Topic 1 • Science Literacy Book Report (100,000 points)

PHYS-205 (H14) & PHYS-309 (3) • Spring 2004

Purpose

Science Classes

As a student, you have received science and science related information from your teachers. Whether you believe it or not is up to you. But a professional has taken the time to determine what sorts of things are important to know and with how much detail, both for the purposes of the courses you are taking and for the more general purpose of "Science Literacy", to help make you a better citizen and better able to function in our science & technology driven 21st Century.

How Will I Get Science Information in the Future?

For some of you, your courses at Western Michigan University may be the last time you will have the benefit of someone directing what science you are exposed to. So, what happens when you get to the "real world"? Well, you may be bombarded with information from all sorts of sources: your job, newspapers, magazines, books, television, radio, movies, the Internet, friends, conversations overheard while standing in line somewhere – you name it. What these methods may lack, though, is the control and expertise of your teachers. You can find all sorts of amazing information on the Internet, but you would have to be very naïve to believe 100% of *everything* you read there. Much of our news is dominated by politics, but how much science do our politicians know? At the moment, we have exactly one professional engineer and one physicist in the House of Representatives (both of these men are from Michigan – you *should* know who they are, but probably don't), none in the Senate. Most of Congress is made up of lawyers. While there is nothing wrong with studying the Law *per se*, legal arguments do not follow the same rules and purposes of scientific arguments. Therefore there is nothing that requires an environmental cleanup bill, for example, to have anything to do with either the environment or cleaning it up. Likewise, the talking heads we get our news from on TV are not trained in science and technology for the most part. I don't know what Dan Rather or Connie Chung majored in at college, but I can probably bet it wasn't Physics. They may have, unlike you, been able to graduate from college without ever having had a Physics course. Even on the cable channels, one of the hosts of a computer show I used to watch is now doing a cable show on gardening – go figure.

So how will you evaluate information on your own? This is possibly something that you have never thought about, but Dr. Phil and other professionals have. Dr. Phil's approach is to have you read a book and examine what you read and how it affects you, as well as whether you believe it. (You don't have to.)

Learning to "Parse" Information

Evaluating what you read in this context is very much in line with definition 3 of the verb *parse*:

> **parse** (pärs) verb
> **parsed, parsing, parses** verb, *transitive*
> 1. To break (a sentence) down into its component parts of speech with an explanation of the form, function, and syntactical relationship of each part.
> 2. To describe (a word) by stating its part of speech, form, and syntactical relationships in a sentence.
> 3. To examine closely or subject to detailed analysis, especially by breaking up into components: *"What are we missing by parsing the behavior of chimpanzees into the conventional categories recognized largely from our own behavior?"* (Stephen Jay Gould).
> 4. Computer Science. To analyze or separate (input, for example) into more easily processed components. Used of software.
>
> verb, *intransitive*
> To admit of being parsed: *sentences that do not parse easily.*
> [Probably from Middle English *pars*, part of speech, from Latin *pars* (*orātiōnis*), part (of speech).]
>
> Source: Microsoft Bookshelf '95 (*American Heritage Dictionary of the English Language* (Third Edition))

Dr. Phil's Definition of Science Literacy

> **science literacy** *n.* An exposure to science in a historical context that serves to allow a person to observe the world around them with understanding, deal with technological applications at home and work, appreciate the distinction between fact and speculation in the media and politics, have a working knowledge of numbers and the scale of the universe, and be able to pursue more information if desired, as a function of everyday life.
>
> Philip Edward Kaldon, Fall 1995

Books as a Source of Information

From all the sources listed in **How Will I Get Science Information in the Future?**, most are very difficult to evaluate. Dr. Phil can't easily watch hours of VCR tapes or interview your friends along with every paper he reads to compare your impressions with the actual information being presented. So by narrowing the choices to one medium – books – we can have a little control and consistency between papers.

For more than ten years Dr. Phil has been building up a booklist of suitable books. They are, as you shall see, not just Physics books, but cover all the Natural Sciences, Engineering, Computers, Technology, Medicine and the Morality and Ethics of using these. The total list is kept around a hundred titles. Books come on and off the list from time to time, sometimes because Dr. Phil gets sick of reading too many papers on Airframe or Jurassic Park, etc., and sometimes because some books work better with some classes (such as PHYS-309) than others.

Because this is not strictly a Physics paper but a Science Literacy paper, the range of books is considerable. There are fiction and non-fiction titles, biographies, science fiction, mysteries and *technothrillers* – books that straddle the line between science fiction and current reality – from some popular best-selling authors as Tom Clancy and Michael Crichton, covering topics that include Physics, Biology, Chemistry, Engineering, Computers, Mathematics, Technology, Medicine, etc.. The list is anything but boring.

It is easiest to pick a book you have not read before. And if you pick a title from the booklist, that's it. However, you may decide that (a) you have read everything on the list, (b) read everything you think is interesting on the list or (c) waited too long to get the book(s) you were interested in from the library and are now stuck. You may read a book that isn't on the booklist, but you must get Dr. Phil's approval beforehand and be prepared to hand in a draft of your paper at least one week before it is due. If you go ahead and write a paper on a book that Dr. Phil has not approved anyway, there is a 100,000 point penalty.

Movies as a Source of Information

It turns out that many of the books on Dr. Phil's booklist have some connection to a movie or a TV program. Many of these are mentioned in the booklist. If you are tempted to avoid reading a book by watching the movie version – don't. For one thing, the movies are almost always different than the books. And not only has Dr. Phil read all the books, he has seen all the movies (and owns most of both). So if you just watch the movie, you are going to get caught (and it's a 90,000 point deduction). Secondly, in most cases, even jaded students like you will usually conclude that the book is usually better than the movie. While there is a lot to say about movies, there isn't the time to contain all the information content of the book. Movies, at best, hold the flavor of the book.

Having said that, it can be worthwhile to *compare* what is in the book and movie of a particular combination. Currently Dr. Phil is using Book/Movie combinations for his second-semester Physics courses (PHYS-115 and PHYS-207 at WMU). You can, however, do this on your own IF you agree to a change in the rules. Having more to evaluate means you have to write a longer paper – it's only fair. You also have to split your paper between the book and the movie.

Scope of the Paper

A booklist only about Physics topics is likely to be a very short and boring list. While it is true that "Everything is Physics", there is nothing more pathetic than someone reading a really good medical story

and then writing a paper where you try to find the one or two things that seem like PHYS-205 Physics, and so end up talking about the "Physics of taking someone's blood pressure". While the use of a *sphygmomanometer* is rather fascinating, even Michael Crichton isn't likely to spend much time to reveal any information about its use in the pages of one of his technothrillers.

The Assignment

- Select a book from the "approved booklist" or get approval for a different title from Dr. Phil.
- You should not read a book that you have already read, it only makes the assignment harder. You may find that a book you are already reading for another class may be acceptable.
- Failure to read an approved book is a 100,000 point penalty.
- If you have ever had Dr. Phil before *and* you read any of the best-seller type books (Crichton, Clancy), you must read a "serious" book for this book report. Failure to comply with this rule will result in an 80,000 point penalty. If you try to submit a report on the same book that you have read for Dr. Phil before, there will be a 100,000 point penalty. This is a science literacy assignment after all, so we want you to learn something new.
- Book titles can be reported in a space provided on the first and second exams. If you don't have a book title in mind, or you don't remember it, you can leave the space blank. This is partly so Dr. Phil can see what people are doing and partly to remind you of this assignment. But it is not required.
- Read the book, especially with an eye as to how science is portrayed, what you may have learned that was new to you, whether you believe it to be accurate or whether you feel that the science issues were well explained. Remember that this is an assignment on science and technical literacy, so what you already know (or don't know) is important.
- Each book in the booklist has a brief description of some points that Dr. Phil came up with. You do not have to agree with Dr. Phil. This is an opinion paper and your opinion matters. Personal anecdotes that tie in with what you have read are appreciated.
- This assignment is not just about Physics. This booklist is about science, engineering, technology, computers and the history, application, ethics, morality, and understanding of it all. So the paper is about this, too. To simply rate the book based on the "Physics" may be to miss the entire point – or in this case, a good chunk of the 100,000 points.
- Write a 4 to 5 page report, **typed, double-spaced and a single simple cover sheet**, on what you read, paying attention to the assignment. You can write more if you feel you need to, but more will not translate automatically into a higher grade. Good grammar and spelling are expected.
- **OR** If you want to write a paper comparing and contrasting a book with the movie version of the book, in the context of the assignment, you can expand the page count to 7 to 8 pages. (There is no extra credit for doing this, but sometimes it can be fun to really tear into both movie and book.)
- Dr. Phil is expecting that a "B" paper will satisfy the above requirements. Exceptional papers will be rewarded; problems will be deducted.
- Late papers will drop an additional letter grade (10,000 points) per calendar day, starting after 5pm at the end of the Grace Period.
- Papers are due at the start of class, or can be dropped off in Dr. Phil's mailbox at the Physics Dept. office *by 5pm on the due dates listed below.*

NOTE: The most popular books, i.e. the ones Dr. Phil has read the most papers on, have been written by Michael Crichton (The Andromeda Strain, Five Patients, The Terminal Man, Congo, Jurassic Park, Airframe and Timeline) and Tom Clancy (The Hunt for Red October and The Sum of All Fears). They wouldn't be popular [and rich] authors or have their stories turned into hit movies unless their writings were a lot of fun. Now not all of these nine books may be authorized for this particular semester, and no other Crichton or Clancy books will be approved, so don't bother asking. But despite the fact that they show up in a lot of papers, there is no problem with many people writing their papers on the same book.

Content

This is an Opinion Paper

For many of the papers you may have written in high school or college, they have not wanted you to have or express your own opinions. But this is exactly what we want here – Dr. Phil wants to know what you think, whether you liked the book, etc.

It is All Right to use "I"

Unlike some college papers, it is not necessary to write in a formal style. Since this *is* an opinion paper, it is okay – even encouraged – to say that "I think that…".

This is Not a Fourth Grade Book Report

Back when you were a kid, most book reports consisted of "I read Book X. This happened and then this happened and then this happened." What such a report really ends up being is just a discussion of the plot. The problem with this is three-fold: (1) Dr. Phil has already read your book, so he knows how the plot goes. (2) Writers like Michael Crichton and Stephen Hawking are best-selling authors because they get paid more than you do to write – they're better at it. Why would Dr. Phil want to read your version of The Andromeda Strain when he can read the book? (3) Just replaying the plot of a novel or a list of topics covered in a non-fiction book or the events in a scientist's life in a biography does not involve any analyzing of the subject. It is this analysis – thinking about what you just read, thinking about what you already know and what you have learned – that is the heart and soul of this science literacy assignment.

You Can Be as Serious or as Light as You Choose

Some of the books are more serious in tone than others. Several of the books regard rather controversial topics. You are free to avoid them. One semester a student asked if they could write their paper as if they were writing a letter to someone and talking about their experience. Sure – as a writing technique it's sort of a crutch, but it get the job done. Others have taken a more humorous tone, or have gotten hostile or offended. Just remember that you should be able to justify your comments. What is Dr. Phil supposed to make of a paper that says the book didn't do anything for them and it was boring and too technical after Chapter Four, and then in conclusion they said it was a great book and they'd recommend it to anyone?

You Do Not Have to Agree With Dr. Phil

Most of these books are on the list because Dr. Phil likes them *and* they cover some subject areas that should make for good papers. However, everyone's experiences and preferences are different. Very few people in the world are Physicists or Physics teachers, and there are certainly very few Dr. Phil's in this world. So it would be surprising if you responded to every book the same way as Dr. Phil did – especially since a good chunk of the book list was read a long time ago when he was a kid and not a Ph.D. Physicist.

Since Dr. Phil asks for your opinion, you are free to give it. You hate the book. You can hate the assignment. You can decide that you didn't learn a thing from the book. Fine. Great. Wonderful. Now just write it up. Give examples, be specific. Some of the very best papers in a particular semester have come from the same book where the students reach completely opposite conclusions.

Suggestions:

The following are suggestions for ways to start your paper (or start thinking about your paper) if you are stuck.

- **Why Did I Choose This Book?**

  For some, the reason might be as simple as "it was the only book I could find". If you were a college student in 1903, you would have read a lot of books. In 2004, you can go to college and avoid reading books. So everyone's experience is different. Just be honest.

- **What Did I Know (Or Not Know) Before I Read This Book?**

  When you sit down to read a book, there is a lot of stuff that you bring to the table with you – this includes what you have learned in school, your life experiences, all the other books you have read in

your life, many hours of watching TV & movies and what you are interested in doing. These are some of the things that will affect how you react to a book and these are some of the things that Dr. Phil would like to know about you, in order to understand your responses.

· What Did I Learn (Or Not Learn) From Reading This Book?

Remember, although you might need to discuss a plot point to explain something, your paper is not about what happened in the book, it is how you reacted to what happened. When we watch a play or a movie or read a novel or play a video game, we often engage in "a willing suspension of disbelief" in order to be entertained. Most people don't really believe in wizards casting magic spells or the plots in James Bond movies or think that there really is a Darth Vader in a black helmet and cape that can use The Dark Side of the Force, or that terrorists set off a nuclear bomb at a Super Bowl game in Denver. But going along with the author is something we do to be entertained. Now, if you don't buy it, you aren't going to like it – we need to know this. If you don't think that we really sent astronauts to the Moon [and some people don't], then that will affect how you view any book about space travel. See how this ties in with the previous topic?

· Pick 2 or 3 Good Examples

This is a 4 to 5 page paper. You don't have time to discuss every one of the topics/chapters in Stephen Hawking's A Brief History of Time – so you can't. A rule of thumb might be about a page for your introductions, a page each for two or three good examples and a page of conclusions. Provided you follow the assignment – you've got your four or five pages.

· Conclusion

You really do have to wrap up your paper. After all, the premise is that books are one way that you might learn something about or improve your science literacy, so did you learn anything? Or did you read something that supported what you already knew? How does this assignment or this book affect your "world view"? Would you recommend this book to your friends? … to other students?

Draft Review (Optional = NOT Required)

If you wish, you may submit a typed, *draft* copy of your paper at least one week before it is due. Dr. Phil will take a quick read and look for (1) basic mechanical flaws and structural problems in your paper and (2) how your paper fits in with the concept of science literacy and the purpose of the actual assignment. In return, the clock stops while Dr. Phil has your paper – if Dr. Phil has your paper for two days, then you add two days to your due dates, etc. The draft will not be graded and the submission of a draft is *not* required. *If* you choose to use this option, you *must* turn in your draft with your final paper – if you *don't* then your final paper *won't* be graded. This is to keep Dr. Phil from going more "as I experience major *deja vu* from thinking that I already had made a comment about some aspect". [Please note that the phrase "rough draft" is never used, which should suggest that the draft be fairly complete as a paper. This is just a free shot before it counts. What could be fairer?]

Please note: If you choose a non-booklist but approved book, you MUST submit a Draft.

Structure

Most of You Will Use Word Processing Software Rather Than Typing

The assignment describes a "typed" paper, but very few of you will actually use a real typewriter. In fact, most of you will use some version of Microsoft Word, on either a Windows PC or a Macintosh.

4 to 5 Pages, Double-Spaced, 1" Margins All Around

The goal here is uniformity of papers for everyone, as well as ease of reading for Dr. Phil.

Readable Font (Examples on Next Page)

If your printer/word processor cannot handle these, talk with Dr. Phil. These fonts and sizes have been selected so that the amount of typing in the average paper doesn't differ by more than about ±10%, however you are allowed a choice so that it looks good to you.

Times New Roman 10 point font is a very readable font.
Times New Roman 11 point font is a very readable font.
Times New Roman 12 point font is a very readable font.
Courier 10 point font is a very readable font.
Arial/Helvetica 10 point font is a very readable font.
Arial/Helvetica 11 point font is a very readable font.
Century Schoolbook 10 point font is a very readable font.

NOTE: Handout may be reduced in size. Fonts will not display on the web page.

Spelling

Nearly all word processors contain some sort of Spell Checker. Use it. But you must know that computers, like calculators, are basically stupid machines. A spell checker cannot tell the difference between *two*, *to*, *too* or *TWoo* – all of which are pronounced the same. Word choice in English is very specific. Misspellings, especially of the author's name (or Dr. Phil's name), looks sloppy, as if the paper was written at the last minute and/or without any care.

Grammar

Reasonable grammar is expected in a college paper. This requirement is loosened slightly in some papers, because some students are not native English speakers and some papers may be written in a casual, often first-person style. However, your paper is supposed to be read – if your meaning isn't clear or your sentences don't make sense, your paper's grade will suffer. Microsoft Word and other modern word processors may have a Grammar Checker feature, but unlike a Spell Checker, Grammar Checkers do not work very well and only find some sorts of errors. They work best with certain types of documents, such as company memos, in order to give all company documents that same "feel". Your best bet is to proofread your paper for readability. But even among *good* writers, it can be very hard to proofread your own work. So you can (1) get a friend to read over your paper and see if they understand it or (2) go to the Academic Skills Center and have someone there go over your paper with you.

Additional Information

Sometimes students go beyond the book, by looking up topics in the dictionary or encyclopedia, or going to the Web and searching the Internet. This is *NOT* required. But some students get enthusiastic about what they have read and want to know more. So you may use additional sources, but don't use them as ways to pad your page count and cut down on how much you have to write. Additional sources and additional information go on *additional pages*.

No Need For Footnotes:

Again, this is not a formal paper in the sense of many other college papers. It is not required that you footnote, or even give page numbers, for every point that you make or quote (or phrase) you use from the book.

Four to Five Pages:

Please make a note that "4 to 5 pages" does *NOT* mean that 3½ pages is "sufficient". It is not. Dr. Phil interprets "4 to 5 pages" to mean FOUR FULL PAGES PLUS YOU MAY BE GOING ONTO THE FIFTH PAGE. You can write more than five pages, but there is no automatic reward for doing so. Some people, like Dr. Phil, just write "long".

Padding Stunts:

There are all kinds of "tricks" you could employ to try to make those four pages without writing four pages. But since Dr. Phil has specified the margins, line spacing, fonts, and further suggests that you do not indent new paragraphs by thirty spaces or put one or more blank lines between paragraphs, or start the first page halfway down because you are repeating as a header the information that is already on your cover sheet – these "tricks" to pad your paper won't work. And endlessly repeating the same phrases or thoughts will be noticed because your paper will be read. And if you want to include a long quote from your book, the proper way to include a long quote of more than two lines on a page is to *single-space* the