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# Using Narrative to Build Community and Create Knowledge in the Interdisciplinary Classroom

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## Abstract

This paper tells two stories about interdisciplinarity: one is a practical story about interdisciplinary teaching in an acoustics course for students from both music and engineering; the other is a theoretical story about how Walter Fisher's ideas about narrative can be combined with principles of participative inquiry to provide a conceptual framework for the interdisciplinary classroom. We call on Fisher's idea that all forms of human communication are narrative at heart to advocate the use of storytelling in the classroom. The use of narrative makes it possible to initiate students from different disciplines into abstract knowledge in a field of study, create a classroom community that encourages the participation of all students, and produce new interdisciplinary knowledge that is unique to the members of that class.

## Introduction

We tell two stories about interdisciplinarity in this paper: one is a practical story about interdisciplinary teaching in an acoustics course for upper-level undergraduate students from both the music and engineering departments that Daryl has taught at the University of Calgary; the other is a theoretical story about how Walter Fisher's ideas about narrative can be combined with principles of participative inquiry to provide a conceptual framework for building community and creating knowledge in the interdisciplinary classroom. Fisher's ideas about narrative grew out of his concern with the way in which what he calls the rational world paradigm limited the participation of ordinary citizens in public discourse. We think his ideas can also be fruitfully applied in the context of classroom discourse as a way to open participation in knowledge creation to all members of a class, regardless of their degree of expertise in the field of study. Fisher's assertion that all forms of human communication are narrative at heart and that knowledge is "ultimately configured narratively" (*Human* 17) lies behind our approach. He regards narrative as a "ground where human scientists can and do meet, however they may pursue their individual projects" ("Narrative" 348). Understanding knowledge as narrative gives students from disciplines grounded in very different logics a meeting place for talking to each other, working together, and respecting each other's contributions. We call on narrative, both in its more limited definition as the telling of stories,

and in its broader definition as the means through which we perceive the world and communicate with others, to provide a framework for using students' stories of their experiences, in this case with sound, to initiate them into the academic study of acoustics, an area that is generally not taught at the undergraduate level. The use of narrative makes it possible to initiate students from different disciplines into abstract knowledge in a field of study, create a classroom community that encourages the participation of all students, and produce new interdisciplinary knowledge that is unique to the members of that class.

Below, we briefly describe what Fisher calls the rational world paradigm and then outline the main principles of Fisher's alternative, the narrative paradigm. This establishes our theoretical framework. We then introduce ideas of participative inquiry that point to a method for implementing narrative in the classroom. Finally, we describe the acoustics course in which Daryl put these ideas into practice. This is our story of teaching, one that we hope contributes to an understanding of the complexities of teaching in the increasingly interdisciplinary environment of universities today.

## The Narrative Paradigm

Fisher proposed the narrative paradigm as an alternative to the rational paradigm that he says has dominated western thought for several centuries. Central to the rational paradigm is the idea that people are basically rational beings who make decisions on the basis of logical arguments. The world consists of logical puzzles that can be solved through rational analysis and argumentative reasoning. Rationality is determined by how much we know and how well we argue ("Narration as a Human" 4). This perspective underpins much of the thinking in many academic disciplines, including engineering. The dominance of the rational paradigm means that knowledge that is based on logical argument is valued more highly than knowledge that is not.

Fisher believes that the assumptions of the rational paradigm limit our understanding of reason and rationality by separating logic from everyday discourse. He describes the rational paradigm as "but one way to tell the story of how persons reason together" ("Narration as a Human" 3). Fisher does not deny reason and rationality as understood in the rational world paradigm, and does not argue that the narrative paradigm should supplant the rational ("Narration as a Human" 2). Rather, he seeks to reconstitute rationality to offer another story about "truth, knowledge and reality" (*Human* 5). His very broad definition of narration as "symbolic action — words and/or deeds — that have sequence and meaning for those who live, create, or interpret them" (*Human* 58) offers an alternative to the notion that communication must be argumentative to be considered rational and paves the way for a perspective that includes values and emotions, as well as aesthetic considerations, as legitimate aspects of knowledge. While Fisher's ideas about narrative may not be the only or even the best way to understand knowledge, they offer a valuable heuristic in generating new ways of thinking about interdisciplinary teaching.

Fisher's narrative paradigm has five major "presuppositions":

1. Humans are essentially storytellers.

2. The definitive modes of human decision and action are good reasons, which vary in form among situations, genre, and media of communication.
3. The production and use of good reasons are ruled by matters of history, culture, and character, along with the specific constraints of time and place or presentation.
4. Rationality is grounded in the nature of persons as narrative beings, in their inherent awareness of narrative coherence — whether or not a story hangs together — and narrative fidelity — whether or not the stories they experience ring true to the stories they know or believe to be true.
5. The world as we live it is a series of stories that must be chosen among in order for us to live life in a process of continual re-creation. ("Narration, Reason, and Community" 314)

Fisher believes that "we experience and comprehend life as a series of ongoing narratives, as conflicts, characters, beginnings, middles, and ends" (*Human* 24). By this, he means not so much that we always tell stories or that all communication takes the form of the genre we call narrative; rather, he believes that narrative provides "a conceptual frame that would account for the 'stories' we tell each other — whether such 'stories' are in the form of argumentation, narration, exposition, or aesthetic writing and performance" ("Narration, Reason, and Community" 313). All forms of communication may be seen as narrative in this broader sense. And no form of discourse (for example, science or logic) can be elevated above others "because its form is predominantly argumentative" ("Narration, Reason, and Community" 318). Contrary to the assumption of the rational paradigm that sees science as logical and other forms of knowledge as non-logical, Fisher says that "[t]echnical discourse is imbued with myth and metaphor, and aesthetic discourse has cognitive capacity and import" ("Narrative" 347). Both forms of discourse, and the disciplines that call on them, have value, and regardless of the form discourse takes, it is always a story at heart. Narrative thus provides the meeting place for students from very different disciplines.

Central to Fisher's paradigm are his ideas about how people come to adopt particular stories as worthy of belief, that is, how some stories come to be accepted as knowledge. According to Fisher, people make decisions on the basis of what he calls "good reasons." Good reasons are the features of stories that persuade us to pay attention to those stories, and these include both logic and values. What counts as a good reason varies from one community or discipline to another. In science, for example, logical analytical argument is valued and provides good reasons for believing knowledge claims about the nature of the natural or social world. In the arts, on the other hand, experiential and aesthetic values provide good reasons to accept knowledge claims. But both kinds of reasons make sense to the members of the community or discipline and provide compelling "evidence" for belief in the claims of that discipline. We can thus regard communication within disciplines as the telling of stories both about what counts as a good argument within that community and about the values held by that community.

Disciplines did not, of course, spring forth fully formed exactly as they now are. They developed over a long period of time, and the stories that count as good stories developed with them. Science is particularly well known to be full of outmoded stories that have been discarded

as new stories have been proposed. In present times, not only do disciplines continue to develop and change, but also the very divisions between disciplines have begun to crumble. Stories that were once the exclusive property of one discipline have been adopted in whole or in part by other disciplines, leading to both cooperation among disciplines and to jockeying for intellectual territory and position. This dynamic is inherent in the ongoing negotiation of good reasons that makes up the process of knowledge creation, particularly in interdisciplinary inquiry.

A key aspect of Fisher's work for our story is his belief that all people have access to what he calls "narrative rationality." Narrative rationality refers to the capacity of all persons, not just experts, to assess the value of stories and through this to participate in public discourse. The grounds on which stories can be assessed are narrative coherence (in some of his work, Fisher refers to this as narrative probability) and narrative fidelity. Coherence has to do with whether or not a story makes sense: is it internally consistent, does it take into account other stories within which it is embedded, and does it present us with convincing and trustworthy characters? Fidelity refers to the truth qualities of a story: does it accord with a logic of good reasons and does it resonate with listeners' life experiences and beliefs? Fidelity involves weighing a story both for its logical and factual qualities and for the implicit and explicit values embedded in the story. According to Fisher, "narrative reason incorporates traditional logics as they pertain to communicative practices, but reinstates significant questions of values so that intelligence, authenticity, argumentative ability, and understanding are enhanced" ("Narration, Reason, and Community" 313). Therefore, people do not have to be experts to understand and assess the stories that surround them.

Fisher's assertion that narrative is the basis of community is also important for our story. "Communities," he says, "are co-constituted through communicative transactions in which participants co-author a story that has coherence and fidelity" ("Narration, Reason, and Community" 323). Fisher calls on a Habermasian view of "genuine communication as an ideal transaction, one of uncoerced, mutual, educative exchange" ("Narration, Reason, and Community" 309). He quotes Dewey, saying that communication is "a process of sharing experience till it becomes a common possession. It modifies the disposition of both parties who partake in it" (qtd. in "Narration, Reason, and Community" 308). While this may be an ideal form of communication, and one rarely achieved, Fisher does provide us with a framework for developing community, if not at the larger societal level, then certainly at a local, classroom, level. Ideally, narrative creates a community in which the contributions of all members of the class are valued and the creation of interdisciplinary knowledge can take place.

### Participative Inquiry

Principles of participative inquiry (Heron; Reason) offer a framework for applying Fisher's ideas in the classroom. The ideas presented in this section come from writings about participative inquiry as a research process, but we believe they apply equally well to the classroom. We have chosen the word *participative inquiry* rather than *problem-based* or *collaborative learning* as we believe that *inquiry* better captures the process of participation in a community in which all members — instructors as well as students — learn and participate in the creation of new interdisciplinary knowledge.

Like Fisher, adherents of participative inquiry reject the "orthodox scientific worldview" (Reason 324) as the only possible approach to inquiry. While not denying the value of the scientific perspective in providing for "critical public testing of what is taken as knowledge" (Reason 324), they maintain that the scientific perspective places the inquirer "firmly outside and separate from the subject of his or her inquiry" (Reason 324). They believe that this excludes and alienates people "from the inquiry process and from the knowledge that is its outcome" (Reason 325). They too propose an alternative worldview in which people are seen as "co-creating their reality through participation" (Reason 324). That is, through the sharing of their "experience, their imagination and intuition, their thinking and their action" (Reason 324), members participate in the construction of new interdisciplinary knowledge. Legitimacy is given to the capacity of all members to create knowledge through inquiry. While a "withering away" (Hansen et al. 303) of the expert is sometimes seen as the ultimate goal in participative inquiry, it is not likely or even desirable that this will occur in the classroom. However, it is possible to strive for a community in which all members (students and instructor experts) "negotiate meaning to produce a hybrid culture in which each is simultaneously student and teacher" (Hansen et al. 304). This does not mean that all members of the group will participate in the same way. In any classroom, some students are comfortable speaking out and others are not. But it does mean that everyone has an equal opportunity to be a full member of the group and its inquiry process.

Another aspect of participative inquiry is its transformative potential. While classroom activities might or might not lead to change in the structure of the disciplines, they certainly have the potential to be transformative for both students and instructors. Participative inquiry offers a way to demystify the process of knowledge construction and ideally produces change in the lived experience and personal development of all participants.

Heron provides a framework for putting the ideas of participative inquiry and narrative into practice in the classroom. He describes four kinds of knowledge that are at play in participative inquiry. *Experiential knowledge* is gained through direct experiences with the social and physical world. For our purpose, this includes both the experiences that students bring into the classroom and the experiences they have in the classroom. *Practical knowledge* has to do with knowing how to do something — knowledge demonstrated in skill or competence. Students generally have more experiential and practical knowledge than they think they do; one of the goals of participative inquiry is to encourage them to see that this is so. Through *presentational knowledge*, we order our experiences. This process generally takes the form of stories that we tell ourselves and others. Presentational knowledge provides the link between experience and practice and the final kind of knowledge, *propositional knowledge*. This is knowledge "about" something, generally expressed in the form of statements or theories that make knowledge claims of one sort or another.

Heron's classificatory scheme points to a method that lets the instructor of an interdisciplinary class "ground knowing and action literally in the body of experience" (Reason 334). Rather than relying on a set of notes to deliver discrete packages of knowledge organized according to the logic of the instructor or of the discipline, the instructor instead elicits narratives from the students about their experiences with the topic being taught. Regardless of

students' home disciplines, the experiential and practical knowledge presented in the students' stories contains elements that the instructor can use to develop or illustrate concepts related to course content. The instructor then stitches together these small islands of knowledge to produce an interdisciplinary view of the field of study. Through narrative and in the interplay of experiential, practical, presentational, and propositional knowledge, a community develops in the classroom that values the contribution of every member, as each story contributes to the development of interdisciplinary knowledge unique to that particular class.

### The Acoustics Course as a Context for Narrative and Participative Inquiry

We now illustrate the use of narrative to promote participative inquiry with a description of an upper-level undergraduate acoustics course taught by Daryl at the University of Calgary. The course is cross-listed in both engineering and music and attracts equal numbers of students from each discipline. The goal of the course is to teach fundamental acoustical principles and to develop understanding of a wide range of acoustical and scientific concepts. The course is interdisciplinary in that it synthesizes diverse forms of knowledge — science and music — with the surprising result that the students develop a level of acoustical and musical understanding that is greater than either science or music alone can produce. The specific goals of the course differ somewhat for members of each discipline.

For the musicians, the goals are to help them to understand the acoustical response of their instruments and to provide them with the language of acoustics. The musicians possess a sophisticated, although tacit, knowledge of sound. However, they have little or no acoustical knowledge of their instruments. Even a small amount of acoustical knowledge can enhance their ability to control their instruments and communicate better with audiences. For example, a musician who knows that the ear does not respond well at low frequencies can attend more carefully to the shaping of a phrase or to the articulation of the notes at low frequencies to make the musical effect more emotionally compelling. In addition, without an acoustical language, musicians are at the mercy of sound technicians and stage managers who are able to talk about sound using a language that is foreign to most practicing musicians.

For the engineers, the goal is to introduce them to acoustics at the undergraduate level without relying on math to talk about sound. Acoustics is a "math heavy" field that is generally taught only at the graduate level. Rather than focusing on deriving and manipulating the equations of acoustics, as is usual in an acoustics course, the equations are instead presented as a means of describing sound. This approach to equations — which is similar to the way in which staves, clefs, and notes are used in music to describe musically important aspects of sound — provides the engineers with an intuitive understanding of the mathematical and physical nature of sound, something that the equations themselves are often a barrier to.

Students from the two disciplines come into the course with very different intellectual frameworks and attitudes. The music students arrive with a vast storehouse of experiential and practical knowledge of sound. They have studied their instruments and played in music ensembles of one kind or another for many years before entering university and have devoted many hours daily to developing their skills as performers during their university education. They have almost no propositional knowledge about what they regard as the scientific aspects of sound, and at least some of them are terrified of this kind of knowledge (numbers and

formulas!), which they regard as clearly superior to their own knowledge. The engineers, on the other hand, come with several years of experience in using math to talk about the physical world. They know that they are in a course with musicians and that there will be less math than is usual in their engineering courses. They expect an easy course in which they will have no trouble being the superior students.

The preceding description of the expectations that the two groups of students have of the course and of their own relationship to the content illustrates what we might call the "knowledge hierarchy." As both Fisher and adherents of participative inquiry have pointed out, the rational paradigm is dominant in society and sets itself as a standard against which other ways of knowing, particularly experiential knowing, have generally been found to be inadequate. Both the musicians and the engineers assume that the engineers have the background training and tools that will give them superior knowledge of acoustics. Although it would be unrealistic to think that this knowledge hierarchy could be removed in society generally, it can certainly be leveled in the classroom. One of the strategies Daryl uses for doing this is to hold the class in the music building. This reduces the degree of intimidation felt by the music students and, he hopes, increases that felt by the engineers. The primary strategy, however, is the use of narrative, starting on the first day and continuing throughout the term, to allow all members of the class to contribute equally to the development of knowledge in the class.

### Narrative in Action

Daryl begins the course by forming groups that include students from both disciplines. Students are asked to introduce themselves to other members of their group by selecting an item from their wallet or backpack (e.g., a card or a book) and using this as a starting point for talking about themselves and their experience of sound. Daryl begins by telling a story of his own. For example, he might use his video store card as a starting point for talking about a movie version of the Puccini opera *La Boheme* that he recently purchased. This is an opera he played over 100 times in his first professional music job on tour with the Canadian Opera Company in the early 1970s. He continues to have a deep emotional attachment to this music. Through performing in over 100 different concert halls and gymnasiums, Daryl began to develop an interest in the ways in which the surroundings of an orchestra influence the response of the instruments and the acoustic experience of the audience. In this particular case, an additional purpose of the story is to establish that Daryl has training and expertise in both music and engineering and is therefore a credible leader for a course in which the goal is to integrate musical and engineering knowledge. After the group members have introduced themselves to each other, one person from each group then introduces the other members of his or her group to the rest of the class based on the experiences that have been shared in the small group. This begins the process of forming a community in the classroom through the stories of members of the class.

After the first class, each class begins with the presentation of a story on the topic of sound by one or more members of the class. These stories generally take the form of narratives emerging from the students' experiential or practical knowledge of sound. There are two rules for these stories: they cannot include demonstrations on instruments and they cannot contain

math. The music students, therefore, have to use words rather than sounds to talk about sound and are forced to explain discipline-specific concepts that they take for granted. The engineers fall back on talking about their experiences of sound, using what they soon realize is the inadequate vocabulary of everyday speech. Without prompting from the instructor, both the musicians and the engineers are motivated to keep their narratives at "street level," speaking in ways that will be accessible to everyone in the class.

As the telling of stories continues throughout the term, the knowledge hierarchy starts to crumble and a community of equals emerges. Every student has a story to tell about her or his experience of sound, and it is readily apparent to the members of the class that the stories of the engineers are not more valuable or credible than the stories of the musicians. In fact, when the musicians start to talk about their experiences of sound, the engineers quickly become aware that math is not the only language for talking about the physical and experiential world of sound and are often embarrassed about their own lack of experience and knowledge of music, in particular. The stories also show the students that they do not come into the course as empty vessels waiting to be filled with the privileged knowledge of the instructor. Instead, they realize through the telling of their stories that they each have knowledge about acoustics to contribute to the class; being able to tell their stories validates this knowledge as an important contribution.

The presentational knowledge that appears in the students' experiential narratives is used by the instructor as a bridge to propositional knowledge that exists in the field of acoustics. That is, the students' stories offer opportunities for the instructor to tell the scientific story of acoustics by connecting the stories to accepted acoustical concepts and principles. Exactly which concepts and how they are discussed remains unique to each class, as the instructor can never predict the stories that students will offer in any given term. The propositional knowledge that is discussed will therefore vary both in the order of its introduction to the class and in the content that is presented. In addition, both the students' and the instructor's understanding of the propositional knowledge is shaped by the stories that offer the opportunity to discuss particular concepts. The instructor uses the narratives as a starting point for discussion of acoustical concepts, but never lectures the students on the "right" way to understand these concepts. And the students are never tested on how well they know the "facts" or formulas of acoustics.

The following example illustrates how this process takes place. The story comes from the lives of the authors rather than from the classroom, but is an example of the kind of story a class member might tell. We (the authors) recently moved to a new house in a neighbourhood just down a hill from one of the largest hospitals in our city. On the third morning in the new house, Barbara noticed an irritating sound coming in an open window. It turned out to be the noise of the hospital power plant, located directly up the hill at the end of our street. This power plant operates all the time, sometimes making more noise, sometimes less, but never being silent. In addition, because the new neighbourhood is more "inner city" than our old one, traffic noise, particularly in the morning and evening, is much louder than in our old neighbourhood. Barbara became preoccupied with the noise, going around with a sound meter, not just in our neighbourhood but in every part of the city, reporting noise levels at every hour of the day and night. Daryl, who at first was not bothered by the noise, became sensitized by Barbara's

constant attention to the noise. When she checked with the new neighbours to see if the noise bothered them, they asked, "What noise?"

A story like this offers Daryl the opportunity to talk about many aspects of acoustics: Why are people more annoyed by some noises than by others? And why are some people more annoyed than others? Are there differences in hearing ability between young and old people? Why are some noises so much harder to control than others? Typically, Daryl will choose a few acoustical concepts to develop in detail, elaborating the ideas in the story, and always relating the concepts back to the story. For example, after this story, he might talk about the following: Noise is defined as a non-periodic sound containing a broad spectrum of inharmonic frequencies. While this "scientific" definition fits certain aspects of the noise in the neighborhood, the constant 60-cycle hum of the hospital generator (periodic and single frequency) is also noise because it is unwanted sound. The low frequency of the sound makes it very hard to control since a large and massive construction would be needed to attenuate the low frequency sound. In addition, because the hospital administration has been so unwilling to deal with the problem over the years, the annoyance level for some members of the community has increased to the point that any remnant of that 60-cycle hum will still be annoying. These extrapolations from the story form a bridge into the presentation of the basic mathematical relationships of acoustics that can provide useful information about the effects of frequency, amplitude, and material density and stiffness on the control of an acoustical system. The annoyance factor of the hum leads to an understanding of how the ear and the mind process sound and what makes some sounds pleasurable over time and others annoying.

The use of students' narratives must be maintained throughout the term, or the participatory nature of the inquiry is lost. That is, there is a danger that as the term progresses, narrative will be abandoned in favour of professorial knowledge. It is easy to start the term with students' stories and then, after a week or two has passed, lapse back into the traditional format of presenting teacher knowledge as the "important" knowledge that students should acquire. Participative inquiry demands that participation take place throughout the term. On the other hand, participative inquiry also offers the danger that the class will become simply the exchange of stories and the instructor will be seen as abdicating his responsibilities for teaching course content. The instructor must take the role of mediator between students' stories and accepted acoustical knowledge, drawing the material together into a focused body of knowledge related to the scientific story of acoustics, but the instructor never becomes the source of that knowledge.

## Evaluation

The main assignment in the course is an interdisciplinary group project. All groups must have members from both disciplines, and the projects arise out of negotiations within groups about their common interests. Groups submit proposals for their projects, and these are reviewed by the instructor to ensure that the topic and the scope of the project are appropriate for the course. One recent project examined the effect of padding the wall directly behind a school music conductor to reduce hearing damage for the teacher. Another project studied different ways to affect the sound production of a grand piano. The students spend a lot of time at the boundary that separates them and struggle to find a way to approach their project in a way that resonates

for both disciplines. Material for the final paper comes from a number of sources. One is the log books of their discussions that the groups are required to keep during the term. Another is the storehouse of stories that members have told throughout the term, as well as the "official" acoustical knowledge that has been developed. Daryl makes it clear that he expects to see reference in the final paper to all three of these sources of knowledge, in addition to the usual references to "authoritative" journals and books. This reinforces the idea that both the students' life knowledge and the project group's new knowledge provide valid material for building credible acoustical knowledge.

Evaluation in the course is problematic because of the assumption by both groups of students that their performance in the course will depend on their grasp of technical and mathematical "facts" about acoustics. The engineers come from an instructional culture in which their job as students is to find the "right" answer to problems. Although this is not the musicians' instructional culture, from past experience they nevertheless expect that in a science course, they too should be finding right answers. Disconnecting students from this quest for pre-existing right answers is a challenge, but doing so is essential in a course that uses an inquiry approach in which the students participate in constructing new knowledge. This does not mean that anything the students produce will count as acceptable knowledge. Drawing on Fisher's ideas of narrative rationality, the final paper is assessed on how well the story as a whole hangs together (coherence) and how well it accesses the complete range of knowledge generated during the course, including the students' own expertise and that of their classmates, as well as appropriate use of reference texts and journals (fidelity). In addition, the paper is assessed on how well the good reasons of the different disciplinary stories are integrated in the final product. These criteria, which are presented to students repeatedly throughout the course, allow the instructor to get away from either applying the standards of one discipline unilaterally or applying different marking standards for students from each discipline.

Through the stories, students in the course begin to have an understanding of how members of another discipline understand sound. Perhaps even more importantly, through their contact with members of another discipline, they also begin to have a deeper understanding of their own discipline. In fact, the musicians become better musicians through their experiences in this course. In general, musicians tend to emphasize artistic concepts in their talk about music but, ironically, are pre-occupied with technical and mechanical production in their everyday practice of music. As they find themselves having to explain to the engineers what they mean when they talk about sound in terms of shape, colour, and texture, they begin to pay more attention to these concepts and incorporate them into their own performance. The musicians also begin to consider the possibility of using the environment to their advantage. For example, they begin to understand that the directionality of the trumpet can be used to emphasize or de-emphasize the importance of the trumpet line. The composer Mahler, for example, sometimes directs particular groups of musicians to stand up or point their bells in certain directions at climactic moments in the score. After taking this course, the musicians are less likely to be tempted, as musicians often are, to ignore these directions.

The engineers, on the other hand, gain a better understanding of the ability of mathematics to model dynamic systems. They begin to see differential equations, for example, as a way to describe something that changes with respect to time and space in the physical world rather

than as simply an abstract puzzle to be solved. Through their contact with the stories of their musician classmates and as a result of the need to explain scientific concepts to the musicians, the engineers begin to connect mathematical models and measurements with the real world of sound and to understand both the possibilities and the limitations of the scientific approach to sound. The engineers also begin to understand how other people think, which is an essential aspect of the education of the successful design engineer. The engineers also begin going to concerts, much to the delight of their new musician friends and classmates.

## Conclusion

If we return now to the elements of Fisher's narrative paradigm and participative inquiry, we can see how the course described here illustrates these approaches to the interdisciplinary classroom. Understanding humans as natural storytellers and knowledge as narrative at heart provides the meeting place for students from very different disciplines and a rationale for the instructor to insist that engineering knowledge of sound is not by its very nature more important or true than musical knowledge of sound. Narrative also ties students' experiential and practical knowledge to propositional knowledge in the field of acoustics. Students come into the class with extensive experience of sound from their daily lives which they are able to share with the class by telling their stories about sound. As they tell their stories, they realize that they do really know something that makes a valuable contribution to the class and makes them active participants in the construction of interdisciplinary knowledge.

Each experience, each story, has embedded within it a set of good reasons that are displayed in the telling of the story. Whether students tell a primarily aesthetic story or a primarily logical story, each story offers the instructor opportunities to make these good reasons explicit and to show that all stories contain both aesthetics and logic. All students have both the capacity and the opportunity to assess the stories that are presented, both personal and disciplinary ones. The students are able to appreciate and judge the worth of each other's stories not because they conform to the requirements of particular disciplines, but because the stories have coherence and fidelity. And as the stories become incorporated into the growing body of knowledge created in the class, this new knowledge is also judged on the basis of its coherence and fidelity for class members.

Together, the class creates a community with its own character, culture, and history, and develops its own good reasons for the interdisciplinary knowledge developed. The end result is a process of re-creation of acoustical knowledge unique to this particular class. The use of narrative to create community makes the class memorable and provides a long-term basis for ongoing learning. The communal knowledge generated, and the course itself, will never be repeated in quite the same way, which makes for some difficulty in an academic world that values repeatability and the universal transfer of knowledge. But the strategies of participative inquiry create a learning community in which, to recall Dewey's words, the members of the class share their experiences, change the disposition of everyone in the classroom, and create new interdisciplinary knowledge. New knowledge is produced from the meeting of members of two disciplines.

Readers may object that without lectures and textbooks to provide solid grounding in the field of acoustics, students' knowledge must surely be below that acquired in a traditional class. Daryl's experience, however, has been that students' interest in and retention of the knowledge that is developed in the course far exceeds that developed by the traditional approach. Students show up at his office months, even years, after the course ends to discuss their continuing interest in their projects and to describe how they have developed and applied the ideas they learned in the course. For example, a recent fourth-year engineering design student proposed and carried out a project on saxophone design that developed from his experience in the acoustics course three years earlier. In addition, many aspects of the course are the same as they might be in a traditional classroom. The goal is to teach specific course content. The dominant narrative is that of the field of acoustics and the expectation is that students will know more about acoustics at the end of the course than they do at the beginning. The instructor sets the agenda and tone for the class and retains the responsibility of assigning marks to students.

The story we have just told is our story of teaching; it displays our values and good reasons, both theoretical and practical, for the choices we make in our teaching. But it may not be the story for everyone. We choose to commit ourselves to this story because of our professional and personal experiences. We both have past careers as professional musicians and current academic careers in engineering (Daryl) and communications studies (Barbara). In the end, we claim not that this is the only way to teach in an interdisciplinary classroom, but rather that this is only one of many possible stories about such teaching. It is, however, a story that has coherence and fidelity for us, and persuades us not only that students benefit from their experiences in the communities that develop in the classroom, but also that, in some small way, the creation of new interdisciplinary knowledge is advanced. As Fisher says, "Knowledge is found in the stories we tell one another" ("Narration as a Human" 15).

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