



SOURCE ENDURANCE

Evaluate of Sources of Information

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The nature of the work of coaches has them significantly involved in the scientific world. Verifying claims, developing novel ideas, and understanding why various training methods do or don't work involves a basic understanding of physiology. This requires constant revision of techniques and research. Professional athletes and coaches need their information to come from reliable sources. And as professionals, the standards need to be higher than the average athlete. In order to accomplish this, an understanding of the types of sources, their strengths, weaknesses, and their validity has to be understood. While each has their place in developing athletes and the athletic community, some have little place in developing the coaching field. As a result, a coach must be able to identify the strengths and weaknesses of various types of information ranging from word of mouth to peer-reviewed journal articles.

Basic Sources

Fellow Athletes

The most prolific source of information is other athletes. However, depending on who you talk to, this may also be the most unreliable source. Often ideas are passed between individuals with very little fact checking. In the end, this is a self-perpetuating cycle of information being spread in a group. Anecdotal evidence is prevalent with assumptions drawn based on experience or observing others. Often a basal level of knowledge exists with ideas and justifications for incorrect practice incorrectly extrapolated out. Often, the idea that "people should do this because athlete X does it and they are really good" is prevalent. However, there is no evaluation as to if the methods are truly effective or detrimental, as causality is not evaluated. Tradition and romanticism surrounding a sport may be surrounding the advice when all modern methods contradict practices. An example is the misinterpretation of "base mileage" in cycling where athletes are instructed to ride a high volume at a low intensity. Additionally the advice may focus on quick fixes that may or may not work, or may even be detrimental to an athlete's progress or even health.



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In this group, evaluating the competency of the individual is key. Often the fellow athlete is not a subject matter expert. However, an educated individual may be providing information, but there is no system to evaluate the quality of the source making this source of information extremely unreliable.

Magazine Articles

Newsstand publications undergo a certain level of scrutiny that allows them to be better sources than the general public. However, these sources are still not reliable, especially when developing a professional practice. It has to be remembered that the primary goal of these publications is sales. With this, the articles are generally easy to read with a rotation of topics. Some tools, such as basic training plans or recipes can be very useful to some athletes. And, the authors usually have some sort of experience in the field. However, the authors may overstep their knowledge base and provide mis-information. Or, the authors may not even be qualified on the topic in general. For example, a Category 1 racer may write an article on sprint training. While the rider may be a successful racer, they have no background in training others, nor the knowledge base to explain why the training works. Often these sources focus on quick fixes that are analogous to fad dieting for athletes. With that said any form of rotating media can be a source of ideas to evaluate. An author of an article may state an idea for training that is novel but not yet evaluated.

Books

Average book shelf literature has often been used as a source of information, but also has many glaring issues regarding the validity of the information provided. On the strengths, the author has a vested interest in producing quality work. More layering of editing increases the reading quality over many magazines. For the most part, books are subject to the same types of scrutiny that magazines are, with the exception of text books. Without the citation of credible references, there is no verification of the validity of the information. The author can have radical ideas that have no proof or backing. Or, they may follow a current exercise trend with terminology that sells. Additionally, the authors may not be educated in the topic, but rather have an idea that sounds good.



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Professional in the field

Professional Athletes

Professional athletes serve as a very tricky source. They have great amounts of experience in a field and may have acquired extensive knowledge over time. However, the source of their information and the validity of their interpretation is still a risk. An analogy would be a race car driver. They can drive the vehicle and make it perform. And by the nature of their professions, they have a basic understanding of how the car works. However, the ones who know how to make a top level engine and maintain the car are the mechanics and engineers. And as such, the professional athlete is likely not a subject matter expert unless they have education and training aside from the professional experience.

On the flip side, these athletes should not be discounted as they can be a viable source of information and ideas. Much like the race car driver who is curious about adjusting the steering, a professional athlete can bring ideas to the table that can then further be evaluated. Additionally, they may have tools that are not physiologically related to performance, such as handling drills, tactics, or advice on a course. Additionally, they may have resources behind them for validating information, such as that mechanic.

Coaches

On a similar plane is the coach. As experience and education of coaches vary, evaluation of a coach should be comprehensive. A consultation with a coach might be the best way to gauge how credible a coach is as a source. This will also elude to the coaches' experiences as an athlete, educational background (including certifications), and congruent training philosophy. Indeed, some coaches are vague in their responses so as not to give away too much information without compensation, however it should be easy to tell if this vagueness is due to lack of experience or knowledge. It may also be important to look at the success of the athletes that an individual has coached as a part of the coaches' credentials. Though this might suggest that a coach has great business and recruiting skills, retention of athletes that consistently achieve their goals and get good results can be a primary evaluator of the effectiveness of the coach in developing athletes. Regardless of the sheer ability of the coach and their credentials, that does not necessarily mean the coach is an expert of a given topic. Though certain certifications may allude to a coach's credibility as a source, certain certifications require a very base



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level of knowledge in the field whereas others require an in depth and/or breadth of expertise. While cross talk within the field is an extremely valuable tool, once again the validity of what is being said often needs to be evaluated.

Academic Sources

Text books

Text books are the basic form of an academic source. They provide myriads of information that is highly filtered. They undergo a fairly rigorous review process and cite their sources of the information—typically a higher level than the book itself. And by design, they are practical due to the various levels of knowledge they address. Entry level books allow refreshing of knowledge or pursuit of more in depth understanding of a topic. For example, a coach may be interested in reviewing the use of energy sources at various intensities while another references pulmonary function for an athlete with a special need. With that however, it is essential that the proper level of text is obtained. For instance, a new coach with a basic understanding of physiology would be bogged down in an upper level book as various chemical structures are discussed and may not be relevant to the information sought.

With as much information and as accessible as this source is, it is subject to a variety of pitfalls. Primarily, the information included may be out of date. Producing a textbook is a lengthy process and takes several years. It is not uncommon in rapidly advancing fields to have invalid information by the time the book enters the classroom. A classic example is in medicine where a new medication may have different uses or be discontinued within a few years. Additionally, a reader must have a level of awareness of what is being said in the text and not extrapolate out information. For instance, the volume of blood held in the chamber of the heart given in a basic biology is not applicable to the working heart during vigorous exercise.

Subject Matter Experts

Professionals within a field can serve as a valuable reference. Those with a history in an academic setting have the experience of talking about a subject of various levels. Additionally, these individuals are familiar with the requirements to stay up to date on the topic. An additional benefit is finding a subject matter



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expert who works directly in the topic of interest as they can bridge the gap between the scientific data and its application to the real world.

However caution must still be used. The source must be critically evaluated to ensure that they are competent in their field. At times an individual may have experience and extensive in education in one practice, but that does not necessarily translate to another. A classic example is the physician. Both surgeons and family doctors undergo similar schooling, but their specialties are very different and one could not perform the others job. Additionally, a very competent physician is not educated on how the body reacts to training in the same way an educated coach would not know how to titrate a medication.

Academic Journals

Scientific journal articles are at the bread and butter for expanding a field and providing a sound knowledge base. The articles in the journals undergo a rigorous review process from experts and top researchers in the field before making it to print. Unfounded assumptions and poor research practices are weeded out. For general information, these articles can be separated in to two categories—reviews of literature and primary research articles.

Primary Research Articles

The best source for the most current and cutting edge information on a topic is the primary research article. Again, being peer-reviewed subjects the content to a high level of scrutiny before it is ever published. But, there are downsides to utilizing this type of source. First, the intended audience is usually researchers and others directly related in the scientific field. This may make the level of depth many of the articles go to may not be necessary for the information being sought by coaches. These often require an in-depth understanding of the topic prior to reading the article, sometimes the equivalent of a post-graduate education. At times, the methods used and an understanding of the data may be fairly advanced for the information sought. As a result, one may need to read extensively on the background to gain an understanding. As a result, attempting to gain an understanding on a topic through primary research articles can be time consuming and unnecessary for those not needing the most minute details.



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While these articles direct the course of research, at first some may seem contradictory. This is due to the field attempting to tease out what exactly is being shown and under what conditions as the science evolves. This may limit the real-world applicability of a single article as only a limited number of facets can be evaluated per experiment. Some work does attempt to provide conditions seen in application, but even then a body of research is required before application. And with this, a reader must be able to read with a critical eye to understand what the data is truly stating and have a basic understanding of statistics.

Reviews of literature

The most practical forms of articles are the reviews of literature. Essentially a topic is selected and background information up to the most recent research developments are covered. These features make these types of articles ideal for those working in fields who are not necessarily interested in the nuances of research, but rather finding the most up to date and accurate information. With the reviews providing background information on the topic, extensive education on a topic is not necessary. These articles are also an easier read than primary research. They can also serve as a relatively short, but in depth reference. In the end, a reader can walk away with a basic understanding on a topic and some arguments surrounding it, but by no means an expert. If desired, however, the cited references also allow further reading and research on the topic if desired.

On the down side, these articles can also become outdated as research progresses. Additionally, a basic understanding of the principals is required likely leaving these articles above the head of the general public. And while reviewed by peers, some articles are still left skewed due to the author's interpretation of the cited data and their support for their argument on a topic.

Regardless of the professional's role as a coach or athlete, it is important to evaluate the claims of the source, but to what extent? It would not be a feasible task to fact-check everything we hear and in turn convey, however, as professionals, it is owed to the clients and the field to provide valid information and limit anecdotal claims. With proper development and education, a coach can ensure they are providing the highest quality of training. And by ensuring the validity of the information and being critical of the sources, the pitfall of having just enough information to be dangers can be avoided.



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Quiz Questions

Name:

USAC #:

Email:

1. As a general rule, if information is accepted as general knowledge amongst athletes, it is reliable.
True
False
2. When researching a new topic, the easiest source type to gain background knowledge from is a primary research article.
True
False
3. A new athlete comes to you with a question regarding a supplement that they just heard about. It is acceptable practice to
 - a. Refer them to a magazine article that recently highlighted the supplement
 - b. Research the topic through journal articles and explain the findings you read
 - c. Refer the athlete to a primary research article you just read on the topic
4. An athlete comes to you with a new prescription medication and has concerns with how it may affect their training. You should
 - a. Use a textbook to understand the mechanism how the drug works
 - b. Check to see if any recent journal articles address vigorous activity and the medication
 - c. Verify safe dose ranges in a textbook and inform the athlete of your recommendation on taking the medication
 - d. Have the athlete check with their physician on the possible effects of vigorous exercise with the medication
 - e. a and c
 - f. a, b, and d.
5. Your athlete has a VO₂max test done at a local facility. The equipment used is by a brand you have not heard of. It is acceptable to trust which of the following resources regarding the validity of the equipment? (Select all that apply)
 - a. A magazine article reviewing the piece of equipment
 - b. A college professor who is familiar with the various types of equipment
 - c. The manufacturers web site



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- d. A peer primary research article assessing the equipment
 - e. A review of literature comparing equipment made by various manufacturers.
6. A professional rider is visiting a club ride and touts a series of interval workouts as their key to climbing faster. It is likely safe to assume that the intervals are an effective means to increase your client's climbing ability
- True
 - False
7. An athlete comes to you with a progression they read about in a recent magazine. It is safe to assume that the article is false as that type of source is unreliable
- True
 - False
8. Your athlete is an emergency room physician. They start taking a supplement to increase their lactic threshold. It is safe to assume that the physician is a subject matter expert and you do not need to research the efficacy of the supplement.
- True
 - False
9. An athlete shares a recipe for a pasta dish they found in a recent cycling magazine. It is acceptable to not caution the athlete in using these resources for this type of information.
- True
 - False
10. An athlete comes to you wondering what drives you to breathe harder when exercising. It is acceptable to research this information in an introductory biology textbook.
- True
 - False