Clever Nihilism: Cynicism in Evidence Based Medicine Learners

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Abstract: Evidence-based medicine (EBM) educators are often confronted with learners who use their new critical appraisal skills to dismiss much of the medical literature. Does this cynical attitude of “clever nihilism” affect educational outcomes, such that educators need to tailor their curricula to these learners? The authors proposed that this critical skepticism may be an intermediate developmental stage for EBM learners as they progress from “naïve empiricism” to “mature pragmatism”, and sought to observe its effect on educational outcomes from an intensive, 6 week EBM course. In this course, fifty-four medical residents reported significantly improved skills in critical appraisal and electronic searching. However there was no association between a measure of clever nihilism and the self-reported educational outcomes. The role of clever nihilism in the EBM classroom remains a potentially important issue, and its lack of effect here may be a product of several methodological limitations addressed in the discussion. Such a construct requires further validation. The question remains as to whether such cynicism is a learning style or a developmental phase.

Teachers of evidence-based medicine (EBM) have all faced the challenge of cynical learners. Medical students and residents may express skepticism towards EBM as they begin to appreciate the multiple methodological problems inherent in published research. Such learners may indiscriminately use blunt criteria and forgo a more balanced consideration of articles. We label this attitude “clever nihilism.”

While this attitude may be familiar to teachers of EBM, it is unclear whether such cynicism is potent enough to interfere with the well-documented ability of EBM courses to improve learners’ skills and attitudes.1-5 Moreover, it is also relevant to know if this is a reaction to EBM itself or a learning style displayed by only certain individuals whenever confronted with any new analytical mode. In either case, if this attitude does inhibit the learning process, then understanding its characteristics could allow us to design educational programs to neutralize its effect.

This phenomenon of said clever nihilism, while not commented upon in the medical educational literature, fits with contemporary developmental theories of education. Numerous education researchers have studied the loss of certainty on which adult learning is predicated, analyzing the stages of growth from simplistic acceptance of knowledge to a more relativistic understanding of how knowledge is created and then pragmatically applied. Learners become able to juggle multiple valuation schemes as they appreciate the importance of context in selecting the best possible solution to a problem.6-8

Understandably, EBM training may engender a loss of certainty for residents. This might overwhelm busy residents and lead them to injudiciously apply their newfound critical acumen.9-10 Seen from a developmental perspective, “clever nihilism” could be a defensive adaptation to the conceptual challenges of learning EBM.11

“Clever nihilism” has anecdotal familiarity but remains to be explored as a relevant force in medical education. Although cynicism as an ethical entity has been researched12-14, its role in physicians’ cognitive and epistemological development is little understood. We suggest its place in the following hypothetical developmental framework: (Figure 1)

1) “Naïve Empiricism;” pre-EBM learners who rely on authority and algorithmic approaches to medicine. Pathophysiologial reasoning is coupled with uncritical acceptance of expert opinion. A learner at this
stage might say “Tell me what to do today, tell me why tomorrow.”

2) “Clever Nihilism”: learners newly immersed in EBM who contend with new feelings of uncertainty and responsibility by adopting a stance of denial whereby medical literature is subject to facile dismissal. Clinical reasoning becomes empirical and deductive but its application is indiscriminate. These learners often state that “I can’t trust anything published – all studies have flaws.”

3) “Mature Pragmatism”: learners who can reasonably balance EBM critical skills with the exigencies of clinical practice. They have evolved in their ability to read effectively, to calibrate the impact of bias in studies, and to accept the limitations of evidence. The thinking here is: “I understand the limits of this information and how best to apply it to my patients.”

While we have yet to validate this framework independently, we were drawn to the concept as we taught and analyzed the results of an intensive six-week EBM course taught to residents and fellows. We wondered whether the clever nihilism expressed by some of our trainees in class correlated with how much they learned. Therefore we compared a new measure of clinical nihilism with the change in trainees’ self-reported confidence and skill scores before and after the course.

**Methods**

Our study focused on a rigorous 60-hour, six-week, annual EBM course for Primary Care Residents (PGY2) and General Internal Medicine Fellows (Table 1). In this graduate level course, taught since 1985, principles and skills are taught through interactive seminars on clinical epidemiology, probabilistic diagnostic reasoning, medical decision-making, and medical informatics. By means of readings, class discussions, exercises, and presentations, trainees learn critical appraisal of the validity and applicability of medical literature including studies of diagnosis, prognosis, etiology, screening and prevention, therapy and harm, systematic reviews, decision analysis, and cost-effectiveness. These daily two-hour seminars are held during an ambulatory block designed around this course. Electronic searching sessions are led by medical librarians in a computer laboratory. Participants have multiple opportunities to practice skills in journal clubs. Trainees also do projects to answer questions of personal interest, and formally present their findings at the end of the course.

We asked all participants from 1997 through 2002 to complete a 45-item questionnaire (see appendix) immediately before and after the course about their self-assessed skills and attitudes. These participants rated their competence on four-point items measuring critical appraisal skills and electronic searching skills (percentage of maximum score on 13-item and 17-item indices, respectively). They also completed three scales measuring attitudes towards EBM. These attitudes (means of 4-point scales with 4=highest), confirmed by principal components factor analysis, were Comfort with EBM; Value of EBM; and Clever Nihilism.15 The items comprising the three attitude scales were:

- Comfort with EBM (3 items, alpha = 0.6)
  - I am comfortable determining if a study’s findings are valid.
Table 1: Evidence-Based Medicine (EBM) Course Outline (60 hours/six weeks)

- Unique EBM Topics
- What is EBM? Paradigm and principles
- Clinical Measurement: Can we agree to disagree?
- The Dx Process: Living with uncertainty
- Diagnostic Tests: Likelihood ratios and the 2x2 dance
- The Who, What, & Why of Screening and Prevention
- Prognosis: Prediction is difficult, especially about the future
- Basic Statistics for Clinical Epidemiology: The "Tao of P"
- Effectiveness: Validity, or first, do no harm
- Effectiveness: Results, or how do I explain this stuff to my patient?
- Systematic Reviews: How to read a study of studies
- Causation: The chicken and the egg
- Decision Analysis: How to not lose the trees for the forest
- Determining Patients Preferences: Utilities and gambles
- Cost-Effectiveness
- Ongoing Sessions
- Medical Informatics labs: Sources and searches for evidence
- EBM Journal Clubs: I can present that study in 5 minutes!
- Weekly Project mentoring sessions
- Project Presentations

- It is easy for me to balance a study’s strengths and limitations.
- I am able to judge the quality of most research studies.

Value of EBM (3 items, alpha = 0.6)
- The medical literature regularly affects my clinical practice.
- I rely more on the literature than on expert opinion to make medical decisions.
- It is worth my time to try to keep up with the medical literature.

Clever Nihilism (4 items, alpha = 0.7)
- I do not trust the results of published studies.
- Most published studies have serious methodological flaws.
- Most studies do not apply to my patients.
- Methodological limitations render most published studies useless.

To examine the educational efficacy of the course, we used paired t-tests to compare pre and post course scores of self-assessed skills and attitudes. To assess whether attitudes affected the skill outcomes, we used Spearman correlations to test the association of baseline attitude scores and change in skill scores.

Results

Fifty-four of all 59 participants who took the course (49 residents and 5 fellows, 59% women) completed the surveys over the 6 years (92% response rate). Before the course, participants reported scores on critical appraisal skills of 66.9% (95% CI 63.3%, 69.6%, range 40.4% to 90.4%) and on electronic searching skills of 71.8% (95% CI 68.6%, 77.5%, range 52.9% to 98.5%). At the end of the course, participants improved their self-reported critical appraisal skills to 87.8% (increase of 20.9%, 95% CI 17.5% to 24.2%; p<0.001) and electronic searching skills to 85.4% (increase of 13.6%, 95% CI 10.3% to 16.9%; p<0.001). The proportion of participants with scores less than 65% on critical appraisal skill dropped from 30% to 2% and scores less than 65% on electronic searching skill dropped from 28% to 2%. These improvements in skill scores did not differ by gender or training level.

Illustrated in Figure 2, mean scores on Comfort with EBM and Value of EBM also improved after the course by 1.0 and 0.5, respectively, on 4-point scales (p<0.001 for both). Each reflects a large standardized effect size of 2.1 and 0.9, respectively. However, the Clever Nihilism score did not change. The mean Nihilism score before and after the course was 2.3 (95% CI 2.1 to 2.5). There was a non-significant trend suggesting that males had greater mean clever nihilism scores before the course (2.4 vs. 2.2, p=0.1).
Moreover, baseline scores on Value of EBM (rs= 0.14, p=0.4) and Clever Nihilism (rs= 0.03, p=0.9) were not associated with improvement in critical appraisal or electronic searching skills. In contrast, participants who began the course with less Comfort with EBM reported greater improvement in critical appraisal skill (rs= -0.5, p=0.003). Participants with pre-course Comfort with EBM scores less than 2.0 reported a 26% improvement in critical appraisal skill compared with a 19% improvement for participants with higher EBM Comfort scores, p=0.04.

**Discussion**

The results of this study corroborate existing evidence that EBM courses can improve learners’ self-perceived skills and some attitudes.\(^1\)\(^-\)\(^5\) Participants reported substantial improvements in their confidence regarding critical appraisal and electronic searching skills. They also reported an increase in perceived value and comfort with EBM, and the improvements in skill scores were most pronounced in those who felt least confident before the course. While such findings are familiar, they have yet to be generated from this kind of intensive course.\(^1\)\(^-\)\(^5\)

With regard to the study’s central hypothesis, this study found that cynical attitudes, as we have measured them, were unaffected by the course and did not affect self-reported EBM educational outcomes. This challenges our proposed developmental framework.

We had hypothesized that clever nihilism was an intermediate stage of a developmental model of EBM learning. The stability of the clever nihilism scores, however, suggests that cynicism may be more of a learning style than a stage or transitional adaptation to the challenges to certainty posed by EBM.\(^16\)\(^-\)\(^18\) “Clever nihilists” might react similarly and reliably to
other tasks that shift one’s worldview, like cost-benefit analyses or cross-cultural studies, and yet learn the material well. In our course, the cynics and non-cynics seemed to do equally well and may have only opined about it differently.

This conclusion may be premature, though, since our measurement of clever nihilism could account for its apparent stability. The relatively short 6-week interval between pre and post measurements may not have been sufficiently long to capture any real change. Perhaps changes would occur over time as residents return to their clinical rotations or after training when they assume positions of more direct patient responsibility. In addition, our scale may be insufficiently responsive to changes in this attitude. These are limitations to our attempt to validate a hypothetical model with the results of an observational correlation. A comparison of our measure of clever nihilism with other measures of cynicism and with residents’ behaviors in practice is needed to determine its convergent and predictive validity. Indeed, using hard clinical outcomes might reveal real differences in educational impact.

Why bother? Clever nihilism is relevant to the EBM classroom in two senses. First, most teachers of EBM will be constantly tempted to fight clever nihilism whenever encountered. The stage concept fits with contemporary educational theory, which focuses on the essential role of ‘transitional uncertainty’ in learning. Educators in all fields strive to seize those teachable moments when uncertainty arises. Indeed, medical educators fear that the cynicism of the clever nihilist may be a potential learning barrier, which if not overcome, could lead to lifelong habits that limit the practice of evidence based medicine. They hope to catalyze the maturation of this attitude in their courses so that their cynical students might efficiently and accurately incorporate evidence into their patient care. Such laudable impulses, however, need to be aimed at an attitude that can change. Is it really an attitude that will budge? Validating the developmental model independently is requisite to any further discussion, as we need to have definitions of clever nihilism which we can confidently measure to both assure ourselves of its transitional nature and thus any course’s success in accelerating its evolution.

Second, understanding whether this attitude is a personal style or universal stage will allow us to design the best possible educational interventions. The critical question concerning clever nihilism’s clinical relevance may only be answered once its validated character has been tested against a variety of educational approaches. Thus we propose to a) validate the hypothetical EBM developmental model by measuring clever nihilism among learners at multiple professional levels and against accepted measurements of educational cynicism and then b) design educational intervention studies to demonstrate which pedagogic strategies to adopt. This two-staged approach might even show that different educational strategies are appropriate at different levels of education and experience, or with different learning styles. Analyzing the role of such variables as age, stage of professional development, type of work setting, and even gender could be very enlightening. Finally, by gathering data from a wide variety of residents and physicians, we would avoid the potential selection bias inherent in using participants from a single academic center.

The best methods for teaching EBM and measuring longer-term outcomes remain to be demonstrated. Until such studies are done, we may be assured by the findings here that learning in our EBM course took place regardless of nihilistic attitudes. At this point, we may be somewhat more confident when we gently ignore our learners’ cynical comments while moving towards the validation and further study of clever nihilism in the EBM learner.

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APPENDIX

Evidence-Based Medicine Survey

**PART A: Please circle ONE answer for each question using the following scale:**

**Please indicate how strongly you agree or disagree with the following questions:**

| Question                                                                 | Strongly Disagree | Moderately Disagree | Moderately Agree | Strongly Agree |
|-------------------------------------------------------------------------|-------------------|---------------------|------------------|----------------|
| 1. I am comfortable determining if a study's findings are valid.        | 1                 | 2                   | 3                | 4              |
| 2. The medical literature regularly affects my clinical practice.       | 1                 | 2                   | 3                | 4              |
| 3. It is hard to practicing Evidence-Based Medicine in my setting.      | 1                 | 2                   | 3                | 4              |
| 4. I do not trust the results of published studies.                    | 1                 | 2                   | 3                | 4              |
| 5. I can find useful information even from methodologically weak studies.| 1                 | 2                   | 3                | 4              |
| 6. I feel guilty if I skip reading even a poorly done study,            | 1                 | 2                   | 3                | 4              |
| 7. It is easy for me to balance a study's strengths and limitations.    | 1                 | 2                   | 3                | 4              |
| 8. I rely more on expert opinion than on the medical literature to make medical decisions. | 1                 | 2                   | 3                | 4              |
| 9. I can trust the results to be valid if a paper is peer-reviewed.    | 1                 | 2                   | 3                | 4              |
| 10. Most published studies have serious methodologic flaws.            | 1                 | 2                   | 3                | 4              |
| 11. I am able to judge the quality of most research studies.           | 1                 | 2                   | 3                | 4              |
| 12. Most published studies do not apply to my patients.                | 1                 | 2                   | 3                | 4              |
| 13. I can usually find answers to my clinical questions in the medical literature. | 1                 | 2                   | 3                | 4              |
| 14. Methodologic limitations render most published studies useless.     | 1                 | 2                   | 3                | 4              |
15. It is worth my time trying to keep up with the medical literature.

**PART B:**

| Question                                                                 | Very Incapable | Moderately Incapable | Moderately Capable | Very Capable |
|--------------------------------------------------------------------------|----------------|----------------------|--------------------|--------------|
| Starting the right computer program to begin searching?                  | 1              | 2                    | 3                  | 4            |
| Connecting to Medline via Ovid?                                          | 1              | 2                    | 3                  | 4            |
| Starting a CD-ROM database program like Up to Date or ACP Library?       | 1              | 2                    | 3                  | 4            |
| Defining a focused clinical question?                                    | 1              | 2                    | 3                  | 4            |
| Operating the database searching program?                                | 1              | 2                    | 3                  | 4            |
| Choosing appropriate search terms?                                       | 1              | 2                    | 3                  | 4            |
| Using MESH headings as search terms?                                     | 1              | 2                    | 3                  | 4            |
| Using wildcards (i.e. #, $, *) as part of search terms?                  | 1              | 2                    | 3                  | 4            |
| Using publication type to refine your search?                            | 1              | 2                    | 3                  | 4            |
| Broadening your search to maximize sensitivity?                          | 1              | 2                    | 3                  | 4            |
| Narrowing your search to maximize specificity?                           | 1              | 2                    | 3                  | 4            |
| Limiting your search to certain journals?                               | 1              | 2                    | 3                  | 4            |
| Saving the search results you want?                                     | 1              | 2                    | 3                  | 4            |
| Printing the search results you want?                                    | 1              | 2                    | 3                  | 4            |
| Getting a valid answer to your question?                                 | 1              | 2                    | 3                  | 4            |
| Getting a useful answer to your question?                                | 1              | 2                    | 3                  | 4            |
17. Completing a search efficiently?

**PART C: In this next section we ask about your**
**critical appraisal skills. When you look at a published study,**
**how capable would you say you are now at:**

|   | Very Incapable | Moderately Incapable | Moderately Capable | Very Capable |
|---|----------------|-----------------------|--------------------|--------------|
| 1. Identifying the authors’ research question? | 1 | 2 | 3 | 4 |
| 2. Determining the study design? | 1 | 2 | 3 | 4 |
| 3. Applying critical appraisal criteria to evaluating the validity of the study? | 1 | 2 | 3 | 4 |
| 4. Determining sources of bias? | 1 | 2 | 3 | 4 |
| 5. Assessing the impact of bias on the findings? | 1 | 2 | 3 | 4 |
| 6. Judging the appropriateness of the statistical analysis? | 1 | 2 | 3 | 4 |
| 7. Understanding the tables and figures in a study? | 1 | 2 | 3 | 4 |
| 8. Interpreting confidence intervals? | 1 | 2 | 3 | 4 |
| 9. Calculating the NNT from a study on therapy? | 1 | 2 | 3 | 4 |
| 10. Evaluating the generalizability of the results? | 1 | 2 | 3 | 4 |
| 11. Judging the usefulness of the findings to your patient, setting, or problem? | 1 | 2 | 3 | 4 |
| 12. Interpreting the study results in the context of other literature? | 1 | 2 | 3 | 4 |
| 13. Critically appraising an article efficiently? | 1 | 2 | 3 | 4 |