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Cracking our own Codes: Creating Instruction for Increased Clarity and Appropriate Control

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Abstract: Throughout the process of designing or redesigning courses and curricula, understanding exactly what our curricula mean to instructors and students is essential. Curricula employ symbol systems that function as codes that point to outcomes featuring reproduction or production by students. That these codes may be appropriated for better course design has strong implications for manageable reform or development of higher education. Recognizing that the boundaries of disciplines is imposed by socially constructed and ordered classifications and frames allows us to creatively explore boundaries of our disciplines with an eye to repositioning our curricula and courses in conscious and sophisticated ways that encourage the development of potentially valuable new knowledge and skills. From relevant communication, semiotic, design and pedagogical theory, we explore the coded nature of our instructional designs; from that we have constructed a tool which individual or groups of instructors can use to determine what design changes may be needed for any course or curriculum; it can be used as well for developing grounded rationales for change or maintenance of present instructional designs.

Keywords: Code, Reproduction, Production, Communication, Meaning, Instructional Design

INSTRUCTIONAL DESIGN, APPLIED to higher education, is a relatively new phenomenon. Numerous articles and books grounded in the metaphor of "design" have been written to assist teachers at the primary and secondary levels (Davis, Hawley, McMullan & Spilka, 2005; Kalantzis & Cope, 1997; Reigeluth, 1983, 1999) and university (Boturri & Stubbs, 2008; Dick, Carey & Carey, 2009; Fink, 2003; Innes, 2004; Pace & Middendorf, 2004; Richlin, 2006; Wiggins & McTighe, 2005). As designers of curricula, university instructors often need ways of locating and assessing any course or course of study as part of a curriculum reflecting a discipline. Although these texts aim to provide valuable practical advice for using a variety of teaching strategies, we argue that significant attention must be paid to the abstract (invisible) nature of the communication processes that form the content in order to improve their usefulness.

This essay offers a theoretical approach and a practical tool that complements existing instructional design texts which aim to provide rational and research-based principles for course design (e.g. Gagné, Wager, Golas & Keller, 2004) by facilitating analyses of courses and courses of study for the purpose of making instructional design decisions that enhance the meaningfulness of courses for students. What's new is a focus on the larger, coded communicative frame for instructional communication.

In our scheme, decoding is the process of making sense of patterns of human activity that are symbolic and potentially meaningful. Such patterns are not always explicit, especially

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in educational contexts wherein many patterns of interaction and communication are taken-for-granted and most cognitive effort is devoted to the specific content of the instructional interaction, rather than considering the patterns of interaction. So, by discerning these patterns or "cracking" these codes, we can better understand and control the limitations that communication practices within each discipline invariably impose upon how each is taught. These communication practices form a part of the way meaning is made in educational settings (Green & Dixon, 1994). We know for example that scientific argumentation in classrooms is different from scientific argumentation amongst scientists, in part at least because of the nature of the communication practices (Driver, Asoko, Leach, Scott & Mortimer, 1994) Further, we can use understanding of these codes which regulate communication practices to identify ways to design courses and curricula that establish *appropriate* control over content and learning by us and our students.

In this essay we first lay out our case for approaching design from a communication perspective. Then we explain three explicit message systems used for designing and teaching courses in any discipline, the means for controlling them and the *productive* or *reproductive* results of their interaction. Finally, we present a tool for analyzing message systems in order to facilitate well-founded executive decisions for designing courses and curricula.

Instructional Code

Bernstein defines code as "a regulative principle, tacitly acquired, which selects and integrates *relevant meanings*, the *form of their realization* and *evoking contexts*." (2000, pp. 109). In other words, over time, we attribute meaning to patterns of activity and this structures or regulates our interaction. For instance, in both undergraduate and graduate teaching, instructors' or advisors' demands that research papers or theses present citations of established scholars to document what often seem to be reasonable conclusions by student writers drawn from their personal experience makes clear to students that legitimate knowledge is not personal, but that which has been vetted by experts in the field. The pattern of requests for documentation serves as a coded message which regulates knowledge claims.

Different disciplines organize knowledge differently (Chouliaraki & Fairclough, 2004; Pace & Middendorf, 2004) because the problems each is trying to solve vary considerably. For example, law organizes around genres of practical human relationships (contracts, business, civil, etc.) whereas engineering organizes around classes of physical phenomena (electrical, structural, mechanical, etc.). Consequently, the bodies of knowledge in the disciplines require different vocabularies and discursive codes. For example, law requires facility in argumentation and legal terminology; engineering requires facility with graphical and mathematical languages. The differing discourses of the disciplines shape core commitments to ways of understanding, analyzing, organizing, valuing, and (in some disciplines) critiquing phenomena within their purview. Consequently, through schooling, we are inducted into disciplinary frameworks and their approved applications (Polanyi, 1962). These implicit or taken-for-granted frameworks in turn influence decisions about how to facilitate and organize student learning. Understanding how discursive forces emanate from our disciplinary languages provides a way to explain or critique curricular and course designs.

Three Message Systems

Bernstein (1975) argued that education regulates social and cultural interaction through what he termed the 'three common message systems' that all educational institutions have in common: curriculum, pedagogy and evaluation. These three message systems work to make education '…an agency of socialization and allocation' (1975, p. 199) and through them, difference is produced and reproduced:

> 'Formal education knowledge can be considered to be realized through three message systems: curriculum, pedagogy, and evaluation. Curriculum defines what counts as a valid knowledge, pedagogy defines what counts as a valid transmission of knowledge, and evaluation defines what counts as a valid realization of this knowledge…' (p. 85)

Our disciplines and the courses we design to teach the knowledge constituting them are constructed from our disciplinary languages. Of course, not everything is discursively (socially) constructed (Hacking, 1999), but the terms that allow us to talk sensibly about specific ideas, concepts and theories necessarily are social constructions (Christie, 2002; Hacking, 1999; Vygotsky, 1997). This idea matters because it features the symbolic and communicative nature of teaching in any discipline. It also points to the embedded power systems that exist within educational organizations that affect instruction indirectly. For example, in professional curricula, essential ideas, concepts and theories are often defined by accrediting agencies which, in turn, affect what must be taught, when, and, at times, how content is taught (Schulman, 2005). The message systems used for instruction, due to their inherent coded nature, create hardly-visible or invisible conceptual and value structures that nevertheless must be properly handled by instructors in order to design, facilitate, assess and document what counts in any particular context as acceptable student learning.

Figure 1 names and organizes three message systems regularly used when teaching. That is, we communicate both explicitly and implicitly with our students using curricula, pedagogies and evaluations (Bernstein, 1971). These message systems merit analysis because, while they serve as complementary communication media, they also vary according to disciplinary and personal dispositions for classifying and framing the content taught. In developing our model, we will define and connect the message systems in order to make visible a third dimension of relationships*,* productive or reproductive codes, that when understood, advise us regarding decisions we make for modifying or maintaining instructional practices.

Curriculum

Bernstein (1971) defines curriculum as the relationship between units of content and the time allotted to treat them (p. 48). This differs from traditional definitions (Goodlad, 1960; Stark & Lattuca, 1997; Wiggins & McTighe, 2005). Surprisingly, it differs from the implicit definition of "curriculum" used by the National Educational Commission on Time and Learning which consistently treats curriculum as "content frameworks" consisting of common disciplinary divisions (p. 19). Bernstein's definition makes time a significant variable as it performs the function of articulating the relative importance of units of content. Simply stated, Bernstein argues that the material that gets the most time in any curriculum or class

session is then understood by everyone to be more important than topics or content units that receive relatively less time in treatment.

A related notion is timing of content. One function of curriculum is setting out when content will be treated which complements the allocation of time. Ordering content topics is more or less significant depending on the discipline. For example, Warren notes that in physics "students must have a thorough understanding of various ways of doing work (including electrical work) *before* going on to the derived, abstract and extremely difficult concept of energy" (p. 211). In contrast to such strict ordering, Joe Ayers, editor of *Communication Education* from 1999 to 2002 argues that order of content often has little relevance in communication courses (Crandall & Hazel, 2002). Differences between disciplines regarding the significance of timing of content can be dramatic. In spite of the variability of organizational flexibility, in our view timing is always meaningful.

Time on task, one of Chickering and Gamson's celebrated principles for good practice (1987) is another important dimension of curriculum. They write, "Allocating realistic amounts of time means effective learning for students and effective teaching for faculty. How an institution defines time expectations for students, faculty, administrators, and other professional staff can establish the basis of high performance for all" (p. 5). This is consistent with the literature from the K-12 arena (Meyers, 1990). While little research exists about time on task at the university level, it makes sense that the more students are engaged with significant or important tasks in their studies the more likely it is that they will learn what is important or relevant in their discipline.

The three patterns of time-to-content (allocation of time, sequencing topics, and time on task) enact meaningful curriculum codes. A serious analysis of curriculum (read as *time x content*) helps align what we believe to be important with our actual curricular designs.

Pedagogy

Pedagogy refers to the repertoire of specific strategies for presentation and processing of content (Bernstein, 1971). Patterns of choices within the repertoire suggest ways of understanding one's roles, relationships and functions within the learning process. According to Bernstein (2000), codes serve to select and integrate three things: relevant meanings, the means by which these meanings are realized, and the contexts which guide interpretation of the codes (p. 186). These three functions of codes then allow interpretation of the pedagogies discussed above. Two examples follow.

When we lecture regularly, the monologue not only articulates the explicit meaning of content for students, but it constantly (and implicitly) privileges the instructor's voice, perspective and interpretation of the content. Over time, if students experience presentations of bodies of fact with little or no historical narrative of their origination or evolution, students learn that knowledge exists in pre-fabricated form. Consequently, there is no place for their own knowledge, or critique of what they are learning. The architecture of the lecture hall or traditional classroom focuses attention on the professor or teacher. When this is reinforced by the almost revelatory nature of the lecture itself or the uninterruptable nature of teacher exposition (Edwards, 1980) it restricts interpretation of information to the lecture content and to the importance of the instructor. Consequently, what students want to know or need to know is understood to be secondary to the interests of the lecturer.

On the other hand, when we analyse the pedagogical code of, say, problem-based learning, we see that the meaning of information and experience is constantly up for discussion and the means by which these meanings are realized put students' discourse in the center of the instructional event—if they don't talk or write about the problem posed, they have no real hope of learning anything. The context of the problem-based learning strategy is typically different architecturally from the lecture and how the class is organized creates "grooves" for how students make sense of the content and the learning experience (Edwards & Westgate, 1994). In sum, the embedded, patterned, coded qualities of our pedagogical choices have meaning for students. The question is: what meanings are they making in response to the message systems we choose to employ?

Evaluation

Similarly, our choices of evaluation or assessment tools shape for students the meaning and value of some content units relative to others. The time allocated to evaluations or testing and levels of thought demanded by evaluations have meaning; the degree of authenticity of evaluation also provides an interpretive guide to students regarding the relative importance of various content units. The more artificial and contrived the evaluation, by implication the less significant the content treated by it.

The teaching of physics presents a complex example. Drawing from the British experience a generation ago, matriculating students from secondary school to university encountered a consistent problem of repetition of topics during the first terms in university programs (Solomon, 1981). Solomon's proposed solution, echoed by Chambers (1981) was a uniform core curriculum. Solomon made the argument that a curriculum that allowed only 25% for elective courses would be great improvement (p. 200). Chambers connected the curriculum and examination systems noting, "The existence of an agreed core syllabus[1] . . . will do little to improve matters unless the examinations themselves are structured to minimise 'question spotting'" (p. 201). He was well-aware of the meaning of examination as a measure of performance and reward. Faculty anticipated questions, taught to them, and students accepted the strategy because of the meanings attributed to scores on standardized examinations relative to teacher and school performance status. Examination boards in England set the exams in the content areas. Chambers (1981) went on to complain that, "there are still some boards whose examination papers do little to ensure adequate coverage of the syllabus. It is the nature of the papers [examinations], rather than the nominal syllabus, which really determines what is taught . . ." (p. 202). Chambers recognized that within the social context of secondary schooling in England, the coded meaning of exams indicated that test performance was more highly valued than knowledge understood by the students.

As noted above, the three message systems of curriculum, pedagogy and evaluation work together as code guiding student interpretations of the value and purpose of disciplinary content. While enthusiastic delivery of content or explicit statements of its value by instructors may be *understandable* to students, the tacit messages of the code created by the interactions of curriculum, pedagogy and evaluation are more *meaningful* to them. These patterns, woven

[1] A syllabus is usually an outline and summary of topics to be covered in a course of study. It is descriptive of what is covered, rather than prescriptive about what should be covered in terms of the curriculum.

from the available codes, articulate what counts as knowledge, skill and value within any particular discipline.

Two Forms of Control

In educational contexts, according to Bernstein (2000) the three message systems respond to two forms of control: classification and framing (p. 12). That is to say, for example, that curricula, pedagogies or evaluations do not exist in their own right, but serve particular instructional functions that must be managed. Classification and framing, as forms of control, shape the message systems to the purposes for which they are designed.

According to Bernstein, classification "refers to the degree of insulation between categories of discourse, agents, practices, contexts", and "provides recognition rules for both transmitters and acquirers for the degree of specialization of their texts" (Bernstein, 1990, p. 214). For example, communication studies is weakly classified because it draws some content and theory and methods from different disciplines such as linguistics, psychology, sociology and anthropology. On the other hand, theoretical physics is strongly classified because its concepts, theories and methodologies are distinct from other disciplines. Generally, speaking, the stronger the classification of disciplines and the more precise and defined their language and vocabulary, the greater their prestige and power. The structure of knowledge (and the degree to which learners must submit to that structure) shapes perceptions of the perceived value of any discipline. The more "mysterious" the knowledge, the more powerful it is. For example, theoretical physics is known by relatively few people; most of the knowledge cannot be inferred from common experience, and it requires understanding of complex mathematics while depending on data from extremely complex and expensive mechanical or computer-simulated experiments. On the other hand, the reflective observer of human behavior can know quite a bit about human communication processes without the need for esoteric mathematical descriptions or experiments. Theoretical physics is therefore necessarily more "mysterious" than communication studies since it creates substantial boundaries between those who know the subject and those who do not and those boundaries are meaningful. So, the greater the perceived separation between disciplines or areas within disciplines resulting from the need for specific or unique vocabularies, skills or theoretical commitments, the greater the degree of classification of each (Moore, Arnot, Beck & Daniels, 2006). However, classification does not operate alone.

Bernstein uses the term framing to name a complementary form of relational control in teaching. It "refers to the controls on the selection, sequencing, pacing and criterial rules of the pedagogic communicative relationship between transmitters and acquirers . . . ." (Bernstein, 1990, p. 214). Framing occurs at various levels of the schooling process—in organization and designation of disciplines, schools, departments, colleges, faculties, etc; framing also operates within courses as instructors select, sequence and pace acquisition of content (Moore et al. 2006). For example, a contract-based course design permitting students some choice regarding what topics they focus on, what assignments they complete and when they complete assignments exhibits weak framing. Traditional courses wherein instructors define all topics, assignments, rubrics and due dates exhibit strong framing as the pacing and sequencing is controlled and managed by the instructor.

Two Codes

Figure 2 displays two overlapping continua connecting classification and framing. Strong classification and strong framing create a reproductive code whereas weak classification and framing create a productive code. In other words, high classification and framing is expected to result in students reproducing ideas, installing precise skills, embracing standard procedures required to reach competence in some area of endeavour; engineering and medicine are exemplary reproductive areas. The complementary continuum is marked by weak classification and framing. Weak classification and framing invites students to produce new ideas, concepts, models, skills or techniques; art and literary studies are exemplary productive areas. The interactions of these codes make possible many sub-types that mix reproduction and production outcomes differently among the disciplines (Bernstein, 2000, p. 14).

Knowing the relationship of reproduction or production codes has implications for manageable reform or development of higher education. Understanding that the boundaries imposed by our socially constructed and ordered classifications and frames allows us to creatively explore the boundaries of our fields of practice with an eye to repositioning our curricula and courses in conscious and deliberate ways that encourage the development of valuable new knowledge and skills (Chouliaraki & Fairclough, 2004; Schulman, 2005).

Production and Reproduction Codes in Two Different Cases

Some examples of code analysis may be helpful at this point. The two areas that have been used so far for illustration, communication studies and theoretical physics, provide substantially different cases between which the reader can locate any particular discipline of interest.

Example 1: Communication Studies. Some years ago, the first author of this essay took over teaching an upper division/graduate Communication Studies course titled, *Communication*, *self and society*. The title itself suggests a weakly classified course. One of the problems with such a course, and the significant problem it had historically, was that it seemed to be about everything and therefore, nothing in particular. In fact, when the author first encountered this course in the catalogue, he dismissed it as a course in "picking one's navel." Challenged by his colleagues to do something more substantial with the course, he set about redesigning it. The problem, which he can now articulate, was the existing course (T_1) was so weakly classified and framed it was inappropriately productive for the area of study. (See Figure 3.)

For the course to function effectively as an elective in the interpersonal communication track within a traditionally weakly classified major, the author had to find a way to bring coherence and focus to the course while allowing some breadth of content. His solution was to strengthen classification by focusing persistently on the central role *communication* played in the reflexive development of self in society. Specific communication practices and theories of communication served as the anchor points for explaining the development of the self and society as mutually influential entities.

In practice, the new course featured technical vocabulary drawn from communication theory that provided students more complex and sophisticated concepts by which to systematically and logically account for specific communication phenomena. Students were required (i.e. stronger framing) to use the specialized vocabulary (i.e. stronger classification) developed in the course for purposes of explaining human symbolic behaviours and experiences. The

strengthened framing and classification created a more precise shared vocabulary through which the concepts and ideas could be explored more precisely.

Since evaluation in the original course design was very weakly framed (student journals of thoughts about "self"), a second intervention pushed toward reproduction by establishing rubrics for an array of optional assignments. Embedded in those rubrics were requirements for proper use of vocabulary, for rigorous logical argument, attention to documentation of relevant scholarly sources so reinforcing the strengthening of the classification introduced earlier. The shift exerted more power on the instructor's part, but still allowed students freedom to pursue topics and activities of interest within the course topic, while clearly articulating parameters of the course through contract grading. Notice that the course remained in the lower right quadrant of Figure 3; relative to many other courses; it was still weakly classified and framed. However, relative to its design at T_1, it was more strongly classified and framed at T_2. What is important in this case is the *direction* of change along the production/reproduction code continua. Design choices and changes were meaningful to students and colleagues because they could see patterns of student action stimulated by enacting a reproduction code through which more precise communication became possible. These patterns meant the course was more demanding because increased precision of disciplinary vocabulary and attention to reproduction are markers of disciplines such as engineering, physics, biology and the like, *toward* which the course moved with the strengthened classification and framing.

Overall, the new course design, achieved by purposefully modifying curriculum, pedagogy and evaluation, became more structured by building in characteristics of a reproduction code. However, the opposite move may be desired at times in other subject areas.

Example 2: Physics. Physics makes a good comparative case because it has a long history of a strong reproduction code (Moore et al. 2006). The English propensity for national syllabi provoked a debate some years ago about the nature of the course contents, how physics should be taught and the effects of evaluation on the processes. However, as the pace of knowledge development steadily picked up through the 1970s, it seems the strength of the reproduction code was widely perceived to be creating a deficit in student learning (Longair, 1984; Warren, 1981). Longair (1984), a Cambridge physicist, wrote:

> there is just so much material which lecturers feel they have to get through that all physics syllabuses are absolutely crammed full and there is little room for sitting back and asking, 'What is all this about?' Indeed, one becomes so preoccupied with the technical aspects of the subject which are themselves fascinating that one generally leaves it up to the students to find out for themselves many essential truths about physics. (pp. 2–3)

While from a constructivist perspective, it is generally important that students figure things out for themselves, there are some limits, one of which is accuracy of the conclusions they draw. Longair continued, "students were not quite clear exactly what theoretical physics is" (1984, p. 4). This was certainly a problem of teaching that required redress.

Interestingly, Longair's response was to present "a lecture course . . . to provide students with a broad outline of the nature of theoretical physics which would put them in a receptive frame of mind for the very intense courses . . . in the final year. (p. xi). One notable condition

of the lectures was that they were "strictly non-examinable" (p. xi). That is, since the lectures were set apart from the curriculum, they could not be included in the students' standard evaluation at the end of their course of study. Longair qualifies his pedagogical approach, by assuring his readers that his course "is in no way a substitute for the systematic exposition of physics and theoretical physics as they are taught in standard courses" (p. xii). However, he remains optimistic about his goal of "improving students' appreciation of physics as professional physicists know and love it" (p. xii).

Longair's solution to the problem set out above was a weakening of the reproduction code. (See Figure 4.) While reproduction of received theory and practice in physics is highly valued, Longair attempted to increase student knowledge of and love for physics by providing an "entirely personal view of the subject" (p. 5). Specifically, he weakened the framing of physics using the curricular, pedagogical and evaluation message systems. In the curricular system, Longair's "personal view" opens the discussion to a more subjective and variable way of seeing physics. In order to accomplish that, he apparently took a new approach in shaping the content of the lectures he provided. Note that even though the specific pedagogical strategy of lecture remained, changing the content to violate generic expectations was enough to qualify his work as a pedagogical intervention. Further, the fact that the lectures were non-examinable seems to have had a major, positive impact on student learning (p. xi) by emphasising the importance of students' interest in the subject.

Summary

The curriculum, pedagogy, and evaluation message systems are the primary instructional communication tools employed in the process of teaching; classification and framing serve as social controllers. Both the message systems and the forms of control tend to be visible to teachers and trainers. However, the interactions of classification and framing tend to be invisible, yet function as codes that serve to regulate meanings regarding what counts as legitimate knowledge in any area of study. Understanding or "cracking" the code moves instructors from haphazard users to purposeful users of what is usually an invisible communication process. As in the cases presented, the potential for greater clarity of purpose in teaching and greater control emerges when the code is understood and appropriated by instructors. Movement along the reproduction/production continua achieved by shifts in patterns of classification and framing seems to be meaningful to instructors and students in any course of study.

Through mindful analysis of the message systems (curriculum, pedagogy and evaluation) and their controllers, classification and framing, instructors can design learning contexts that address students' levels of knowledge and develop their expertise more fully. This can therefore challenge the underlying or implicit assumptions and limitations for the application of disciplinary knowledge in order to reshape how students, faculty and administrators value an area of study through curriculum and course design.

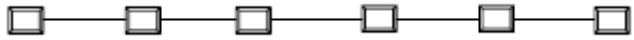
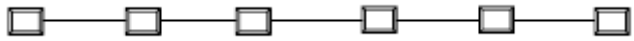
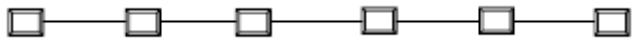
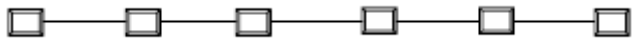
A Tool for Instructional Design

The following worksheet, built upon the theory presented above, provides a starting point for applying the knowledge of message systems and their controllers to instructional design projects. The tool is particularly useful for assessing instructional design decisions at the

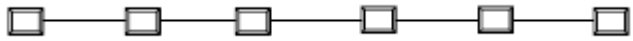
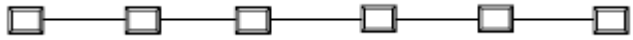
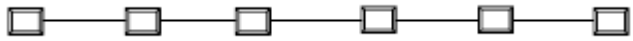
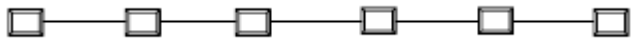
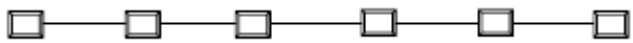
course or module level, but it can be used at the department or college level to assess curriculum design as well.

Directions for Responding to Worksheet [2]

Items in both sections respond to the overlapping continua of framing and classification. Consequently, the items are forced choices that attempt to measure the balance of factors you see operating in the message systems. *So after reading each stem, select the point on the scale that best describes the balance of factors you perceive.* For example, if you teach a course in which the time per topic (1.a.) is allocated by a standard syllabus, fill in the far right box.

Score A	*Framing*	**Score B**
	1. Curriculum	
	1.a Time is allocated to specific topics in a course or curriculum by: Students  Profession, Department or Instructor	
	1.b Topic order in a course or curriculum is: Variable  Fixed	
	1.c Instructional time is primarily given to: Student work  Instructor demonstration or lecture	
	2. Pedagogy	
	2.a The method of teaching used most in the course or curriculum is: Collaborative projects  Lecture	
	2.b Who is qualified to make knowledge claims? Students  Authorities (text, instructor, experts)	

[2] An online, automated beta version is available at: http://hypergraphia.wikispaces.com/Instructional+Design+Tool

	2.c How dependant are students on authorities for learning? Self Dependant  Dependant on authorities	
	3. Evaluation	
	3.a What type of evaluation predominates? Self designed projects  Objective Exams	
	3.b What levels of knowledge do evaluations predominately feature? Synthesis/evaluation  Knowledge/understanding	
	3.c How authentic are evaluations? Real problems *in situ*  Abstract problems	
Sum	**Maximum total for either A or B is 45**	**Sum**
Score A	*Classification*	**Score B**
	a. How unique are the skills, technology, theories, etc in your area of study relative to all others? Cross-disciplinary  Unique	
	b. How unique is the context to which course content and skill may be applied? General Application  Unique or highly specific application	
Sum	**Maximum total for either A or B is 10**	**Sum**

Directions for Scoring

Note that each item has two scores associated with it. To determine the scores for the far left box of each item, count the number of blank boxes from left to the filled box; for the right score, do the same in the opposite direction. For each item the total number of possible points is five. For example,

2	1.c Instructional time is primarily given to: Student work  Instructor demonstration or lecture	3

Sum the scores for all nine Framing items for A and then for B. Subtract B from A. Sum the scores for Classification A and B, then subtract B from A.
Framing Score:_____ Classification Score:_____

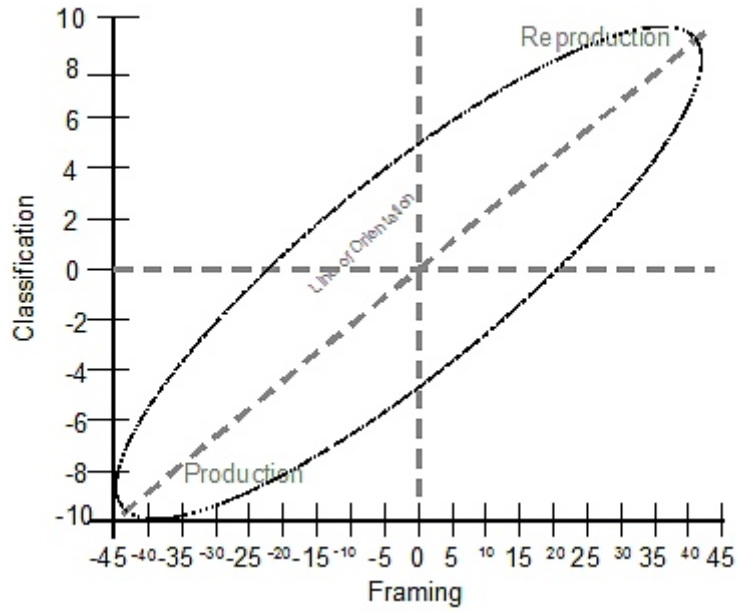
Interpreting Scores

Scores should be interpreted as follows:

Framing: > 30 high < 10 low	Classification: > 7 High < 3 Low

Plotting Scores

Using the matrix, plot framing score on the horizontal axis; plot classification score on the vertical axis. Use a line at right angle from the plot point to line of orientation to provide an estimate of the location of any course or curriculum on the production/reproduction continua. From that estimate, course or curriculum designers can make a judgment if changes need to be made, and; if so, in what direction such changes are likely to be productive.



Conclusion

As the examples discussed earlier illustrate, the level of design analysis can vary from a specific course to a national curriculum. The dynamic relationships among the many variables in the teaching process are often invisible, and therefore hardly controllable, until they are made visible by naming them. The theory and tool presented provide a systematic scheme for naming instructional message systems, organizing their relationships, and analyzing teaching as communication process. Bernstein's vocabulary complements existing models of teaching design in a flexible and functional way and it helps us to break the codes we implicitly use in order to design teaching experiences with greater clarity and appropriate control.

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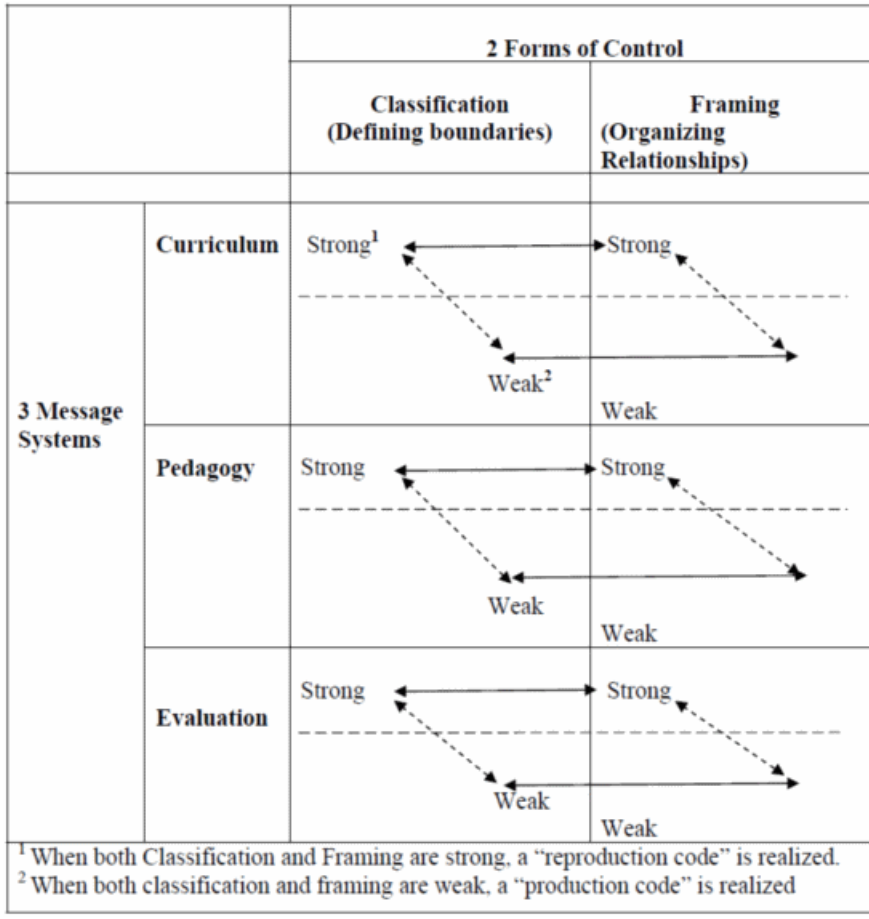

Figure 1: The Coded Relationship between Three Message Systems and the Two Forms of Control

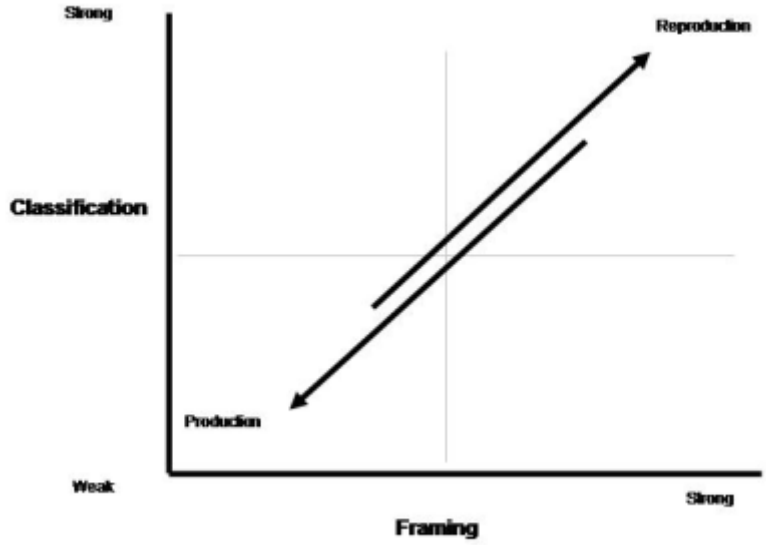

Figure 2: Displays the Coded Relationships between the Forms of Control, Classification and Framing

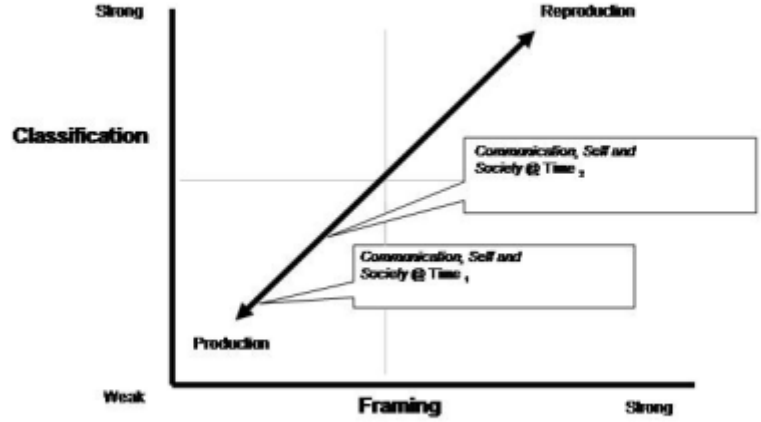

Figure 3: Original and New Location of Communication Course Mapped Relative to Classification and Framing

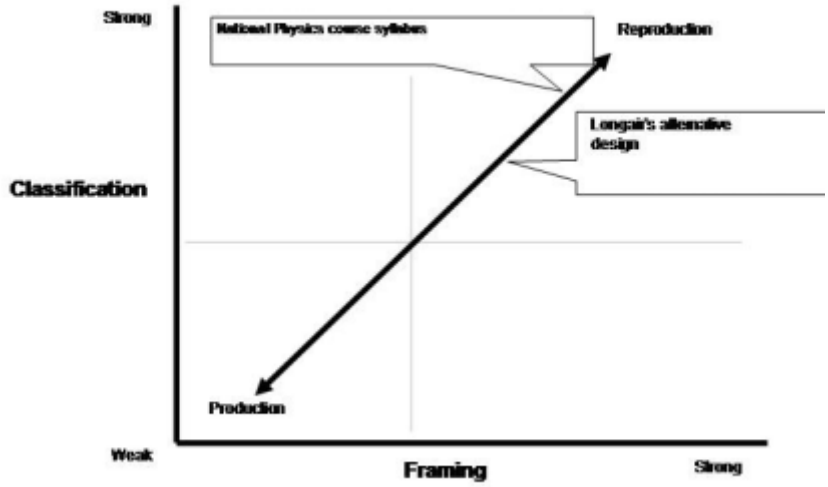

Figure 4: Map of Longair's Suggested Modification of the British Secondary Physics Course

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I am in my 28th year in higher education. My Ph.D. is from The Ohio State University (1987) in rhetorical theory and criticism; my M.A., also from OSU (1982) was in communication theory. These areas continue to ground my research and teaching. I am the lead author of Making Sense of Messages: A Critical Apprenticeship in Rhetorical Criticism (2005). In my 2006 sabbatical, I was Visiting Fellow at University of Newcastle Upon Tyne and Lancaster University and taught a short course at University of Zurich; all three postings surround the topic: principles of instructional communication. I have been recognized for excellence in teaching at California State University and by the Western Communication Association (representing the Western region of the United States). I serve as Assistant Director of the Center for Teaching and Learning at CSU Sacramento. Finally, I do consulting for the State of California on communication issues.

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My research interests include the areas of effective use of information and communications technology (ICT) and digital technologies in schools, understanding how learner's thinking and reasoning develops, and how teachers can be supported in developing the quality of teaching and learning in their classrooms. I have a particular interest in the educational philosophy of Pragmatism and the implications for teaching and learning. I am currently a member of the TLRP/TEL-funded SynergyNet research team, investigating the use of multi-touch tables in classroom learning. I joined the School in September 2006 from Newcastle University, where I was the founding Director of the Research Centre for Learning and Teaching.

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