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AUTHOR	Larson, Jane O.
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ABSTRACT

Descriptions of curriculum often divide it into components entitled intended, implemented, and learned. Each domain intersects with the next to form a sequence of events in which curriculum, teacher, and students are major participants in the process of curriculum modulation. The focus of the research reported in this paper was to study the learned curriculum which is defined as the sum of student's learning in the areas of concepts, skills, attitudes, cognitive abilities, and understanding the nature of science. During the course of the study within a Department of Defense Dependents School on a military base outside the continental United States, the objectives were extended to explore the phenomenon of the hidden or unintended curriculum and to define, clarify, and interpret its presence, possible causes, and effects within the student culture of the chemistry classroom. The results from this study indicate that the social order created by the students represented their adaptations to educational circumstances, both local and institutional, and the consequences of the unintended curriculum influenced social and personal values and attitudes. To minimize the effects of undesirable, unintended consequences of the hidden curriculum educators must continue to examine the social construction of knowledge and the meaning that various experiences have for individuals, determine causes, and retailor classroom interactions accordingly. (Contains 25 references.) (JRH)

Fatima's Rules and Other Elements of an Unintended Chemistry Curriculum

Jane O. Larson
University of Colorado
Boulder, CO

Postal Address:
PSC 78 Box 4321
APO AP 96326

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Introduction

Curriculum Modulation

Descriptions of curriculum often divide it into components entitled intended, implemented and learned (Cuban, 1992; Duschl, 1990). As curriculum is planned and presented by a teacher and then learned by students, it appears to be transformed by various factors, a process termed curriculum modulation (Roberts, 1984). Jackson (1992) compares this process to the melting of an ice cube such that very little of the original entity remains by the time the final stage is reached! Traditionally, curriculum modulation has been linked to the 'teacher deficit image' (Roberts, 1988) which places fault upon a teacher who fails to ensure that the content and theoretical perspectives of the official, manifest curriculum are transmitted through recommended teaching strategies to students who receive or experience it in the original form. However, other commentaries on curriculum modulation recognize the uniqueness of classrooms and teachers, and state that such transformations are natural and inevitable (Cornbleth, 1988; Doyle, 1992; Mahung, 1984; Olson, 1981, 1982). Although studies have been conducted to validate the fidelity of learned curricula to intended curricula, e.g. Cronin-Jones, (1991), very little has been done to record the entire process of curriculum modulation in a natural setting in order to reveal and interpret the translation of content and theory from curriculum developer to teacher to student (Erickson, 1982,1992; Gordon, 1982; King, 1986; Martin, 1976; Steinhardt, 1992).

Theoretical Framework and Purpose

An ethnographic study of the intricacies of a chemistry curriculum modulation began with the following theoretical framework. Curriculum, here defined as a particular course of study to be taught, is divided into three domains - the intended, implemented, and learned (Duschl, 1990). Each domain intersects with the next to form a sequence of events in which curriculum, teacher and students are major participants, the process of curriculum modulation. Internal stakeholders, i.e., the state or district administration, local school administration, curriculum developers, and teacher contribute to the formation of a vision of the intended curriculum. For the purposes of this study, the final version of the intended curriculum was that constructed by the teacher from those sources to guide his implementation of the chemistry curriculum. As a function of the teacher's knowledge, beliefs, and actions, the implemented curriculum domain represents the actual teaching of the curriculum. The focus of this study, the resulting learned curriculum, is defined as the sum of student's learning in the areas of concepts, skills, attitudes, cognitive abilities, and understanding the nature of science.

As the study got underway, an unintended hidden curriculum became evident within the student culture. This was manifested in an active classroom subculture that created a system of learning strategies and social behavior, not evident to the teacher, in response to the implemented curriculum. Therefore, the objectives of the study were extended to explore the phenomenon of a frequently discussed and often challenged adjunct to curriculum modulation - the hidden curriculum. Although it has been given various definitions, in this case the hidden curriculum, labeled the 'unintended curriculum' (Martin, 1976; Portelli, 1993), was considered the outcome of student mediation of curricular and contextual factors into adaptive strategies, behaviors, values and attitudes. These adaptations are often in direct contrast to the versions intended and implemented by the teacher. Thus the unintended curriculum became a complement to the learned curriculum domain, a covert discipline underlying its overt counterpart. The purpose of this section of the study was to define, clarify, and interpret its presence, possible causes and effects within the student culture of the chemistry classroom.

Methods and Data Sources

The process of curriculum modulation is predicated upon an ecological perspective in which an understanding of curriculum is formed by interrelationships of all participants and contexts involved in the teaching-learning process. In keeping with this, an ethnographic methodology was chosen to investigate the complex and diverse factors which contribute to the transformation of the curriculum. In order to reveal stakeholders' personal meaning systems and determine the nature of their participation in development of the intended, implemented, learned and unintended curriculum, I became a participant-observer in a high school chemistry class for an entire school year. I joined in daily activities with the students and recorded extensive field notes. A journal of personal reactions to participants and events was [illegible] to enable me to confront my biases and feelings and to understand their influence on the research, as well as to record ideas for further exploration.

Interviews with stakeholders in the curriculum modulation process provided valuable data. Mr. London (a pseudonym), henceforth noted as Mr. L., the teacher, was interviewed formally throughout the year, and we took part in frequent informal conversations. Six students, selected to represent high, middle and low levels of achievement, were interviewed at the termination of the school year. Additional data sources included Learning Logs, in which students wrote answers to content-oriented questions, without threat of a grade, in order to provide Mr. London and me with knowledge of their mastery of key chemistry topics. Finally, examples of student work, tests, and handouts were collected for analysis.

Data were analyzed with a combination of methods. First, Spradley's (1980) domain analysis was employed to describe the cultural environment of the classroom. Three levels of analysis - descriptive, taxonomic and componential - were conducted on successive types of observations. This method is considered effective because it uses the perspectives of participants to understand their meaning systems. Along with this, data were analyzed on a continuous basis according to methods outlined by Erickson (1986). As data collection continued throughout the school year, additional questions were generated to serve as foci for subsequent observations and interviews. This review and interpretation process led to assertions which were tested against the data for confirming and refuting evidence. The assertions, both suggested and supported by the domains extracted from the data, thus represent a combination of researcher and participant perspectives.

Setting and Participants

The study was conducted in a chemistry class within a Department of Defense Dependents School (DoDDS) on a military base outside the continental Unites States. The school has an enrollment of approximately 700 students in grades 7 through 12, mostly American military dependents. The school has a diverse ethnic student population, and as in any school, ethnic and cultural differences often exert an influence upon the educational environment. Chemistry was offered in three sections per day to an average of 22 students per 50-minute class. Most students were juniors concurrently enrolled in advanced mathematics. Class was conducted in a well-equipped room with six lab stations, and a nearby computer lab was available.

The chemistry instructor volunteered for the study. A veteran of sixteen years of teaching science and math, he has taught senior physics and ninth grade physical science at this school for six years. Mr. London is in his early forties and is involved in extra curricular activities. He demonstrates a positive attitude and good command of subject matter and he is well regarded in the community.

Interpretations

Mr. L's Intended Curriculum and Aspects of its Implementation

The model of the intended curriculum as an amalgam of curriculum content, preferred teaching style and theoretical perspective (Cronin-Jones, 1991) is used to describe Mr. L's intended chemistry curriculum. First, Mr. L chose to rely on the newly adopted chemistry text, Dorin, Demmin & Gabel, (1992), *Chemistry* published by Prentice Hall, Inc., for content objectives.

> "We're supposed to be covering a little bit of everything. For chemistry it's basically set. Density, how we use equipment, the basic concepts of chemistry, which is pretty well set. I feel that the authors of the book are professional people and they have written this book, so I tend to follow pretty much what the author is doing." (LI:5).

Mr. L's theoretical perspective for this curriculum was an outgrowth of his ideas on the role of the teacher, the role of the chemistry student, his theories of learning and of the nature of science.

> "They are supposed to ask me questions. I'm there as their helper. So their learning is their business and their job, so what I'm doing - I want to try and stress more that they need to ask me questions - and to use me. I shouldn't

have to go ahead and push them. They know that they have to do certain things. (LI:4).

Mr. L. hoped that as self-regulated learners the students would learn "how things work and being able to use the tools to make an interpretation." His emphasis was on creative investigation using the concepts from the book as a basis for exploration. "It's not just learning the book, but it's also experimenting and trying things to see if it works." The result of these investigations would be the formation of connections between ideas as well as a logical sense of thinking. "It's kind of investigating and thinking, trying to think your way through things."(LI:3).

In elaborating his intended curriculum, Mr. L revealed his theories about learning. Confusion is a term he frequently used - both in interviews and in the classroom with students. Mr. L believed that confusion in the Piagetian sense was a necessary starting point for learning. "First of all, I like them to attempt to read it so they get good and confused, and then we'll go back through it and I'll ask them questions." He often expressed satisfaction when students complained about not understanding, explaining that reflection on the ideas would lead them to better understanding. "Think about it," he said frequently to his class.

In addition, Mr. L viewed student construction of scientific concepts as a process of elaboration through time. "And hopefully they remember some of what they have in the back, because...we're going to pull on that information. And if it's in their pigeon holes somewhere, it'll be fuzzy there, but they'll remember it." (LII:13). Repetition and elaboration of ideas, Mr. L. feels, lead to learning. "I think they have to hear it, ..it's the same old thing: they have to hear it, they have to write it, they have to get confused..." (p. 9). Thus, through the steps of confusion, reflection, logical thinking and review, Mr. L believed students could accomplish meaningful learning. Memorization is not the key to mastery of chemistry concepts. "You could memorize all that stuff, and be able to write it down; that doesn't mean you understand it." (LII:9).

Intertwined with his theories of learning science concepts were Mr. L's views of the nature of science. Related to his ideas of learning, he conceived of science itself as a process of creative investigation based upon observations, experiment and reflection. The importance of man's sharing of ideas, of scientific development as a social process was another distinctive element of his conception of the discipline. He realized that many students believed that science was magical, mystical, and unrelated to their daily lives. Therefore, he emphasized science as humanistic, as the product of cooperating, curious minds whose goal was to understand the world around them.

It becomes obvious that Mr. L's instructional methodology was an outgrowth of his theoretical perspective and commitments to chemistry content. In his role as helper he hoped to serve as a clarifier of ideas to students who would exhibit their independence in learning through investigative group work, much as scientists do. As a believer in the meaningful construction of ideas through investigation, he emphasized lab work, assigned quarterly projects on topics of personal interest to the students, and emphasized important ideas in multiple ways. The demystification and humanization of science became a primary goal, to which end he often repeated, as in a discussion of Celsius' temperature scale, "Where did he get this idea? He made it up! You could make one up, too!"

> "I'm trying to get them to relax, to realize that it's just a bunch of stuff that we think about, and we give names to it. Sometimes students feel - at least I did --get caught up on a name. And it's not the name, it's the idea behind it. And we just happen to give it a name." (LIV:10)

Finally, the conviction that all the students were capable of learning chemistry was demonstrated in Mr. L's creation of a positive, supportive learning environment in which understanding rather than competition for grades was the motivating factor.

> "Empathy. To show the student that you understand what they're doing, so they realize that you're not...they can see that, hey, somebody else had that problem, so it's okay for them to have that problem. Just because they're lost doesn't mean they're never going to be able to go anywhere." (LIV:11)

Student Mediation of Curriculum and Context

A portion of my fieldnotes and journal are reproduced below to describe the student culture discovered through participant observation:

> *Fieldnotes 51. Friday November 19, 1993*
>
> *Mr. L.:"I have a few more tests to grade, so I won't return them today. What you need to do today - Work on Chapter 6 - there's lots of interesting stuff about atoms. We'll do something different - you can work in groups for Chapter 6. Put answers in the notebook. This is an important chapter because it leads into atomic structure of atoms and things like that. If you don't understand ask me, but ask your partners first. I'm setting up a lab for next week. Do 1 to 10 at least and maybe 11, 12, and 13 if you're done with the first ten.*
>
> *"On Labs - I want yours today. Get in groups - circle 'em up! Get to know who's in your group."*
>
> *Abe hasn't read the chapter. He notes that it is a LONG chapter. He and Betsy have a book. Fatima and Tyler will share. Tyler has to get a book from his locker and just walks out, I see, not asking for a pass. He returns shortly.*
>
> *Our group in the back right corner of the room begins chapter 6. We go right to the review questions on the second page of the chapter.*

1. Name the three major subatomic particles and describe their locations. (Fatima has begun to work assiduously. "The answers are on the chart on top of the page. All you gotta do is copy the chart.")

2. What is the net charge on a particle that consists of 12 protons, 13 neutrons, and 10 electrons?
(The kids are writing quickly. I say I need to read this first. Fatima gives me a lecture on succeeding in science: "If it's not covered in the review questions or in the back of the book, it's not gonna be on the test. In history, though, you read everything. In math, if you listen to the teacher's explanation, you're usually OK.")

3. Does the law of definite proportions apply to mixtures? Explain.
4. Does the law of definite proportions apply to elements? Explain.
(Here the kids are stuck, not having read thoroughly and not willing to spend the time or effort. They call for Mr. L. He explains with an analogy of his German wife making a pumpkin pie - for Americans 2 cups of sugar, for Japanese less because they don't like sweet things. In other words, I see he means that the composition can vary in a mixture. However, in comparing compounds H_2O and H_2O_2 we see that definite proportions must be kept. Finally, he explains that aluminum is an element and you can have 2 pounds or 10 pounds of it. The students appear to understand and write in their answers.)

5. Observe the tiles in a bathroom. Are the tiles always used as indivisible units? Explain.
(Here Tyler suggests each person could do a separate group of questions. Fatima says no - they are sequential so you wouldn't know what was going on. "Let's ask Mr. L before we write this down." Again Mr. L comes over. He suggests that if you are selling tiles, you could cut them in two. Then he gets off into a discussion with Tyler on how to measure the mass of a proton.)

6. When a customer at the butcher shop orders a pound of hot dogs, the butcher, before weighing the hot dogs, sometimes will ask, "A little under or a little over?" Account for the butcher's question in terms of continuous and discontinuous material.
(Since the Ss don't have a command of the vocabulary, they do not understand the question. I think it is because hot dogs are discontinuous and you must purchase them in wholes. Mr. L confirms my guess and I feel proud, not having read the chapter myself)

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This is the entry later called Fatima's Rules. It should include, but somehow misses, the use of bold words for finding answers. I was surprised at the *confidence with which Fatima has established these guidelines and the verity of them. If I confess, I've always known these same rules and used them with alacrity.*

To summarize;

FATIMA'S RULES FOR SUCCEEDING IN SCIENCE

1. *Don't read the book*
2. *Don't pay attention to any information not reviewed in questions at the end of the sections and/or chapter.*
3. *Look for charts, tables, and bold words.*
4. *Ask the teacher for help as soon as you're stuck.*
5. *Don't split up the work among members of the group to save time in getting answers if questions move sequentially through the chapter.*

Fieldnotes .'4. Friday January 7, 1994

Since I am far behind on questions and mixed up on content of the chapter, I decide to begin by surveying the vocabulary which appears as bold words through the text. Fatima is working with her group on questions, and I tell them I have to do more reading in order to get an overview of the chapter. She says I am crazy and begins to tell me how to pass the test in the easiest manner. Here are her rules:

FATIMA'S RULES FOR PASSING CHEMISTRY TESTS

1) *You do not have to read the entire chapter to pass the test.*
2) *Procedure to follow:*
    a. *do the problems by scanning bold words and captions*
    b. *discuss the questions*
    c. *pass the test*
3) *Do this a few days before the test, a little at a time, so you're not 'overstressed' on test day.*

It was an easy going, talkative class with kids working in small groups, mostly on topics other than chemistry as far as I could tell.

The above illustrates several features of the culture which developed in the chemistry class. First, Mr. L encourages the students with the promise of "interesting stuff" in the chapter which is "important". He advises students to work in groups. In his perceived role as a helper of independent learners, he tells students get to know each other and then to first ask their partners before consulting him on questions they do not understand. Some of the students have not read the chapter, some do not have their books. Rules are breached when Tyler walks out without a pass to fetch a book from his locker. The students appear to have completion rather than understanding of the work as their goal, hence they follow Fatima's rules and don't read the chapter, call the teacher as soon as they do not understand, all the while discussing their social lives. Fatima's Rules and the group's behavior typify students who have become 'school-wise' or 'teacher-wise' when they have discovered how to respond with a minimum amount of pain and discomfort to the demands, both official and unofficial of classroom life" (Jackson, 1968).

The Unintended Curriculum

As "active participants in the creation and interpretation of their social environments and actions", students "differentially mediate curriculum and context, both individually and collectively" (Cornbleth, 1984). In instances where the intended curriculum is not accomplished and gives way to a hidden, or unintended curriculum, we seek to explain the nature, the source and the consequences of the messages the students received. These are discussed within the assertions that follow.

Assertion 1: Institutional demands preempted Mr. L's intentions for students' meaningful learning.

The values and norms of the educational system are firmly implanted in the high school juniors who chose chemistry, a science elective. These students planned to attend college and realized the importance of a high grade point average. Therefore, the reward system was a potent influence in their school lives. Mr. L hoped for students to grapple with scientific problems, to investigate, to think, and to learn. However, the students were willing to sacrifice scholarship and creativity to the immediate rewards of task completion and success on tests (Snyder, 1971). In addition, the demands of a seven period day with a full load of academic classes impacted upon students' time and energy. In their final class of the day, the students in Mr. L's chemistry class could be expected to be at the limits of their energy reserves. Most students therefore aimed for the "highest grade with the least expenditure of effort" (Snyder, 1971). In order to succeed, they devised adaptive strategies such as negotiating for higher grades on tests, 'improvising' results on labs they did not finish, and formulating timesavers such as Fatima's Rules. Despite Mr. L's reduced emphasis on grades and flexibility in scoring tests and labs, students continued to exhibit more concern for the scores they received than the concepts they learned.

Assertion 2: A hidden curriculum was created in response to Mr. L's high expectations of students as responsible self-regulated learners which he demonstrated with relaxed measures of accountability.

"Students' views about what is in fact necessary to do are usually different from the tasks as expressed by teachers" (Portelli, 1993). The most pervasive expression of an unintended curriculum in the chemistry class appears to have its basis in the trust of Mr. L that students would monitor their learning, complete assignments, ask questions, and study for tests with a high degree of responsibility. In the absence of strong accountability measures, the students interpreted relative importance of assignments by due dates and point value. Snyder (1971) calls these "stratagems, ploys and adaptive techniques" which may develop when "professors often misread the cues which their students' signals" (p. 119). For example, when students did not ask questions, Mr. L assumed they understood the material. When they were off-task, he simply reminded them of the responsibilities of college life and provided hints for success.

The students, meanwhile, were involved in the gamesmanship of "playing school" (Cornbleth, 1984). In his role as helper, Mr. L frequently circulated about the room, stopping at each group to inquire on their progress and answer questions. A few groups were adept at having a question ready for his arrival, in the meantime discussing their social lives. Because they were encouraged to work together in groups, some students applied little effort to learning, stating that someone in the group was always available to help them and even the tests were done first in a group context . A 'card party mentality' was evident in many of the group. They often did their assignments with the informal chit chat of a card game, proffering a minimum of attention on the chemistry. Because Mr. L did not check the homework and only graded notebooks if students submitted them for extra credit at the end of the quarter, most students chose not to maintain complete binders of notes and problems. Mr. L did not give quizzes on new material, and the only review of problems was through mini-lectures during which many students talked. The atmosphere of the classroom was comfortable for students in the absence of academic pressure, but meaningful learning may have been sacrificed.

Assertion 3: Unintended learning outcomes and messages were evident in students' personal aversions to chemistry and their plans to discontinue their educations in science by the end of the school year.

Mr. L's goals were to humanize and demystify science and to make chemistry enjoyable. To this end, he encouraged students to participate in the process of science through projects and chemistry labs. His lectures were interspersed with references to interesting discoveries. He himself modeled the scientific mind, telling stories of his childhood when he researched and produced gunpowder, when he skinned a pet rabbit rather than bury it. His enjoyment in giving chemistry demonstrations that were 'sound and light shows' was obvious. In addition, the learning environment he created was supportive and non-threatening. He was always available to answer the questions he encouraged. He expected students to learn that chemistry was interesting, important, and do-able.

However, despite Mr. L's willingness to help, many students found the concepts of chemistry difficult to learn. Many became frustrated and ceased to complete the assignments for their notebooks. Labs, graded on a zero or 100 basis, were often copied from others rather than discussed for meaning. Contreras (1992) speaks of the "alienating practice of using formulas to solve problems" in the classes he observed. Given the nature of chemistry with its reliance on symbols, formulas and equations, many students, pressed by demands from other classes and the desire to 'get by', may have been alienated in the same way. In interviews with students, most expressed aversion to chemistry.

Linda: "Well, I do want to get a higher grade - I just don't understand it, it doesn't make sense to me. That's why I don't really...
Ethnographer: So you gave up, sort of?
Linda: It's all chemical. I'm not interested in it. All I worry about is to get out of that class and pass it. (SB:2)

Ethnographer: Do you enjoy learning chemistry in school?
Shelly: Well, no. If I had it to do over again, I wouldn't..
I think chemistry..it must have to come natural,
because it doesn't come..I like science, but the chemistry portion - I don't know, I just don't deal with chemicals. I guess I just don't have that much interest in chemistry. (SC:7)

Ethnographer: Why do you think some students do like chemistry?
Celeste: The really smart people in our class, they are good in math, too. And they're like those engineer kinda type people who like chemistry. But I just don't like chemistry.

Of interest here is the refusal of the students to blame the teacher. Attributions for poor performance and lack of interest were based upon students' perceived inherent inability to understand the concepts and upon the 'chemical' and/or mathematical nature of the subject itself. The source of this unintended curriculum is not apparent, but its messages and outcomes are clear.

Discussion and Implications

The literature on the hidden, or unintended, curriculum, reveals four 'major meanings' identified by Portelli (1993). The first, "unofficial expectations aimed at by educational administrators, and perhaps teachers and to a lesser extent parents" is the source of the unintended curriculum described in the first assertion. Here, Mr. L's intentions were overwhelmed by institutional pressures for academic success, influencing students to short cut understanding for test mastery.

Portelli's (1993) second meaning of the hidden curriculum is based on unintended messages or outcomes. Assertion 2, detailing the contrast between the teacher's and students' expectations and reactions, is a case of unintended consequences. The students apparently were too immature to take on the responsibilities for learning which were offered by Mr. L. Unaware of the extent of the coping behaviors developed by the class, Mr. L expressed his belief in the students' ability to regulate their learning.

Although the structure of schooling may have supplied implicit messages about society, the content of Portelli's third meaning, I must yield to Gordon's (1982) caveat that interpretations of classroom events not be more sophisticated than messages appropriate for the average student More fitting is Portelli's fourth definition of the hidden curriculum as created by students in response to the classroom context. In the present study, this form of the unintended curriculum was most obvious. Cuban (1992) describes high school classrooms where "students negotiate covertly but insistently with their teachers over the rules, the amount of work, the level of performance, and acceptable classroom behavior" (p. 223). All of these patterns of behavior were evident in the chemistry classroom.

Regarding the third assertion, a puzzling reversal of attitudes toward chemistry between teacher and students, the cause of this phenomenon is not as easily perceived. Gordon (1982) advances the Latent Influence Definition of the hidden curriculum. This reasons that the hidden curriculum may be more effective than the manifest curriculum because it is both transmitted and received unconsciously. The teacher may be aware of the primary consequences of his/her teaching, but secondary consequences, of which neither teacher nor student is immediately aware, may result from student mediation of classroom events. If this is the case with Assertion 3, Mr. L may have unconsciously influenced his students' negative reaction toward chemistry. It is tempting to label the event unexplainable. However, the prevalence of students' negativity toward the subject of chemistry, requires that a source of the message be sought. A clue is found in Celeste's interview response to queries about her loss of interest in science:

> *Celeste: It's hard, so I just close my mind. I don't want to try, because I don't get it. You try and you get bad grades anyway...*
> *Ethnographer: But aren't you getting an A in the class?*
> *Celeste: Yeah, but my tests, I mean, I don't understand. I get an A because I do my work, but as for like, if you could grade me on how much I know, I'd get an F, because I fail my tests, but I do everything else, like my labs and stuff like that. I like labs. I don't like the book and answering all those questions. I don't understand it.*

Celeste, a bright perceptive student, realizes that her high grade is not legitimate, she knows she does not understand, and feelings of wavering self confidence are apparent in her rejection of this subject which has been so confusing and frustrating. Snyder (1971) emphasizes that self worth and self esteem are bound within the hidden curriculum. Why has Celeste, usually such a competent student, failed to understand chemistry and therefore withdrawn from it? One possible explanation is the a mismatch in perceptions between Mr. L and the class. Believing that he guided the students in multiple contexts - reading the text, answering questions, labs, and lectures - and having students ask few questions, Mr. L concluded that the students learned the material. The students, possibly not willing to expose the extent of their lack of understanding, and hopeful that they could 'get by' on the test, never revealed their uncertainties. Thus they tried to preserve their feelings of self worth and self esteem. Mr. L's strong messages about the wonders of chemistry were rejected by feelings of inadequacy and rejection, creating an unintended consequence.

Significance

Since the hidden, or unintended, curriculum has been a subject of debate for over two decades, Gordon (1982) addresses "The Problem of Imputation" with two suggestions for presenting evidence of its existence. First, he recommends the researcher use the "Pervasiveness Test" through qualitative inquiry to illuminate examples and patterns to substantiate claims of a hidden curriculum. Second, he suggests that "lack of sophistication" by the observer allows the students themselves to illuminate features of the hidden curriculum rather than the observer imposing complex interpretations which may not exist within the classroom culture. As a participant observer I shared in chemistry class activities for the course of a school year and documented behaviors and attitudes which constituted the "classroom underlife" (Erickson, 1992). The social order created by the students represented their adaptations to educational circumstances, both local and institutional. As portrayed in the public classroom behaviors and in the private revelations of interviews, the consequences of the unintended curriculum influenced social and personal values and attitudes. It must be concluded that the unintended, hidden curriculum certainly does exist and, because of its nature, will continue to exert influence students. To lessen the effects of undesirable unintended consequences, educationists must continue to "examine the social construction of knowledge and the meaning that various experiences... have for individuals" (Steinhardt, 1992), determine causes and retailor classroom interactions accordingly.

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