a major research university in the US. I examine the interplay of students' academic and social experiences in the two programmes and show how the curricular structures create opportunities and pressures for particular kinds of social relations that, in turn, influence how students perform the academic tasks embedded in the curricula.

In this analysis the term 'curricular structure' refers to the *network organization of pedagogical contexts* within disciplines. I introduce this term as a partial corrective to the practice of conceptualizing curricula as school-sanctioned repositories of knowledge—textbooks, examinations, and classroom materials—or as enacted knowledge—the knowledge accepted as legitimate in classroom interaction (e.g., Anyon 1981, Keddie 1971, cf. Whitty 1985). The analytical focus of such frameworks is curriculum as 'textualized' knowledge that can be 'deconstructed', critiqued in terms of the information it includes and excludes, examined for the implicit messages carried by a rhetorical form, or analysed in terms of the ways it values different conceptions of knowledge and its uses. But such analytic accomplishments are achieved at the price of an implicit endorsement of the basic assumption underlying existing curricula: the idea that learning takes place through students' encounters with knowledge in particular classrooms; that subject matter is learned, or not learned, or learned in particular ways, as the result of what happens in discrete classroom settings. What is ignored are the organizational structures of curricula, the patterning of students' academic careers through these structures, and the cumulative growth of students' knowledge over the course of their academic careers (see Nespor 1986, 1987).

An alternative conception of curricula begins with the premise that student learning takes place over long periods of time (months, years) as students move through systems of courses and contexts. From this perspective, academic learning would be a function of students' *academic careers* through curricula, and these curricula would be viewed as *sequences of organizational contexts* distributed over time. These contexts—courses, for the most part—would be said to consist of sets of 'activities' or 'tasks' analysable into four basic components: 'goals', objects or 'resources' that can be used to achieve those goals, 'operations' or actions that can be used to transform resources to achieve goals, and 'constraints' on permissible lines of action for achieving goals (see Doyle 1983, Nespor 1986). In particular tasks, or in particular courses, students may define task components in ways quite different than their teachers expect, but these task definitions are *not* idiosyncratic, nor do they merely 'reflect' differences among students. Rather, *students's ways of defining tasks are products of their cumulative experiences in curricula* (Nespor 1987), and, at least in curricula with the kinds of structures discussed here, task definitions are powerfully influenced, indeed are created, by means of 'conversions' of students' social and cultural 'capital' onto 'academic capital'. It is this process that I shall try to describe.

The first part of the study describes the structures of the undergraduate physics and management curricula at the university in which this study was conducted. The second part analyses the kinds of social practices students in the two fields develop to negotiate the demands of the curricula. The research reported here comes from a field study of four undergraduate majors (physics, management, sociology, and secondary science education) that differed markedly in curricular structure (see Nespor 1988). I need to note that only physics and management possessed the kind of curricula 'tightness' (defined below) that seemed to produce conversion processes of the kind described here.

The fieldwork was conducted at a large, state-supported research university during the 1986-87 academic year and consisted of 116 interviews with students, faculty, and administrators; over 100 observations of class sessions; the collection and analysis of course syllabi, catalogues, textbooks, and students' class-notes; analyses of 225 transcripts of recent graduates in the fields; and ethnographic observations and interviews with students outside the classroom. In the following analysis I rely most heavily on college catalogues for the discussion of curricular structure, on interviews with seniors in physics and management for discussion of how students experienced the curricula (14% and 12%, of the seniors [fourth year students] in the two majors were interviewed), and on course syllabi, classroom observations, and interviews with faculty for the comments about the task structures in the courses of the curriculum.

Curricular Structure

The curricular structures of the two programmes can be compared along three basic dimensions: density, tightness, and interlocking. *Density* refers to the proportion of the students's undergraduate course requirements accounted for by courses within the major field of study. *Tightness* refers to the proportion of the required courses (or hours of course credit) that are 'completely determined'(in the sense that the specific courses to be taken, whether or not they are in the major field, are prescribed and named). Finally, *interlocking* refers to the linkage and sequencing of courses in the major by prerequisites. When describing interlocking I shall speak of 'interlocked strings', the number of courses (or hours) linked by prerequisites. Table 1 shows the variation across these dimensions in the two fields.

Physics was a dense, tightly-organized, and highly-interlocked major. From their first through to their final semesters, physics majors moved through a sequence of courses that were completely structured by prerequisites. Figure 1 depicts the structure of the curriculum (I use generic labels instead of actual course titles to preserve anonymity).

Table 1
Course requirements in physics and management

	Physics	Management
Total hours for the Bachelors	126	120
Hours in the major	40	21
Completely determined hours	66-69	53
Longest string of interlocking hours	52	15

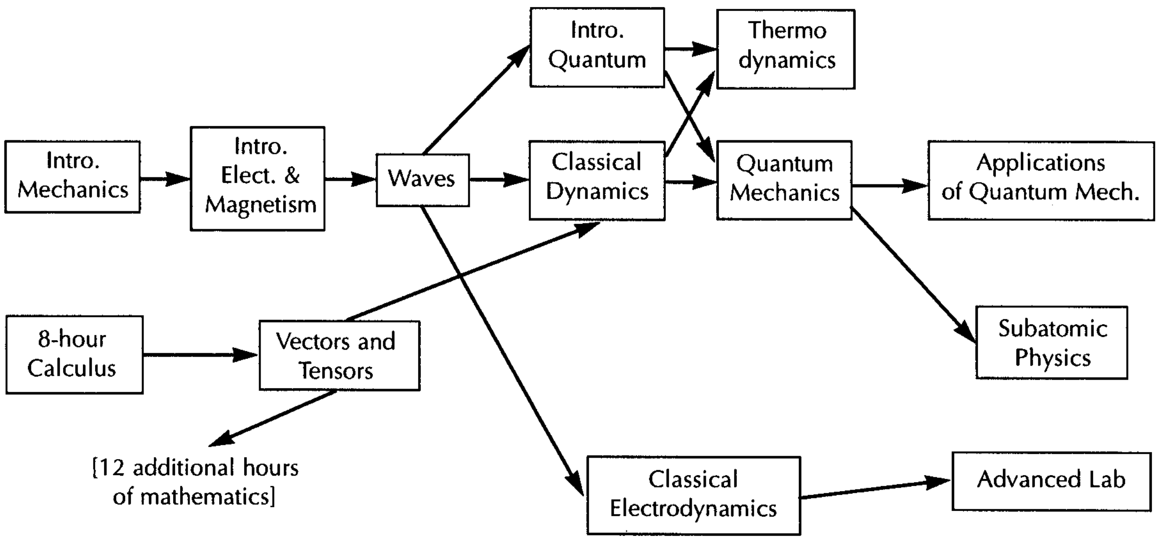

Figure 1 The physical curriculum.

Management, by contrast, had a low density (only 21 hours in the major), but a tight organization (49% of the undergraduate coursework is completely determined). As figure 2 shows, the curriculum derived its tightness from the large number of general business courses, or 'core courses', required of students majoring in the field: six hours each in economics, accounting, and finance; three hours each in statistics, data processing, business law, and marketing. By contrast, there were only nine completely-determined hours in management itself; no management courses were taken until the junior (third) year, and interlocked strings of courses were short.

These figures do not describe the actual course-taking patterns of the students, or even show all of the completely-determined courses students had to take (omitted are the nine credit hours of English, and the four hours each of government and history required for both majors). Rather, they show the curricular structures that formed the skeletons and musculature underlying students' idiosyncratic academic careers. These structures placed powerful constraints on academic careers by limiting the courses students could take, how many they could take, and when they could take them. Less obvious perhaps is the way these structures created pressures for particular kinds of learnings to take place. This is the topic I turn to now.

Conversions and Transformations of Capital in Physics

The undergraduate physics curriculum I studied was part of a longer physics curriculum that began in high school and continued to the graduate level. Students decided to major in physics while in high school, usually taking physics, and mathematics at least to the pre-calculus level. Indeed, the long sequence of prescribed courses beginning in the freshman (first university) year almost required students to have committed to a major in physics prior to entering college (the alternative being a significant extension of one's college career).

What the high school physics and mathematics courses did, then, was recruit and sort students, crating a small clientele for the physics programme, while preparing those students for undergraduate study. The high school physics courses introduced students to some of the basic concepts that they would encounter in Introductory Mechanics (and to lesser extent, Introductory Electricity and Magnetism). However, in addition to a more sophisticated reworking of subject matter already familiar to the students, the two introductory courses did three things.

First, they forced students to work more intensely and for much longer periods of time than they had in high school. The work itself might not have been especially difficult, but there were vastly greater amounts of it. As a student explained:

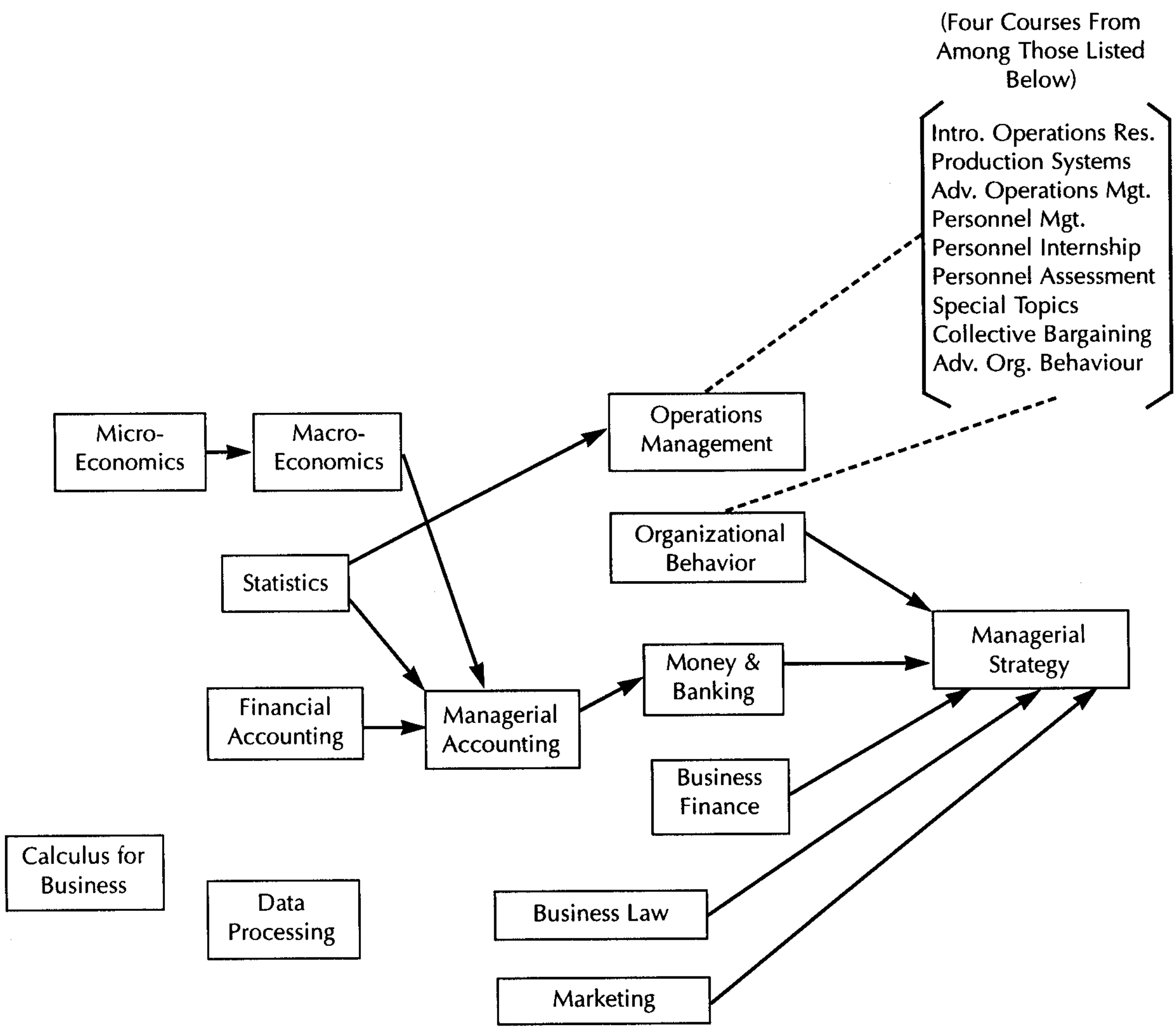

Figure 2 The curriculum structure of the management major.

> One of the things you get out of your early classes is you get used to doing a lot of homework. That may sound kind of funny, and it is, but it's true. I mean, when I was in high school I whipped through homework in five minutes towards the end of class. . . . So when I got here I wasn't used to, like, spending most of the night doing problems and getting three or four hours of sleep. And the massive quantities of homework they tend to give you in initial classes teaches you that you're going to have to do that, if not through difficulty then just through sheer volume.

A second and related function of the introductory courses, articulated for the most part by faculty, was to weed out students without the necessary knowledge and willingness to work. About 30% of the students were expected to fail in each of the introductory courses.

Finally, the introductory courses gave students a 'feel for the phenomena'. As one student explained, they provided:

> a better intuitive grasp for what's going on. By the time you've gotten into classical dynamics or classical electrodynamics the math is so powerful—it's just amazing to be able to solve these problems that you had to slave over in earlier courses just in one line. But if your introduction to these concepts . . . is through this very powerful mathematics you're going to lose touch with what's going on behind the math, with the physics. And so you develop, perhaps, your intuitive grasp of the real world in the introductory courses, as well

> as just an ability to comprehend this mathematics and apply it. . . . Its a levels process. In graduate school I'll take exactly the same thing (e.g., mechanical), except at a higher level of mathematics.

As this statement suggests, the physics curriculum was interlocked in a cycling, recursive fashion (a 'spiral' approach, one professor called it, 'where you circle around and bury into the tissue more and more'). As one student explained:

> After you've taken a course and you're onto the next level, you see how that course really help you to get to where you are now. And you do each step of the way. As you're actually taking it you're basically trying to get through the course, pass, get a grade, and . . . I find that I don't understand it as much while I'm taking it as I do *afterwards*, when I've seen everything. Then I see how it all sort of fits together and intertwines. So I find it more and more interesting as I get into the higher and higher levels.

But seeing how it all 'fits together' did not come easily, nor was it in most cases an individual achievement. Rather, understanding both within and across courses was a function of a *group effort* to produce a consensual understanding of the subject matter—students working together to accomplish course tasks.

This group effort was shaped and partially produced by curricular pressures. The density of the coursework in the major, the interlocking of courses, and the 'weeding out' that took place in the introductory courses, meant that by the beginning of the upper-division (third year) coursework (Classical Dynamics and Modern Physics) classes were small (about 20 students) and the students in them knew each other from past courses. In the lower-division (first and second year) courses students had begun experimenting with joint work in groups growing out of lab partnerships. These study groups crystallized in the upper division courses, and through the many hours spent together in and out of classes, physics students began to form close friendships with one another, often to the exclusion of other friendships (the female students were an exception, having friends unconnected to physics in addition to a core of physics friends). As a senior explained:

> Since there's a core set of courses, you usually go through them at the same time. There turned out to be some courses that you weren't taking with your other friends—depending on how they arranged their schedules it was sometimes different, but usually there was at least one person in your class that you had in a class with before. . . . I studied for maybe a year to two years with just the same people . . . you get to be real comfortable around them and you get to know them very well. And we've all become pretty good friends.

According to another senior, working in groups was a conscious strategy for academic success:

> I think either you're extremely bright or you're a fool if you don't get in a study group. Because you save so much time, simply because when you sit there, even if you're trying to explain a problem that you already understand to someone, you learn it that much better by explaining it. And you find out what you don't know while you're trying to explain it. Also, if you're having a problem with something, then someone else might have a different viewpoint on it so they might understand it a little better. And there's also the fact that you're not sitting by yourself for five and six hours on end, pounding over a problem. Instead you sit in groups of four or five and pound over them for four or five hours.

But group work was not merely a more efficient way of learning something that could be learned in solitude. As a senior explained, learning as part of a group was different than learning on one's own:

> If you just try to always think about it or write about it I don't think you ever know what you knew. You need to talk about it, you need to be able to put it into words, what you know. Because if you can't, then you really can't understand it. Working with other people forces you to put it into words, to say what you think, to say why you think your answer is right and his is wrong.

One reason why talking about problems was important was that the kinds of problems students were asked to work changed from the introductory to the upper-division courses. In the former, problems were routine, with well defined goals, operations, constraints, and resources. The emphasis was on learning to work. With the Waves course the emphasis shifted. Only a handful of problems were assigned each week, but they were less well-defined, providing ambiguous specifications of goal states and partial sets of resources (givens). Students could not simply 'solve' them, they had to refine their understandings of the goal and discover the relevant operations. In accomplishing this other students became key resources. As the student just quoted described the process:

> We work, just . . . basically solving problems. And we would just take turns. Each getting up to the blackboard and writing the next equation, and arguing about how things are, and why we believe the answer is this, and there were a lot of things that we found we didn't understand and we argued through some of them.

The instructors reinforced the emphasis on understanding by giving substantial credit for *how* problems were solved. As a senior explained:

> [The professors] don't tell you how to solve a problem. If you solve it in a valid method they have to give you credit for it, even though they may tell you, 'Well, that's not the way we wanted it done'. Most of the time they will give you at least partial credit. . . . They'll leave a note on your paper like 'Not exactly what I had in mind.' Lots of time . . . if you're wrong because of something you don't know about . . . they will give you most of the credit and say like, 'Excellent argument, however, see . . .' and they'll reference a book as to why this can't be done.

The formation of academically-oriented friendship and work groups among physics students thus produced shared understandings of physics, qualitatively different conceptions of the subject matter than would have developed among students working individually. It also had academic consequences. All of the interviewed students who worked in groups had above a B average in physics, the cut-off criterion for admission to graduate school in physics, while all of the interviewed students who worked individually had less than a B average. Although there were undoubtedly exceptions to this pattern, it seems clear that group work influenced grades, and through grades, one's chances of a career in physics.

Why then did four of the 11 seniors interviewed choose to work alone? There was no indication that groups excluded students. Rather, solitary work seemed to be a consequence of one of two factors: strong friendship networks outside physics (and students' entry into the programme in the upper-division), or working-class backgrounds that shaped the outlooks of students in ways that made them reject group study.

One of the four students, for example, had family ties in the area that monopolized his time outside the classroom. With no friends among the physics students, he failed several physics courses, and ultimately abandoned his plans to go to graduate school in physics.

Another student had joined a fraternity (during the summer before he began coursework at the university) and had found his time monopolized by fraternity activities. After making good grades in the lower-division physics courses he began to fail the upper-division physics courses.

> The first physics class . . . I did really well in that, but I'm sure that's because I'd had two years of it in high school. And the same kind of thing happened with my sophomores (second) year, taking the other two lower division physics classes. I didn't do as well, just because the stuff we'd had in high school wasn't quite up to the same level, but still I spent almost no time doing it, I spent a lot of time at the fraternity. And so my grades started to go down. . . . And then first semester junior year was rock bottom.

During his senior year, this student decided to go into secondary school science teaching.

Social class effects on students' orientations to group work were more complex. One of two students with working-class backgrounds had finished 'about 10th from the bottom of the class' in high school. Interested in science from childhood, he earned a degree from a state technical institute, but found himself dissatisfied with work as a technician. He came to the university and began at the bottom of the curriculum in the introductory courses, several years older than his classmates. His prior training did, however, help him find a place in a professor's laboratory as a device-maker. As he described his situation:

> I'm much ahead of my contemporaries, just by the fact that I've got a two-year degree and can design electronics. In physics there's not a lot of coursework designed to familiarize people with electronics. There's one course in the undergraduate curriculum, maybe two, but they're mickey mouse, by and large. . . . And so I can design things, and that's helped me out immensely.

This niche enabled him to survive in the major with a grade point average barely above a C. He still hoped to go to graduate school in physics, but was already pursuing other science-related jobs. He had no friends among the undergraduate physics students, he explained, 'because they have a very unsophisticated view of physics. They haven't ever done it.' More than this, he saw himself as having a fundamentally different approach to life than the physics undergraduates:

> I try to experiment and get things that are really outside of the physics train of thought, just because you can become, and this happens time and time again . . . people are so completely monomaniacal that they're just geeky idiots that know nothing about anything but how to solve the Schroedinger equation or something like that. And they're not able to carry on a conversation to people that are outside of their field. And I think that's really a shame. They're just not well-rounded.

The other working class student I interviewed, the son of a truck driver, used similar terms to describe other physics students:

> Most of my friends are not physics students. . . . [Most physics students] are very introverted and like all they think about is physics, all they want to think about is physics, apparently. You can't strike a conversation up with them about much else. They seem to be quiet and just basically boring. . . . They sit in libraries with books and read and that's boring to me. There's a whole world out there and you've got to try and experience it, in my opinion, to be a well-rounded person.

These students were not unaware of the benefits of group work, but they rejected it as an approach to learning. As the device-maker put it:

> I never work with other people. . . . It's not because I'm full of scruples or anything like that. I just feel that it's a personal endeavour for me. It's just a matter of thinking about things. That's the way I solve the problems. . . . Sometimes talking to other students, your classmates, helps, and a lot of people do that, rely on that, but I don't. And I'm certainly doing myself a big injustice, I think, because, well, it would just make things easier, but I've never been one to address things easy.

This student simply went over and over problems, spent enormous amounts of time on them, and often, by his own admission, failed to find the right path to the solution. The other working class students quoted here also did most of his work alone, though on occasion he sought advice from professors (which was somewhat unusual for an undergraduate).

Both students agreed that the kind of learning one got from working problems alone was qualitatively different from what one would get working in groups. One saw the results of group work as a shallow understanding of physics.

> The key to learning . . . is to understand what's going on, the basics, I mean, why it is happening. If you don't understand that a rock falls because masses attract each other, then you may be able to tell people, if you drop it from this tower it will be moving this fast when it hits the ground. But if someone perturbs the problem and makes it odd so that your formulas don't work exactly and you have to change them, unless you understand why it works, you don't know how to change your formulas. . . . You have to try to teach it to yourself. And some people, myself included sometimes, have a hard time doing it. . . . It's not a very pleasant thing to sit there for hours on end confusing yourself endlessly. And that's just the way you feel about it, you know. I don't feel that a lot of [the students who

work in groups] are worried about it. I don't think they have the right attitude. A lot of them are just interested in getting A's.

The device-maker put it another way, suggesting that the students working in groups acquired an artificial conception of physics.

As a student—what do you know when you know physics?—you know how to solve problems. Which is kind of nothing really to it—that's kind of a lie, it can be very complex, but you just know rules of mathematics, you know some logical thought, you know how to think. . . . So solving problems is just that, it's just something that you have to do. But in the real world situation [in the lab]—what do you know when you know physics?—well, I'll know nuclear physics, which is how, more or less, fundamental particles interact with one another at specific energies. I'll know electronics to design apparatuses. I'll know how my apparatuses work, and I'll know how to write computer programs to analyze my data because it's too complex to do by hand. And then I'll know what it means when I get it out. And so it's much more thorough, yeah, thorough. Academic problem-solving is very mindless in a way. I really have a lot of problems with academic problem-solving—not problems doing it, just problems motivating myself. It's so completely removed from what you have to do, ultimately. I mean, you're never going to have to have to sit and figure out how a penny spins and show it mathematically. And on top of that, everything is set up for you. It's so completely orthogonal to real life situations.

The group *versus* individual work split thus had fateful consequences not only for students' chances of continuing in the field, but for the approach to doing physics that they developed. Figure 3 depicts the curriculum/social organization/academic performance relations described above.

What the physics curriculum did, then, was create a structural pressure for the development of friendships or 'strong ties' (Granovetter 1983) oriented around the performance of academic tasks. Students' responses to these pressures were shaped by their social backgrounds and positions in alternative systems of strong ties. In the language of 'capitals', the curriculum functions as a 'converter' of one form of 'embodied cultural capital' (general tastes, modes of interacting, leisure-time preferences; see Bourdieu 1986) into a narrow and focused kind of social

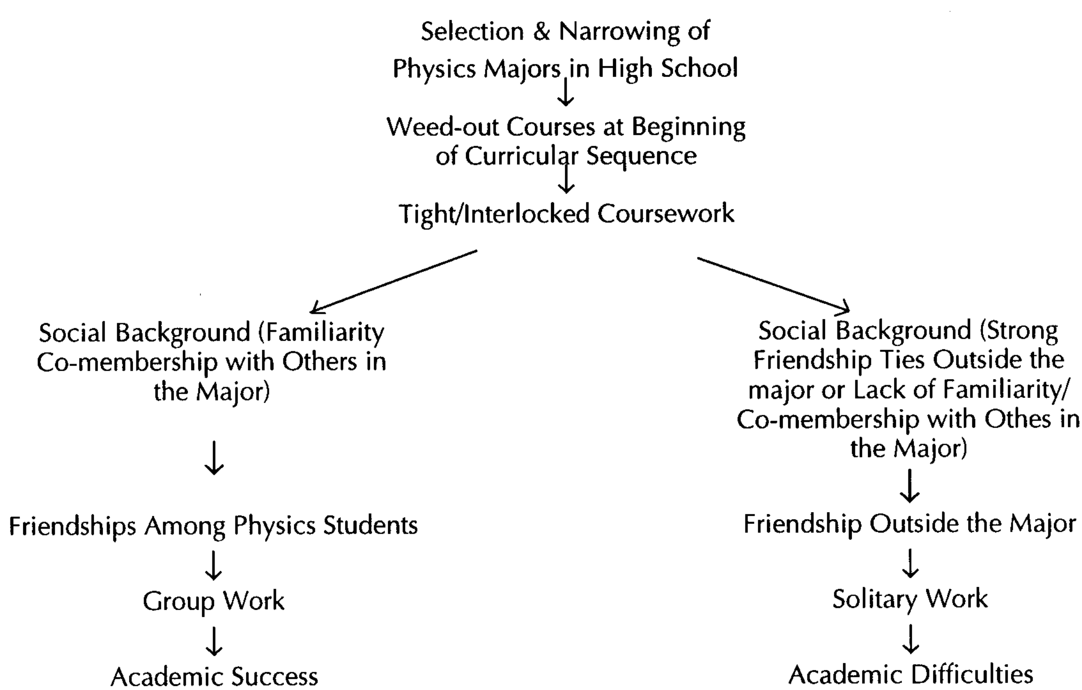

Figure 3 Conversions of capital in physics.

capital (friendship groups organized around physics problem solving and studying). This did not occur if students had different kinds of background capital, or if alternative social networks short-circuited the conversion. The students who did make the conversion were then able to convert their new form of social capital into a different form of embodied cultural capital (oriented to the kind of social skills needed for participation in the study groups). This cultural capital could then be converted in turn into academic capital through the process of group work. Ultimately, this academic capital could be converted into a kind of institutional capital in the form of admission to a prestigious graduate programme.

Indeed, although the study reported here did not extend to the graduate level, other research suggests that in some respects academic success can be seen less as a form of valuable capital in itself and more as a kind of institutional certification of students' possession of the narrow form of social capital. Ziman (1987: 63), for example, quotes one participant from his study of practising scientists as presenting the representative view that:

> You only use about 3-5% of your undergraduate training at postgraduate-level, anyway, even if you stay in nominally the same field of physics, and I think if you've got a scientific and technical training you can pick up the other 3-5% in another scientific or technical field . . . very quickly indeed, in a matter of months.

The inference to be drawn is not that the particular field of undergraduate education is unimportant. Rather, it is that the scientific knowledge and skills that students acquire as undergraduates are perhaps no more important than the way they learn them and the social and embodied cultural capital that they acquire in the course of learning them. Team research seems to be the norm both at the graduate and professional levels in physics (Kleppner 1985, Memory *et al.* 1985). This learning to work as the member of a team may be more than a strategy for academic success; it may be an accomplishment that begins to shape students' capacities for participating in the dominant forms of social relations in the professional work of the field.

Generation and Conversions of Capital in Management

Instead of looking at undergraduate education as a preparation for graduate study, management students saw it leading directly to the corporate world upon graduation. This aspiration seemed to flow from parental example: except for three students (two managers returning for degrees that would certify them for 'higher' positions), all of the students interviewed had parents who were managers, professionals, or business owners.

As in physics, the introductory, lower-division courses seemed aimed at weeding out the less able and motivated students. The courses were notoriously difficult, and some, like economics and mathematics, had no direct relevance to the rest of the business curricula. Business faculty had introduced various other measures to limit enrolment, such as a minimal grade point average (GPA) required of students seeking to take upper-division business courses (there were no GPA restrictions in physics). Unlike physics, however, the goal was not to produce a small, highly motivated cohort of students, but simply to reduce the very large number of students who wanted business degrees.

The introductory courses, then, were academic hurdles, not the initial stages in a substantive interlocking of courses. Beyond these courses, there was minimal interlocking in the major, and most of that was clustered around the Managerial Strategy class (essentially serving to make this the last management course taken by management majors).

Although the number of completely-determined courses was fairly large, then, the sequence in which they might be taken was largely up to the students. Moreover, unlike the situation in physics where only one section of an upper-division course was offered each semester (if it were offered at all in a given semester), in business multiple sections of the completely determined courses were offered each semester, and were taken by students from all of the business fields, not just management. As a result, management students did not pass through their courses together.

The lack of interlocking and group passage through the curriculum meant that management students did not form academically-based friendships with their classmates. Indeed, the friendship networks of most of the interviewed students centred not on business students, but on people from hometown schools, dormitories, or boyfriends or girlfriends.

The absence of friends in classes went along with the fact that students did not work together. All of the interviewed students rejected group work as a viable strategy, and it was a major source of dissension in courses where it was required (as in the Managerial Strategy class).

Finally, because the required courses were drawn from a wide range of business fields, and were only minimally interlocked, there was little consistency in the kinds of academic tasks students encountered as they moved through the curriculum. Task types were course-specific rather than general to the discipline. Unlike the 'problem'-based task structure of the physics curriculum, some business courses used large group lecture formats and required only that students pass multiple-choice tests (e.g., marketing), while other courses were oriented around problem-solving (e.g., accounting, operations management), research-based term projects (a number of the elective courses), or case analyses (e.g., business law, Managerial Strategy).

As a result, faculty could not assume that students taking their courses were familiar with the types of tasks they were to be presented with. This forced faculty to make the goals, operations, and constraints of the tasks highly explicit and well-defined. Even in Managerial Strategy it was necessary to review or reteach past lessons and explicitly relate them to the tasks at hand. As a teacher of the course put it:

> Like the accounting—many of them had the [Managerial Accounting] course, they normally would take it in the second semester of their sophomore year. For most of them that's two years back, and for some maybe three or four. It's way back in the recesses of their mind.... It's something when I lecture on it or go through examples, it stirs old memories, but it's clearly something that's right at their fingertips.

Despite the number of prerequisites for the course, then, students in Managerial Strategy needed only a rudimentary acquaintance with accounting, finance, and marketing to perform the tasks of the course (e.g., interpreting simplified balance sheets and calculating simple financial ratios), and most of the necessary knowledge was reviewed and provided in the course itself.

However, though there were no academically-oriented friendship groups among management students, no group study activities, and no curriculum-wide task types that would have allowed students to benefit from group study, there *were* several senses in which social networks were of extreme importance to management students.

First, because the students had to take specific courses but had control over when and from whom to take them, a premium was placed on information about courses and professors. Fraternities, sororities, and other student associations played important roles in the distribution of this information. As a student described the process:

> With the sororities and fraternities, what they do is like they . . . put them all into alphabetical order. They put 'Money and Banking' and they'll put 'Dr—' beside it, and they'll have a list. They'll have a 'good list' and a 'bad list'. And the bad list are usually professors that are incoherent... or something is not kosher. And then you have put your name under the stuff you wrote down. That means that people can come to you and ask you 'why didn't you like this class?' Like people will come to me and they're going to ask me' ...why didn't you like Business Finance with Dr—?' And I'm going to go 'basically because of my attitude, I didn't care. I wanted a grade, I wanted out of that class. I studied for it. It was just frustrating, because I tried and I couldn't do it. And therefore I don't like the class.' And they're going to go, 'Oh, okay'. And I'll go, 'But, you know, if you're a finance major and you get into economics and accounting, then that's fine, you'll love the class. But for me, uh uh'.... it's what people want, it's not just good or bad.

Often student organization meetings were arranged specifically for the purpose of allowing students to counsel each other:

> This next coming Tuesday, the Management Association is going to have a [meeting] about—we're just all going to get together and help each other out on who to take/who not to take. Or, if you want to take this, this is what you're going to have to do. So people know

> what to expect. It makes you feel like—maybe it makes you feel like you have a jump on the next guy—and you probably do.

All but three of the interviewed students used these kinds of advising networks (two of the three had outside jobs, and selected courses on the basis of what would fit into their schedules, the third 'researched' courses by sitting in on the first class session, looking over the course outline and the teacher, and then formally adding the works to his/her programme later).

A second use of the social networks was the distribution of task resources. The well-defined character of course tasks, along with the fact that students belonging to the networks took the courses at different points in time, meant that students became task 'resources' for each other. Most often, resource distribution took the form of circulating notes, test, and papers done for a class to students about to take the class. As one student explained:

> I save all [my notes], I have them all up on a shelf. Some people I know, younger, I've given them to, and I've gotten a lot of notes from people.... You might have an old test or two and you see how they're doing it. It helps a lot to study off of those.

Notes thus were passed down across generations of students

> A lot of people . . . they come and ask 'did you have such and such a class?' 'Yeah.' 'What were the tests like?' 'Well here's my test, my old test, my old notes and stuff'. I mean, I got all these notes from other people, they just keep getting passed down the line. So, I mean, I have them all, and I had a lot of them I've given away. So they've come in helpful, like me using other peoples' notes, cause I mean, it's the same class, but they'll get stuff out of it, maybe, that I wouldn't have . . . that's been really useful.It's just another set of notes that I would coincide with my notes, which I would then coincide with the outline of the chapters to try to get the basic ideas, the main points of the course.

Tests and writing projects (term papers) were also circulated. As one student explained:

> I'd say it's real prevalent in writing projects, as being passed on and somewhat amended in different areas to change it a little bit. So you've got a 20 page project that's due for professor X, and you've got a friend that says 'Hey, I had Professor X, I did this project, let me give it to you.' I think there's a lot of that going on. . . . Either that, or modeling it after another. Which would save a lot of time.

In many cases the stockpiling of tests became an organizational function. As one student, an officer in a service organization, explained; 'I save tests—I try to save many tests as I can. And I put them in the [organization's] test file for other people, to help them'.

Participation in social networks thus clearly had academic benefits, but these were by no means so clear-cut as in physics. Some of the students who participated in the networks had GPAs below the B level, while two of the three students who did not participate were well above the B level. In other words, participation in the social networks was neither necessary nor sufficient to ensure academic success, though by all accounts it improved performance.

Moreover, it would be misleading to suggest that joining fraternities, sororities, service organizations, or student associations was an *academic* strategy. Rather, the initial decision to join seemed to be a function either of 'social strategies' or 'career strategies'. By social strategy I mean a way of finding a friends or getting access to social activities. The physics curriculum supplied its students with a stable block of fellow majors with whom one moved from class to class. That, and the group study format, allowed students to form friendship groups that overlapped with academic groups. The lack of interlocking precluded this in management, but the tightness of the curriculum created shared interests and concerns, and outside organization provided a source of friends with whom one shared similar career goals.

For the most part, however, management students did not join organizations to find friends. Rather, organizational participation was a form of 'career strategy'. Put simply, it was commonly believed that job recruiters placed a premium on membership and activity in student organizations. Not only were the groups important for recruitment—as a form of social certification—they could also serve as means of access to jobs and employers, as introductions to job networks. As one student explained: 'Definitely one of the main advantages of [belonging to groups] is that it looks good to a future employer, I think, being involved, not just being a student'. Others echoed these sentiments:

> I'm in the management association and the marketing association here. I've also been in IASBCE, International Association of Students of Business, Commerce, and Economics. But I was only in that for a semester. [Nespor: Why did you join those?] Well, I hate to say it, but a lot of it had to do with resumes. Towards the end you say 'I've got to make that resume look better'. And while that's not a very good reason for starting it, I've really enjoyed my experiences with these associations, and thought that they've been very beneficial. Although I didn't get into them for maybe the right reasons or whatever.

Sometimes membership could lead directly to a job:

> I found a lot of friends in the business school just because I think you're so aware of 'networking' (laughs). And you want to make these friends, and it's just something that you do consciously. . . . I joined [the Management Association] because I was getting worried about getting a job and I wanted to have more contacts. And it worked. [The group's sponsor] got me a job.

As these statements suggest, many of the organizations' activities centred on making connections and learning job-getting skills:

> Like [in a service organization], you learn things that will help you in your business career. We have top business people come talk from all over. We fly them in and they speak to us and give us pointers. We have like executive cocktail parties. We don't drink at it but we have like 250 executives from all over fly in. We've had resume workshops.

The interplay of curriculum and capitals is thus in some ways more complex in management than in physics. In the first place, the associations and organizations that functioned as networks of 'weak ties' (Granovetter 1983) were stable entities that preexisted the student cohorts that participated in them. Unlike physics, where work groups were formed afresh by each class of students (most of whom were unaware of such groups among their predecessors), the fraternities, sororities, and associations were already there for the management students. Second, management students did not join these groups because of curricular pressures. Rather, they joined them for the most part to build up social capital. Indeed, the idea that business recruiters are interested in students' social accomplishments and organizational memberships was to a great extent signalled to new students in the business programme by the very existence and high visibility of such organizations. It was only when students joined the organizations that they discovered that the groups provided valuable information for negotiating the curriculum. That is, the structure of the curriculum made valuable such information as the groups possessed (knowledge about professors, information about tasks that will be encountered in particular classes). Figure 4 depicts these relationships.

The curriculum in management education, through the way in which it immersed students in the peculiar social world of the business school, thus seemed to act as a *generator* of social capital in the form of group memberships. This social capital could be converted in two ways: directly into another, broader form of social capital spanning the boundaries of the institution (i.e., job networks and 'contacts'), and indirectly into academic capital through the circulation of information about courses and resources for the performance of course tasks.

This dual conversion seemed to stem from the different role that academic performance played in business as opposed to physics. In physics academic performance was a direct reflection of both students' knowledge and their social and cultural capital. In management academic success could be the result of many factors and carried no clear implications about students' social or cultural capital. Moreover, there was a congruence between the academic world of undergraduate physics education and the academic world of graduate physics education that was lacking in the relationship between the academic world of the business school and the world of business. Indeed, good grades alone could have negative meanings for employers in certain areas of business. As one student explained:

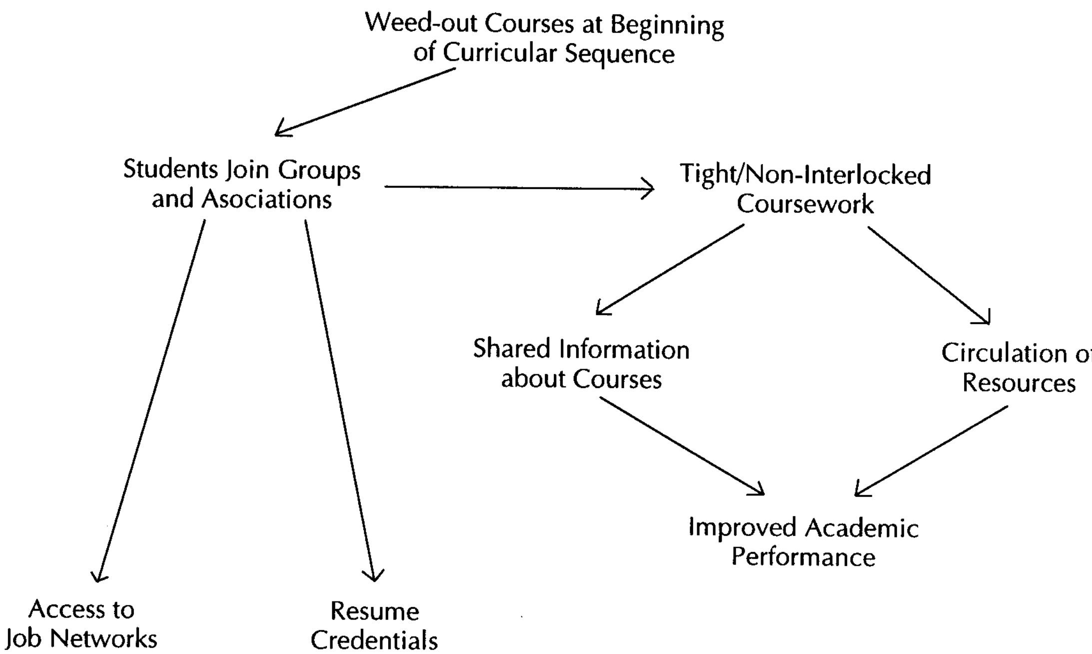

Figure 4 Conversions of capital in management.

> To accounting firms [good grades are] worthwhile, to engineering-type firms it's worthwhile—quantitative-type businesses. In marketing and advertising and many other fields [including management], [my high GPA] probably go against me. [Nespor: Go against you? Why?] I would have to prove myself. I would have to show them that I didn't spend the last four years of my life locked up in a room with a book.

Paradoxically, then, in some instances (where a person had a particularly high GPA), social capital might well have functioned to offset the academic capital into which it had previously been converted.

Conclusions

By looking at curricular structure as organizational instructions and resources for activity spread out in time, the approach adopted here focuses attention on the consumption or use of curricula rather than its production. The concepts of 'capitals' and conversion processes represent one way of talking about these uses. Taken together, attention to the curricular structure and capital emphasizes the temporal dimension of educational experiences and moves away from the preoccupation with specific classrooms, focusing attention instead on interactions across a network of classrooms and other contexts. The approach also allows us to talk with some specificity about the interplay of social and academic activity, though as presently formulated it may seem to stray unpleasantly close to economistic, rational choice models of action. This is not my intent. Instead, I am trying to develop a way of talking about curriculum as practice rather than treating it as a text to be picked apart through some sort of hermeneutics.

One 'problem' with looking at curriculum as the product of students' academic careers is that it undercuts our usual way of talking about curriculum. Rather than talking about 'the physics curriculum' or 'the management curriculum' we have to talk about 'the academic careers of physics students' and so forth (although I think it is still useful to talk about 'curricular structure' in the strictly organizational sense used in this paper). In a sense this article has taken the easy path in looking at two fields where particularly 'tight' curricular structures produced group effects that overlapped with organizationally-defined majors. By contrast, a discussion of sociology students, majors in a field with a very loose and thin undergraduate curricular structure, would have revealed an agglomeration of idiosyncratic academic careers among majors in the field. This is not to say that there were no conversion processes going on among sociology majors, simply that they were unrelated to sociology's curricular structure.

As this implies, curricular structure is not the only factor influencing or serving as a medium for conversions of capital. Social groupings organized along a number of lines—from athletic teams to groups of ethnic minority students to members of residential cooperatives—sometimes worked together and shared information and resources even though they may have been majoring in a variety of fields. Group perspectives may have emerged, but they did not correspond to particular disciplines or fields of study.

It is for that reason that disciplines such as the two described here deserve special scrutiny—for they involve the production of the people who will inherit the positions and institutional apparatuses of disciplines that control or influence important domains of everyday life.

This point raises the question of how curricular tightness and interlocking are related to disciplinary power and status. Although there is clearly a need for much more work in different fields and different kinds of institutions, from the evidence presented here one could speculate that fields preparing students for positions of power and status are structured so as to produce cohorts of graduates with shared outlooks, ambitions, definitions of reality, and strategies for acquiring and using knowledge. The curricular structures of the fields produced pressures for and served as resources for the problem solving in physics ad the 'networking' in management. Both kinds of activities can be looked at as kinds of normalizing technologies (Foucault 1977) suppressing difference and 'deviation' and insuring social and cultural 'reproduction' in spheres of power. The content of courses is of secondary importance. It is the structuring of social and academic experiences that accounts for the reproduction of paradigms.

The tight curricular structures of power-linked disciplines do not produce 'better' or 'more powerful' forms of knowledge than other fields. Rather, systems of power are created simultaneously with and interweaved with systems of knowledge in processes that spread out over years, pushed and shaped by organizational structures that become effectual only when experienced by people with certain backgrounds.

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