Survival of the Print Book! The Falsifiability Approach towards an Inductive Belief

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Abstract

Looks at the historical and philosophical roots of the reasoning and defines the induction as the most popular style of reasoning. Discusses the problem of induction and its complexities through an example. Explains one of the solutions provided for the problem of induction; i.e. the falsifiability theory. Defines the falsifiability theory and concentrates on an ongoing argument among information professionals. Survival of the print book, as an inductive belief, is what this article tries to analyze and gauge. Through an all-inclusive literature review, viewpoints of the pros and cons of this inductive belief are discussed; and much number of evidences is provided for the death of the print book. Concludes that the *survival of the print book* belief is falsified and liberal information professionals should be trained to press e-book publishers to develop their products.

Keywords: print book, electronic book, the problem of induction, falsifiability theory

Introduction

Philosophy is a discipline derived from the ancient Greek civilization. *Socrates*, *Plato* and *Aristotle* were among the first thinkers and Athenian philosophers and were the first to develop a system for thinking called logic. Logic was the apparatus through which human beings were able to reason and give explanation for every phenomenon. *Socrates*, an eloquent orator, was always searching for the truth. His method involved observing evidences and comprehending a given theory (Afzali, 2008; Jalali, 1997; Kabir, 2007; Khosro Panah, 2004; Nabati, 2006; Sadeghzadeh Ghamsari, 2007). Based on new observations and understandings, the theory was susceptible of refinement. Nowadays, such an approach is called *induction*[1]. Socrates was Plato's teacher. *Plato* naturally follows in his teacher's footsteps. In addition to that, he was very interested in metaphysics. Therefore, he developed the idea of the *Theory of Forms*. Plato nurtured many students who became renown, one of whom was Aristotle, who

further developed the ideas of his predecessors and was the main propounder of logic, especially on obtaining logical results from sentences containing a proposition.

These philosophers helped human adopt an effective system for reasoning and judgment. We are currently able to talk and write and communicate ideas to other people without any fear of misunderstanding. We are helped by a logical system for thinking that is accepted as the norm throughout the world. The inductive method of Socrates is now the most common reasoning procedure among all the literates and thinkers; so that one person from China would be able to have an effective communication with another person from Argentina, with logical steps of questioning for example. Where are you from? How old are you? What did you study when you were a college student? What academic degree did you receive? What is your business? Actually, it makes no difference. If you have enough familiarity with the inductive method of reasoning, you would be able to shape your belief and communicate it easily. Definition and more explanation of the induction will be provided in the next section.

The Problem of Induction

Mathematics and Philosophy students are thoroughly directed to be acquainted with the induction through the courses they pass in any programme. In general, *induction* starts with observation of the nature. The observation remains personal as long as the observer does not socialize his/her understanding. As the observer intends to socialize, s/he needs to comprehend and subsequently verbalize it. Verbalization may fail because of lingual and cultural barriers. However, the observer shapes at least one *observation statement*. Mixing a collection of observation statements enables the observer to draw a conclusion and generalize it in similar situations (Abedi Shahroodi, 1988, 1989; Ackermann, 1967; Afzali, 2008; Ahmadi, 1999; Gutas, 2001; Hadavi Tehrani, 1991b; Haghghi, 2002; Jalali, 1997; Kabir, 2007; Kheirollahi, 2007; Khosro Panah, 2001; Mousavi, 2003; Shaghool & Mahoozi, 2008; Sheikh Rezaie & Dabbagh, 2008; Tavakkoli, 1999). For example, suppose that Mary does not know the temperature in which the water is boiling. She arranges an experiment and finds that the water is boiling at 100 degrees Celsius. Then, she repeats the experiment and finds the same result for several times. Through such a simple procedure, Mary would be able to make an induction. Some scientists believed that adopting inductive approach matured human knowledge. Thousands and thousands of experiments were done and uncountable ideas and theories were tested, eliminated and emerged. Inductive approach has the following requirements:

- There should be much number of experiments;
- There should be many kinds of experiments; and
- The conclusion should not be in contradiction with other theories.

There should be much number of experiments means repeating an experiment for several times and this is an essential condition. Furthermore, the experiment should be repeated in

many experiments in different situations. At the final stage, what we conclude should not be in contradiction to other findings and comprehensions. Using the water example, one can argues that when we say the water is boiling at 100 degrees Celsius, all water should follow this rule. Also, the water should be boiled in different places (on the top of a mountain, in the house or at the beach) and times (in the morning, afternoon or during the midnight). After many experiments, if we observe one in which the water is not boiling at 100 degrees Celsius, then we should false the rule. In other words, any theory is valid as long as it is not failed.

However, there are three main questions around inductive reasoning (Beheshti, 1998; BonJour, 1998; Fanaie Ashkevari, 1994, 1995; Gandomi Nasrabadi, 1998a, 1998b; Hadavi Tehrani, 1991a, 1991b; Kabir, 2007; Khosro Panah, 2004; Nabati, 2006; Rabbani Golpayegani, 1994, 1995; Sadeghi, 2004, 2010; Sadeghzadeh Ghamsari, 2007); including:

- How much experiment should we have?
- How many kinds of experiments should we see? And
- How long does it take to reject a theory?

Simply, when can we accept a theory without any doubt? Are 10 experiments enough? What about 100? What about 1000? What is the final number? Who is able to justify sufficiency of experiments? How many kinds of experiments should we have? 10? 100? 1000? Again, what is the final number? When can we reject a theory? Is the first negative experiment enough to reject it? The 10th experiment? The 100th experiment? The 1000th experiment? What is the final number of failure for rejecting a given theory? Such an ambiguity is called the *Problem of Induction*. Much has been published on this matter and many philosophers have tried to solve this problem. Popper is one of the successful theorists who could solve the problem through his falsifiability theory. The next section will provide an explanation of the same theory.

The Falsifiability Theory

The Falsifiability Theory was developed by Karl R. Popper. Popper was born in Austria, was a socialist and was interested in Kant's Philosophy. He studied Psychology at university but never worked as a psychologist. The emergence of Nazism in Germany and the totalitarian regime of the Soviet Union directed Popper to write his seminal work "The Open Society and its Enemies". Popper did a historical review on different political philosophies and came to the conclusion that the liberal democracy is the best political system. However, Popper was not reputed for his political viewpoints, but was renowned for his methodology in the philosophy of science. Popper tried to solve the *Problem of Induction* and provided the *Falsifiability Theory*. Many criticisms were thrown at Popper's viewpoint (Ahmadi, 1999; Shojaie Shakoori, 2006), but others found it is attractive and effective. According to this theory, we should try to arrange hypotheses in a manner that rejecting a given theory became possible. If we succeeded, then the theory fails and we should look for a stronger one. But, if

the theory confirmed, we can trust it temporarily. Popper argues that scientific theories are not verifiable, because they are just predictions (Sadeghi, 2010). Falsifiability means that we should look for ways to falsify the theory (prediction), not to verify it (Sadeghzadeh Ghamsari, 2007). The theory, itself, becomes strong when our efforts fail to falsify it. He also believes that confirming a theory is almost irrational. But, its cancelation is possible and rational. The true scientist, according to Popper, is someone who is looking for a condition in which falsifying his/her theory became possible. Finally, Popper says that as long as a theory is not falsified, we can trust it (Sadeghzadeh Ghamsari, 2007). Such a belief can be regarded as the *Darwinist Epistemology* in which weak theories are eliminated by strong ones.

The following sections of the article will focus on an argument that is buzzing among library and information professionals. The argument is in fact an inductive belief that could be falsified by the falsifiability theory.

Survival of the Print Book!

There are many librarians and non-librarians who believe in the survival of the print book (p-book). In contrast, there are many who do not have such a belief. This is the main question that the present article tries to answer. *Will the print book survive?* To answer this question, we have to do an all-inclusive literature review. This is just the only solution that can help us shed light on the argument, view contributions in the literature and assist two parties of the dispute to reach an agreement on the issue.

People may love print books. Some are comfortable and feels better handling print copies. Print copies are portable and one can use them anywhere, no matter where one is, in the bus or in bed. Print copies enable continuous study. Study is one of man's good habits. If one is always studying, s/he cannot quit this habit; and to sustain this habit, s/he prefers print copy. Coldewey (2010) concentrates on this advantage. In addition to the *portability*, people feel at ease with studying print copies. All of us experience quiet times when we indulge in reflecting or thinking. Thinking usually accompanies the study. In other words, we think as we study, and we study to think and sometimes feel *pleasure*. From the book lovers' point of view, such a cycle necessitates having a print copy in hand. There are many people that prefer p-book because of *portability* and *pleasure*. As studies have shown, most of them are middle-aged, those who do not have adequate computer skills (Fulford, 2011).

In contrast, there are many others that prefer electronic book (e-book). They are mostly teenagers and young people (Springen, 2012). They have been born and raised in the digital age. They know how to use a computer, how to run software, how to do an effective search on the web, how to play online, and how to participate in social networks. Actually, they have a virtual life next to their physical/real life. This generation - that is usually called e-generation in social sciences textbooks - uses e-books as they are more comfortable with the electronic format. E-book readers are the essential devices for the new generation. Modernity, lightness,

portability, high storage, and attractiveness are among reasons by which the e-generation selects e-book readers and hence studies e-books.

Nowadays, this picture is usual for most people. It seems that p-books and e-books have a peaceful coexistence. But, will it be a durable circumstance? What is your prediction about future of the book? Will p-books remain forever? Will e-books replace p-books? If yes, how long does it take? Is it a gradual process or an unexpected occurrence? In fact, these are secondary questions that will automatically be replied by answering the main question. As we said, the main question is: *Will the print book survive?*

We should try to answer the above question. Then, we will be able to provide additional information about borders of the issue. There is an inductive belief among many people including library and information professionals that considers p-book as a permanent medium. Plenty of evidences can be found in the literature for such a belief. For example, Franzen (the American novelist and essayist) clearly confesses that he is not comfortable with e-books (The Guardian, 2012). Preference for p-books by old people has also been reported (Fulford, 2011). MacManus (2010) tries to enumerate 5 ways that p-books are better than e-books. He mentions *feel*, *packaging*, *sharing*, *keeping*, and *second-hand books* as the main factors by which p-books are preferred. MacManus characterized e-books as cold and life-less; whilst, p-books are more personal, help create memories and nostalgia. Some parts of e-books such as images are usually missed. But, packaging helps reader has a complete asset in p-books. Well-designed cover is another feature of a p-book. Sharing p-books is easily possible. But, you cannot lend e-books; because of the Digital Rights Management (DRM) agreements. Developing e-book readers as the device and platforms as the software on which one would be able to study an e-book is another challenge. In contrast, keeping p-books for the future use has no technological obstacle. Finally, e-books are generally expensive. But, second-hand books became cheap gradually. Abram (2010b) provides similar viewpoints. Alizadeh (2011), Brookman (2011), Bruccoli (2007) and Shrimplin, Revelle, Hurst, and Messner (2011) concentrate on the feel too. DRM was also counted as an obstacle by Pellé (2009), Slater (2010) and Weinstein (2010). Carlock and Perry (2008), Soules (2009) and Van Der Weel (2010) give a review of disadvantages, weaknesses and uncertainties of e-books' technological side. Wagner (2010) adds that when you visit a bookstore, you can buy books from any publisher, but currently each e-reader can only read the e-books from a limited range of publishers. We are also able to add some others to the abovementioned criteria. P-books can be browsed as you intend to buy or borrow it. But, this is not an easy task for e-books. People can have access to a p-book anywhere. While obtaining an electronic copy of a given book requires computer facilities, telecommunication infrastructures and multiple costs. All the above reasons support the idea of survival of the p-book, and energize that inductive belief.

What about overwhelming barriers of e-book readers? Suppose that you are living in 2050. To name a few, we just enumerate some of the indicators:

- Second life is as usual as the physical life;
- Educational systems and programs are planned and performed digitally; and e-learning is the only solution;
- Families and communities have full digital communications;
- Entertainments are digitally possible;
- Telecommuting is popular for all professions; and
- Participation in social and political affairs is possible through digital media.

This list could be developed further. Cannot we have appropriate e-book readers, when our life style is susceptible to such improvements? Cannot e-books be warm? Cannot e-book readers be safe? Cannot e-book publishers find a solution for DRM? Cannot e-book publishers develop flexible readers and platforms? And cannot e-book publishers find a formula for discounting? The reality is that we are supposed to cope with these barriers; and will do so eventually. We have to do so, because the sustainable development model essentially obligates it. Bieman, Ortega and Rupp-Serrano (2010) and Death (2010) provide similar futurological viewpoints. In addition to this necessity, p-books can just be used through reading. In other words, sight sense is the only active sense when we study a p-book. But, e-books can be read through both sight and hearing senses, because the reader is able to read and hear simultaneously. This added value reinforces imagination and enhances creativity. Access to an appendix in e-books is also easier than access to the same part in p-books; because hyperlinks facilitate connecting different information resources to each other. Other interesting technological, psychological and biological comparisons have been provided elsewhere (Abram, 2010b; Hoseth & McLure, 2012; Shelburne, 2009).

However, mere comparison between *P* and *E* books is not our goal. Habits of offline and online users, reasons supporting the inductive belief implying survival of the print book, illustrating inevitable future, and explicit questions about the e-book industry were discussed here to notify that for falsifying this belief we have no choice unless we adopt the falsifiability approach. We adopt such an approach not for confirming our idea in a biased manner, but for this reason that we accepted any belief is only justifiable when the observer fails to falsify it. In fact, we are going to test the survival of the print book belief. If we failed, then we will speak in favor of the p-book. But, if we succeeded, then we will accept that the book industry will be fully digitized, whether we like it or not. Therefore, the shortcomings of e-book that is currently cited by p-book lovers are not important at all. We will review the literature and find evidences in favor of or in opposition to the p-book survival. As a general principle, impartiality forces us to not repeat predictions like those quoted by Mims (2010b), not follow reactions similar to those adopted by Denny (2010) or even not inject a type of confusion like what Hansson (2011) did.

Death of the Print Book: Multiple Evidences

At the beginning of the third millennium, a list of predictions for e-book market was provided (Hawkins, 2002). There is a newer estimation (Anderson, 2009). Slow (Abdullah and Gibb, 2008a, 2008b; Foasberg, 2011; Pattillo, 2008) and steady growths in this market have also been shown repeatedly (Cheong and Tuan, 2011; Grudzien and Casey, 2008; Reid, 2002a, 2002b; Report, 2010; Simon, 2011; Slater, 2009; Students, 2010). Recently, *Amazon* reported that e-books were sold more than p-books (Bosch, 2012; Brookman, 2011; Fulford, 2011; Milliot, 2010; Mims, 2010b; Takahiro & Akira, 2011; Wagner, 2010). The same trend has been reported for Barnes & Noble (Springen, 2012), Japanese e-book publishers (Fitzpatrick, 2010; Foote & Rupp-Serrano, 2010), UK, India and Brazil (Albanese, 2012; Bury, 2009; Estelle & Woodward, 2009; Littman & Connaway, 2004; Ramaiah, 2012) and Chinese people (Fitzpatrick, 2011). Whereas the *Pew Research Center's Internet and American Life Project* shows that print books are only better for reading with a child, and sharing with friends (Yarow, 2012), the *New York Times* in an earlier research reported an interesting result that indicates a boom in e-books bought by children (Fulford, 2011; Maynard, 2010). Another study showed that teens are more interested in e-books than p-books (Springen, 2012). Among subject fields that are of interest among e-book readers include literature, especially fiction (Abram, 2010a; Alizadeh, 2011; Fitzpatrick, 2010; McKnight, Dearnley & Morris, 2008; Springen, 2012). Monographs and reference works are the next preferences (Anuradha & Usha, 2006; Hernon, Hopper, Leach, Saunders & Zhang, 2007; Ismail & Zainab, 2005; Wu & Shih-chuan, 2011). Apart from these realities, there are opinions about the problems of changing the ideas of famous editors regarding the survival of the print book (Bunkell & Dyas-Correia, 2009; Mims, 2010a).

Moreover, there are many studies about e-book usage in different contexts. Berg, Hoffmann and Dawson, (2010), Langston (2003) and Zhang and Beckman (2011) provided a good literature review about user attitudes towards e-books. Ease of e-book usage has also been studied (Letchumanan & Tarmizi, 2011a, 2011b). Hawkins (2002) predicted that students in medicine, science, and law are an attractive market for e-books because the demand is large and continuous year by year. Other potential markets are authors, travelers and users with special needs. The same study reported that 62 percent of students would prefer using their textbooks in electronic form, to save carrying a load of heavy books with them (a frequent cause of back problems in the student population) and to enjoy the enhanced functionality of e-books (bookmarking, note-taking, and searching).

While e-book usage studies are complex (Lewis, 2008), yet we have no choice but to be aware of the matter. There are projects that were carried out to discover the extent of e-books penetration amongst academic and public environments. Ebrary (2008), Global (2008), Jackson & Holley (2011) and Kimball, Ives & Jackson (2010), for example, indicated that the majority of students prefer to use e-books. Croft & Davis (2010) did two surveys in 2003 and

2009. They observed an increase in e-book usage among Royal Roads University students. Best (2008) and Grigson (2009) have reported similar results. Nariani (2009) indicated that 76 percent of students have used e-books. At the University of Pittsburgh, the same result was shown. Eighty six percent of interns, residents, and fellows reported using an e-book to support clinical care (Folb, Wessel and Czechowski, 2011). Nicholas et al. (2008) found that 61.8 percent of all UK students use e-books in connection with their scholarly work. A similar result was recorded for the UK (Study, 2008). Camacho & Spackman (2011) showed a decline for p-book circulation and an increase in e-book usage. Carlock & Perry (2008) recorded more interest in e-book usage among science and engineering faculties. Such willingness encouraged three-quarters of academic libraries and half of public libraries in the UK to increase their collections of e-books (High, 2009). Hawkins (2002) also reported two cases: one from an Australian public library that their six e-book readers were in constant use, and 90 percent of the users said they would continue to read e-books, and the other from the Rochester, New York, public library in which 67 percent of its e-book users read one or more complete titles, enjoyed the experience, and reported no eyestrain problems.

Concluding Remarks

As we discussed the falsifiability theory, the investigator should look for ways to falsify the theory (prediction). As long as a theory is not falsified, we can trust it. But, if the theory fails we should look for a stronger one.

In this article, we analyzed LIS literature implying survival of the p-book. To falsify an inductive belief, we should only provide one violate item. But, the interesting point is that more than forty five evidences were cited. Therefore, the main question of this study is replied; *the p-book will not survive*.

From such an important result, one can learn that LIS education and research programs should be refined so that liberal information professionals could be trained. The liberal librarians should carefully examine e-book market, new trends and models in e-business, hardware and software issues, capabilities of platforms, and end-users' information behavior to make a continuous press on publishers and e-book vendors to develop more stable and cheaper e-readers, incorporating nostalgic features in e-books, more safe systems for keeping the whole content, more balanced financial models in which the reader could benefit of discounts as the work became more outdated, more transparent and robust search functionalities, and more flexible copyright agreements.

Endnote

1. It can be added that new qualitative research methods are inductive in essence.

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