

Wickedpedia: the 'iEvo' Effect in Contemporary Education

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The Internet and its increasing availability over the past quarter century have revolutionized education, imparting positive and negative changes. Ironically, the most-negative effects on the learning process might have been manifested in making students **less** lazy. With so much information accessible literally at their fingertips, most students readily will acquire material in voluminous quantities. These students have mastered their information collecting skills and become proficient at presenting material in written or spoken form. But, perhaps as partial compensation for effort invested in research, they rarely reveal any selectivity or aptitude for synthesis. I dramatically exposed this emerging trend in a recent undergraduate course in evolution, and the events that I recount in this education forum may be used to establish policies for using the Internet effectively as a teaching tool.

Frustrated with students' abilities to round-up, record, and regurgitate information without synthesizing it, I devised an assignment to demonstrate to them the dangers in amassing and redistributing facts uncritically. I created a fictitious theory about human evolution to function as the subject for the assignment and, simultaneously, comment on student inabilities to integrate ideas in a discriminating manner. I christened the theory 'iEvo,' paying homage to the burgeoning market for 'i'-products (e.g., iMac, itunes, ipod), for which students have an affinity. The theory, itself, existed and would be described only at a Wikipedia page, available for students (and other, incidental Internet surfers) to discover.

In late summer, I composed text for the theory. I secured an account at Wikipedia and uploaded the text to create an iEvo page. I initiated a campaign to Google-search the terms 'iEvo' and 'Wikipedia' repeatedly, every day, for approximately one month. By September, the iEvo Wikipedia page was accessible among the top 10 hits from a Google search on only the term 'iEvo.'

iEvo was described as stating boldly that modern innovations like the Internet had halted human evolution. The theory was purported to have been founded on the basis of data demonstrating that many contemporary conveniences created by humans counteract factors that normally would impose selection (the contents for the original Wikipedia page are accessible as supporting text).

The population involved in the experiment comprised $n = 262$ undergraduate students in an evolution course that served as a prerequisite for two fourth year courses (population genetics and human genetics, $n = 37$ and 52 , respectively)

and an optional prerequisite for two others. Most students, therefore, may be considered to have elected to have taken the course.

I assigned the report on the first day in term. I presented instructions for the report electronically (using an LCD projector) as soon as students had entered the lecture hall for the first time, so effects from lecturing style and expectations on the data that ultimately were obtained were minimized. The instructions read: “using as few words as you can (and no more than 250), please provide a critical report about iEvo.” I provided no other information. I told teaching assistants nothing about the assignment in advance, providing them only with the same instructions that I had provided to the students during lecture and reiterated electronically, via the e-learning tool WebCT.

Text at the Wikipedia page contained hints that the theory was phony. The theory was professed to have been authored by Connie Furnzorçis (‘confirm your sources’) in a nonexistent journal (‘e-Evolution’). The text contained a technical inaccuracy: the paper in which the theory was published was described as comprising 7 pages, but 218 pages (16-234) were cited in the lone reference that was provided. The text also presented a fundamental conceptual inaccuracy that was intrinsic to the course subject matter (*i.e.*, evolution) and independent from the assignment: an unqualified statement that selection leads to ‘improvement.’ I had covered this misrepresentation in lectures during the first week in term (*i.e.*, that all statements about selection and fitness must be qualified by reference to an environment), providing sufficient time for students to identify the error.

The overwhelming majority among students (approximately 90% by teaching assistant estimates) ‘copy-and-paste’d the information from the iEvo Wikipedia page into files, usually with slight textual emendation, to produce their reports. As evolution technically is among the most-accessible major scientific theories, this particular result may be interpreted as typical, habitual learning behavior for undergraduate students in science programs, at least in reputable North American universities. Evidence that some students had invested more effort was detected when the course instructor was contacted via voicemail by library staff and visited in person by the Sciences Liaison Librarian. These librarians had been consulted by the more-industrious students and were as puzzled as were their clients about the assignment. The Sciences Liaison Librarian was informed about the experiment, who, appreciating the objective, summarily informed the library staff.

Less than half (42%) the students noticed that the theory was a hoax or, at least, suspicious. This is the iEvo effect (Figure 1). From the remaining students, approximately 2% mentioned only that they were unable to obtain the lone reference (electronic or hardcopy); approximately 11% noticed the ‘planted’ technical or conceptual inaccuracies; and approximately 20% reproduced the information from the Wikipedia page but with commentary.

One bright student, who probably realized the scam and its purpose, revised the text at the Wikipedia page. This hopefully emphasized the intent to other students. To test whether that intent had been appreciated, I included in the 'open-book' (and open-notes) examination to end the course one related multiple choice problem was (the problem, which received a difficulty index $P(\text{diff}) = 0.153$ and options are accessible as supporting text). The results were encouraging, albeit modestly. Approximately 15% responded to the problem perfectly; approximately 78% demonstrated at least partial appreciation; and approximately 7% still missed the point completely.

Internet resources, like the Internet, itself, constitute fascinating and innovative human achievements. The pages at Wikipedia generally contain accurate information, though lacking in breadth and depth, and probably constitute a valuable repository for student learning in many forms (2-4). Until a consensus is reached on best to utilize Internet resources like Wikipedia for learning, educators should counsel students to interpret information that is accessible at those pages with caution, consider Wikipedia, itself, as a portal, providing first-access to general information and sources, and avoid the iEvo effect (5). Educators ought to adopt more-active roles and consider Internet resources like Wikipedia as exciting teaching tools, with which they can promote research-based composition for online contribution as invaluable means for facilitating local and global learning (2).

References and Notes

1. B. Alberts, *Science* **323**, 437 (2009).
2. A. Forte, A. Bruckman, in *Proceedings of the 7th International Conference of the Learning Sciences*, S. A. Barab, K. E. Hay, D. T. Hickey, Eds. (International Society of the Learning Sciences, Mawah, 2006), pp.182-188.
3. D. Murley, *Law Lib. J.* **100**, 593 (2008).
4. N. J. Schweitzer, *Teach. Psych.* **35**, 81 (2008).
5. The term 'iEvo effect' was coined in a conversation between the author and R. K. Logan, during a lecture in the course ORIGINS 3F03.
6. Public reaction to and the fate for the iEvo page are accessible as supporting text.
7. Subsequent to the events described herein, the name iEvo has been adopted as a name by an unrelated Canadian company.

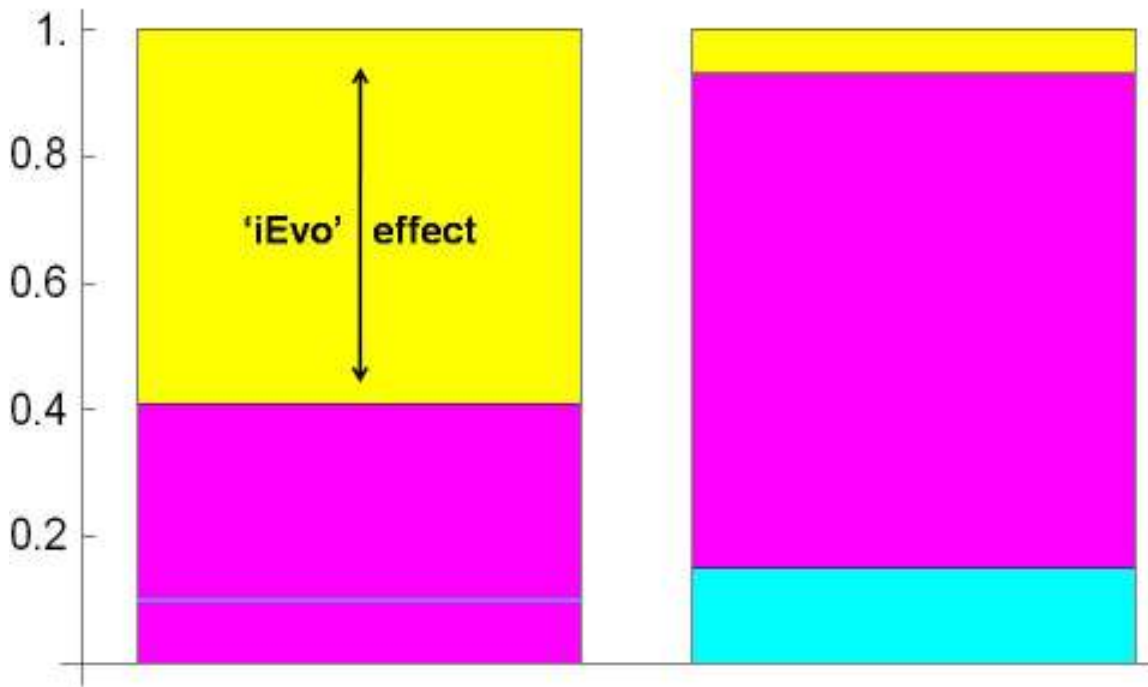


Figure 1. Proportionate response-types by students. Bar at left represents responses to an assignment posed at term initiation, in which students transferred information from a Wikipedia page about a phony theory (iEvo) for a report, with (magenta) or without (yellow) assessing the information; the cyan line represents the 11% who noticed technical or conceptual inaccuracies with the text, itself. Bar at right represents responses to a related multiple choice problem posted at term end, in which students demonstrated complete (cyan), partial (magenta), or no (yellow) learning to have taken place.

Supporting Text – iEvo Wikipedia Page

The term 'iEvo' is the shortened form for 'iEvolution,' the name given to the theory that modern innovations like the internet have halted human evolution. The theory was proposed by Connie Furnzörçis.

The theory involves the notion that the human lineage has stopped evolving because many contemporary conveniences created by humans are counteracting the factors that normally would impose selection regimes that would lead to improvements. For instance, glasses enable humans with imperfect vision to perform tasks as effectively as do humans with perfect vision (all other things being equal) and, so, can achieve equivalent fitness.

The theory was developed on the basis of empirical data obtained from experiments in which undergraduate students who use the internet in a cautious, complementary manner, the 'cc' group, were compared to undergraduate students who use the internet in an extensive and exclusive manner, the 'ee' group. The students were assessed on the basis of their abilities to intake information, abstract and assimilate concepts, and apply them to solve problems. Students in the cc group outperformed their peers in understanding subjects and assimilating ideas with their worldviews (a long-term, fitness measure), while students in the ee group outperformed their peers in delivering detailed presentations and reports (a short-term, performance measure).

The 7-page theory was published in the electronic journal 'e-Evolution.'

References

Con. Furnzörçis. 2007. iEvo: a new perspective on human evolution. e-Evolution 17:16-234.

Supporting Text – iEvo Multiple Choice Problem

Please select any and all responses that complete accurately the following statement.

An inaccuracy that is associated with iEvo as it was presented at the Wikipedia page involved

- a. its description as a 7-page theory and the page numbers that were cited in the journal 'e-Evolution.'
- b. its claim that human evolution has been slowed by modern innovations like the Internet.
- c. its claim that glasses effectively confer unto humans with imperfect eyesight vision equivalent to humans with perfect eyesight.
- d. the sample sizes that were used in the experiment that is described at the page, which were too small.
- e. its implication that modern innovations could affect human evolution.

Supporting Text – Fate for the iEvo Wikipedia Page

Currently, a search at the Internet site Wikipedia (<http://www.wikipedia.org>) for information about the term 'iEvo' returns 0 hits. But, until recently, it returned 4 links from 2007, among which one lists entries from an online discussion, held on December 06 through 08, about suspicions that iEvo might have constituted a "hoax;" another lists iEvo as an article (number 36) that had been scheduled for deletion on December 06; yet another explains that a page containing information about iEvo had been 'reverted' as suspected vandalism; and a final one confirms the aforementioned deletion.