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| ***Techniques for Documenting with Proof or Supporting Evidence, and Related Strategies for Problem Solving***  **By David Alderoty © 2017**  **Chapter 19 ) Technique-17, Using the Results of a**  **TRIAL-AND-ERROR Effort, as Supporting Evidence, as a**  **Topic for a Writing Project, or to Solve a Problem or Obtain a Goal**  [**This e-book presents 28 techniques for supporting the validity of the statements you write**](http://www.TechForText.com/DP/List)**.**  **Left click on the above for a list of the techniques**  **This chapter contains a little over 3,700 words**  **If you want to go to chapter 18, left click on the following link:**  [**www.TechForText.com/DP/chapter-18**](http://www.TechForText.com/DP/chapter-18)  **To contact the author use** [**David@TechForText.com**](mailto:David@TechForText.com)  [**or left click for a website communication form**](http://www.david100.com/Mail)  **Table of Contents, and an Outline of this Chapter**  The following is a hyperlink table of contents, as well as an outline of this chapter. If you left click on a blue underlined heading, the corresponding topic or subtopic will appear on your computer screen. Alternatively, you can scroll down to access the material listed in the table of contents, because this chapter is on one long webpage.  [Topic 1.) Technique-17, Using the Results of a TRIAL AND ERROR Effort, as Supporting Evidence 4](#_Toc476106232)  [**Subtopic, Simple Examples, of the Trial and Error Process** 5](#_Toc476106233)  [**Subtopic, Examples of Goals that may Require the Trial and Error Process** 6](#_Toc476106234)  [**Subtopic, Obtaining Goals, With The Trial And Error Process, with Your Knowledge and Experience, and/or With Instructions** 8](#_Toc476106235)  [Topic 2.) Definitions, Descriptions, and Practical Applications, of the Trial and Error Process 8](#_Toc476106236)  [**Subtopic, The Simple Version of the Trial and Error Process** 9](#_Toc476106237)  [**Subtopic, The Complex Version of the Trial and Error Process** 10](#_Toc476106238)  [**Subtopic, Knowledge and Information Use to Reinforce the Trial and Error Process** 11](#_Toc476106239)  [**Subtopic, The Utility of the Basic, and Complex, Versions of the Trial and Error Process** 12](#_Toc476106240)  [**Subtopic, the Trial and Error Process, and Goal Attainment from a Practical Perspective** 12](#_Toc476106241)  [**Your Knowledge and Skill with the Trial and Error Process, In Relation to a Specific Discipline, or Type of Goal, can Determine if You Succeed or Fail** 14](#_Toc476106242)  [Topic 3.) Using Information Obtained From a Trial and Error Effort, as a Subject to Write About, and/or as Evidence to Support the Statements You Wrote 15](#_Toc476106243)  [**Subtopic, The Similarities and Differences of Information Obtained from the Trial and Error Effort, Compared with Information Obtained from Experimentation** 16](#_Toc476106244)  [**Subtopic, Using the Results of Trial-and-Error Efforts, To Write Articles that Relate to Goal Attainment** 18](#_Toc476106245)  [**Additional and Supporting Information For Topic-2, From Web-Based Articles** 21](#_Toc476106246)  [**Additional and Supporting Information For Topic-1, from Web-Based Videos** 23](#_Toc476106247)  **This E-Book Provides Additional and Supporting Information from other Authors, with Web Links**  This e-book contains links to web-based articles and videos from other authors, for **additional, alternative, and supporting information.** The links are the blue underlined words, presented throughout this e-book. However, some of these links are to access different sections of this e-book, or material on my own websites.  Quotes and paraphrases in this e-book have hyperlinks to access the original source. The quotes are presented in brown text, which is the same color of these words. (The precise text color is RGB Decimal 165, 42, 42, or Hex #a52a2a)  Some of the web links in this e-book will probably fail eventually, because websites may be removed from the web, or placed on a new URL. If a link fails, use the blue underlined words as a search phrase, with [www.Google.com](http://www.google.com/) If the link is for a video, use [www.google.com/videohp](http://www.google.com/videohp) The search will usually bring up the original website, or one or more good alternatives. |

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| ***For those who prefer listening, as an alternative to reading, this book is recorded in an audio format.***  [***For an audio narration of topic 1, left click on these words (requires 5 minutes, and 9 seconds)***](P1.mp3)  [***For an audio narration of topic 2, left click on these words (requires 9 minutes, and 7 seconds)***](P2.mp3)  [***For an audio narration of topic 3, left click on these words (requires 21 minutes, and 56 seconds)***](P3.mp3) |

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| **Topic 1.) Technique-17, Using the Results of a TRIAL AND ERROR Effort, as Supporting Evidence**  |||  The results of a Trial and Error effort, has some similarities to experimental evidence. However, experiments are carried out to obtain information, such as to confirm or refute a hypothesis. A trial and error effort is focused on obtaining a goal. Nevertheless, both experiments, and trial and error efforts, can provide useful information for a topic in a writing project, or for supporting evidence for statements in a document.  **The trial and error process** is the technique that is used when an individual is engaged in a trial and error effort. The **trial and error process** is essentially a problem solving and goal attainment technique, as well as a learning strategy. Thus, with this technique, the goal can be to solve a problem, obtain an objective, to learn new material, or to develop a skill.  **The trial and error process** involves carrying out the activities to obtain the goal, and evaluating the resulting **feedback**. If the **feedback** indicates less than optimal results, the goal related activities are modified to increase the chances of obtaining the goal. At a more sophisticated level, any equipment or materials that are used with the goal related activities might also be changed or improved based on less than optimal results.  **Subtopic, Simple Examples, of the Trial and Error Process**  |||  At the simplest level, the trial and error process can involve modifying hand movements in a series of trials to obtain a goal. When the hand movements appear to be inadequate, excessive or inaccurate, **corrections are made** to maximize the chances of obtaining the goal. A simple example is threading a needle. Another example is trying to put a key in a lock when the lighting is inadequate.  A slightly more complexed example of the trial and error process involve developing a skill that is based on proper hand, body, and eye movements. When the feedback from a practice session indicates less than optimal results, hand, body, and eye movements are corrected to increase the chances of obtaining the goal. Some examples are learning to drive an automobile, fly a plane, or operate a crane.  Formal classroom studies, and conventional testing, can also be used as an example of the trial and error process. The test results represent the feedback, and if less than optimal, good students might do one or more of the following to increase the chances of obtaining a good grade: modify study strategies, increase the time spent studying, and focus their studies to eliminate specific weaknesses they have in a specific course.  **Subtopic, Examples of Goals that may Require the Trial and Error Process**  |||  Some examples of goals that are likely to require the trial and error process are presented below. Some of the more complex goals on this list require expert knowledge and skills, and special equipment, in addition to the trial and error process. The list starts with simple goals and proceeds to the more complex examples.   * Assembling a jigsaw puzzle * Searching for information on the web * Finding your way out of the woods * Developing a skill * Solving an unusual problem * Creating a work of art * Finding employment, * Starting a business * Designing and building an invention * Searching for oil or mineral deposits * Creating a new medicine * Developing a new product, medication, or service, suitable for mass production, and sales to the general consumer   **Subtopic, Obtaining Goals, With The Trial And Error Process, with Your Knowledge and Experience, and/or With Instructions**  |||  Most goals involve at least some trial and error, including personal, business, industrial, and scientific objectives. This includes most learning goals, especially when it involves computer technology, symbolic logic, mathematics, physics, and chemistry. However, **if you are knowledgeable and experienced in obtaining a specific goal, there will be little if any trial and error.** On the other hand, if you lack knowledge or experience, your goal attainment effort will probably require a great deal of trial and error. **If you have a perfect set of instructions to obtain a specific goal, you might have little if any need for trial and error.** Conversely, if the instructions are less-than-perfect, or difficult to comprehend, you might have to use the trial and error process, to some degree, to obtain the goal. |

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| **Topic 2.) Definitions, Descriptions, and Practical Applications, of the Trial and Error Process**  |||  Note the following definitions and descriptions of the trial and error process are based on the way the terminology is used in this e-book. Based on this terminology, there are two versions of the trial and error process. The first is the **simple version**, which is carried out in daily life by humans and animals. This **simple version** is used to obtain the necessities for survival, and to develop basic skills in early childhood, such as learning to walk, talk, and manipulate objects of the hands. The simple version of the trial and error process is also used throughout life, such as to acquire social skills, obtain friends, find employment, to solve problems, and to facilitate learning and skill development.  The second version of the trial and error process is complex and it involves many components and dynamics, and it is useful for obtaining complex goals, as well as industrial, and scientific objectives. This is explained in the following subtopics.  **Subtopic, The Simple Version of the Trial and Error Process**  |||  The simple version of the trial and error process is a goal attainment effort, consisting of a series of trials that are focused on obtaining a goal. The strategies and results of one or more trials are evaluated for correctness and effectiveness. If the evaluation indicates less than optimal results, the strategies used are improved, or replaced. The improved or new strategies are evaluated in subsequent trials, which might indicate the need for additional improvements, or replacements.  The strategies used with this simple version of the trial and error process are usually relatively simple, involving one or more of the following: hand, eye, and body movements, talking, listening, and persuasion. This can also involve a series of practice sessions, to develop skills over a period of weeks, months or years.  **Subtopic, The Complex Version of the Trial and Error Process**  |||  There are two main differences between the simple version of the trial and error process presented above, and the complex version presented in the following paragraph. The simple version, involves evaluating and correcting a performance and related strategies to maximize the chances of obtaining a goal. The complex version involves evaluating, and correcting multiple factors, such as methods, rules, machinery, tools, and consumables, to increase the chances of obtaining an objective. This can include evaluating and correcting the performance of a number of individuals working on a specific project.  Specifically, this involves ongoing, or periodic, evaluations of strategies, techniques, knowledge, instructions, plans, data, equipment, materials, personnel, and other entities that are involved with a specific goal attainment effort. If the performance or results of any of the above are less than optimal, corrections, improvements, changes, and/or replacements are carried out, to maximize the chances of obtaining the goal.  The above can involve the addition of new strategies, techniques, equipment, and personnel to improve results. This can also include the elimination or modification of strategies, techniques, equipment, and retraining of personnel. Sometimes there is a need to modify the goal, or replace it with a more realistic objective. This can be necessary when there are repeated failures, and/or inadequate financial resources to obtain the original goal.  **Subtopic, Knowledge and Information Use to Reinforce the Trial and Error Process**  |||  The trial and error process can be guided by, and/or reinforce with, knowledge, study, instructions, and data. This can sometimes involve experts, or trained individuals that are providing assistance to obtain the goal. The complex version of the trial and error process is almost-always guided by, and reinforced with knowledge, instructions, data, and/or personal study. This can sometimes require the assistance of experts or trained individuals.  The simple version of the trial and error process sometimes is carried out with little or no knowledge, study, instructions, and data. This can involve a series of semi-random trials to obtain a goal. This is more likely to be the case, with babies, young children, and animals.  **Subtopic, The Utility of the Basic, and Complex, Versions of the Trial and Error Process**  |||  The simple version of the trial and error process is very efficient and easy to use. It is useful for most of the goals and problems people face throughout life.  The complex version of the trial and error process is suitable for technical and scientific objectives. This can involve companies that are focused on creating and marketing new technologies, or new medications. In some cases, it may also be useful for small and medium-size businesses, if there are many relevant factors to evaluate and correct. The complex version of the trial and error process may also be useful for very difficult and complex personal goals.  A good example of a highly complex trial and error process is the space program. This involved the efforts of many individuals and corporations working together with NASA, to put men and machines in space, on the moon, and robotic devices on Mars.  **Subtopic, the Trial and Error Process, and Goal Attainment from a Practical Perspective**  |||  When you are making plans to obtain a goal that is relatively complex, it is a good idea to evaluate the time, money, work, equipment, and other entities that will be required to carry out a successful project. **Making corrections and improvements in your plans, equipment, and the goal itself, before you start a project, can prevent failures, and related loss of time and money.**  One way of improving your plans for your project, is to imagine that you are carrying out the goal, and try to imagine the results. Try to think of all the things that can fail or lead to problems. Then make a list of the possible adverse events, and figure out how to reduce the risks, and/or minimize the adverse consequences.  One of the most important factors to consider is the cost of the project you are planning, and how much time it will take to complete it. Try to avoid underestimation, which can be achieved by deliberately overestimating by a reasonable amount.  Starting an experimental or miniature version, of your project is sometimes feasible. This can provide important feedback from trial and error. Keep in mind that the trial and error process provides information as you are working on your goal. This information can be used to make changes and improvements in all of the components, factors and dynamics you are using to obtain the goal. This can involve modifying, and/or replacing strategies, techniques, equipment, materials, to optimize your chances of success, even before you start the main project.  The information obtained from the trial and error process can indicate when plans, self-imposed deadlines, and the goal are unrealistic. When this is the case, it is best to make the required changes or modifications, to minimize the chances of failure.  **Your Knowledge and Skill with the Trial and Error Process, In Relation to a Specific Discipline, or Type of Goal, can Determine if You Succeed or Fail**  |||  Succeeding or failing to obtain a goal, might be at least partly determined by your level of skill with the trial and error process, in **relation to the specific field and goal** that you dealing with. This involves evaluating feedback, to determine what has to be improved or corrected. Then you have to figure out precisely, how to make the corrections and improvements. If you improve or change the wrong entities, in response to feedback, you might fail to obtain your goal. Similarly, if you misinterpret the feedback, or underestimate its significance, failure is likely.  If you encounter the difficulties mentioned above with a major project, probably the best option is to obtain the assistance of individuals with appropriate knowledge and experience. The precise knowledge and experience required, of course would depend on the discipline and goal involved with your project. |

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| **Topic 3.) Using Information Obtained From a Trial and Error Effort, as a Subject to Write About, and/or as Evidence to Support the Statements You Wrote**  |||  The information obtained from a trial and error effort can be used for writing a topic on how to obtain a specific goal. This information can sometimes be used to support the validity of the statements in a document, in a way that is similar to experimental evidence.  The trial and error process can be thought of as a series of experiments that are focused on obtaining a specific goal. Just like a series of experiments, the trial and error process can provide information. **Even trials that produced negative results, as well as entire trial and error efforts that failed, might provide useful information, such as what to avoid, when attempting to obtain a specific goal.**  However, it is important to understand the similarities and differences of information obtained from the trial and error process, and data obtained from experimentation. This is explained in the following subtopic.  **Subtopic, The Similarities and Differences of Information Obtained from the Trial and Error Effort, Compared with Information Obtained from Experimentation**  |||  The trial and error process can be thought of as a series of experiments that are focused on obtaining a specific goal. Just like a series of experiments, the trial and error process can provide information. In the following paragraphs, the similarities and differences of experimentation and the trial and error process are discussed.  Experimentation provides information, such as whether a hypothesis is valid or not. Experiments can also provide information on what will happen when a set of actions are carried out, with a set of components, under a specific set of conditions. **For example, if** **20 grams of sodium metal** **is placed in a container with one leader of water**, **at 20 degrees Celsius, what will happen?** With this example, the **blue type indicates the components.** The **red type indicates the actions**, **and the green type indicates the conditions.** **The answer to the yellow highlighted question is the experimental results, which is as follows:** **A portion of the *water, will react with the sodium, and it will decompose and release hydrogen gas. The oxygen from the water will oxidize the sodium. The product that results will instantaneously react with the water producing sodium hydroxide. The water will become alkaline, because sodium hydroxide is a base that easily dissolves in water.***  I did not have to carry out the experiment described above, because the results are obvious. **These experimental results can easily be reproduced by anyone that is knowledgeable in chemistry.** **This is important, because,** **experimental results are only considered valid, if they can be reproduced by other individuals.** This is assuming they have the training and equipment to carry out the experiment.  The underlined words above represent a major difference between an experiment and a trial and error effort. This is an important distinction. **Unlike experimental results, the results of a trial-and-error effort, may, or may not be reproducible by others.**  When a trial and error effort involves high levels of human achievement, it is less likely that it will be reproducible by others. The results of a trial and error effort are sometimes influenced by innate potential. For example, an Olympic athlete that won a gold medal, and broke a world record, most likely used at least some trial and error in their training program. Very few, if any, people following an identical trial and error effort would have the innate ability to duplicate these results.  In addition, the motivation of the individual, the time they have available, and their financial resources can affect the outcome of a trial and error effort that involves human achievement. Their physical and social environments can result in dynamics that reinforce or interferes with achievement. The habits of the individual, and their knowledge, skills, education, and training, and previous achievements, are probably the most important factors that can affect the outcome of a trial and error effort that involves human achievement.  Because of the factors mentioned above, it is unlikely that the results of a trial and error effort, involving human achievement, can be duplicated by others, in the same way that experimental results can be replicated. However, efforts of this nature can sometimes be approximated by others. This is especially the case if they have similar skills and abilities that relate to the goal in question.  However, when a trial and error effort, involves simple tasks, skills that most people can develop, and systems in the hard sciences, it is more likely to be reproducible by others. The results of trial and error efforts in this category can sometimes be confirmed experimentally, and these results might be useful to support the validity of statements in a document.  **Subtopic, Using the Results of Trial-and-Error Efforts, To Write Articles that Relate to Goal Attainment**  |||  Keep in mind that almost all goals that involve human achievement, usually involve at least some trial and error. To write articles that involve the trial and error process and/or any type of goal attainment, gather information about people that obtained a specific goal. This information can be attained by interviews or discussions carried out face-to-face, or over the telephone. Alternatively, send out a series of questions in an email, fax, and/or letter, with a series of questions that relate to the specific goal. Another alternative is to collect information about famous people that obtained a specific goal, by searching the web.  Obtaining information on how people failed to obtain a specific goal can also be useful for a writing project. The way people succeed, and the way people fail, might result in a good article showing how to succeed at a specific type of goal attainment.  There are certain limitations with the ideas presented in the previous two paragraphs. As already stated, the results of a trial and error effort are not likely to be the same for everyone. In addition, you may not obtain all the relevant information from interviews, because when people use the trial and error process, they may **not** be aware of all of the strategies that they use to obtain their goals. For example, if you asked people how they succeeded in business, or became rich, and/or famous, they might mention a few common sense strategies that most people use in daily life, such as hard work, and persistence. Common sense strategies probably are involved with almost any type of successful goal attainment. However, other strategies and/or factors are almost certainly involved with individuals that obtained extraordinary levels of success.  You can probably improve the quality of the information you obtain from your interviews, emails, faxes, letters, or research, if you create a list of questions, such as the following:   * How many months or years did you invest to achieve this goal? * How many hours a day on the average did you study or practice to obtain this goal? * What strategies, techniques, equipment, and/or materials did you use to obtain this goal? * Did you have special skills, training, or abilities that helped you obtain this goal? * How much money did you spend to achieve this goal? * Did your formal education help you obtain this goal? * Did you make any errors while attempting to obtain this goal? If so, what are the errors, and how can other people avoid these mistakes? * Did you obtain any assistance to obtain the goal? Who helped you the most with this goal, what type of assistance did they provide?   Some examples of topics, involving goal attainment and trial and error are presented below:   * Educational goals, such as how people successfully obtained, and/or fail to obtain, a college degree, a Master’s degree, or a PhD, or trade school training * How people obtained, and/or fail to obtain, technical and/or scientific skills, such as skills that involve computer technology, computer programming, mathematics, physics, chemistry, electronics, etc. * How people developed, and/or fail to develop, a career in a specific field, such as in art, photography, engineering, physics, mathematics, chemistry, or any other type of employment * How people started a successful business, and/or how people failed in business There is a large amount of information on the web, that relate to this topic, such as the people that started Google, Microsoft, Facebook, Myspace, and Yahoo. However, there strategies might not be relevant to the average reader.   **Additional and Supporting Information For Topic-2, From Web-Based Articles**  |||  [Learning theory VS trial-error approach, by Cyprien Rusu](https://www.linkedin.com/pulse/learning-theory-vs-trial-error-approach-cyprien-rusu)  [Psychology: The Basics of Trial and Error Learning (with examples)](http://hubpages.com/education/Trial-and-Error-Learning)  [The Use of Trial and Error To Solve Problems](http://www.exforsys.com/career-center/problem-solving/the-use-of-trial-and-error-to-solve-problems.html)  [Trial and error, Neir Eshel, Science](http://science.sciencemag.org/content/354/6316/1108.full)  [The Effective Learning Method of Trial and Error, The Use of Trial and Error](http://www.self-learner.com/effective-learning-method-of-trial-and-error/)  [More about trial-and-error learning in the classroom](http://www.cengage.com/education/book_content/0170181812_krause/go_further/pdf/krause3e_gf_0403.pdf)  [Thorndike's Theory of Connectionism/ Trial and Error Learning](http://teachertraineeaide.blogspot.com/2013/05/behaviourist-thoery-thorndikes-theory.html)  [How Dogs Learn by Trial and Error Home](https://www.vetary.com/dog/care/how-dogs-learn-by-trial-and-error)  [To really learn, fail — then fail again! That ‘error’ in trial-and-error learning can be the ticket to learning well, by SUSAN MORAN](https://www.sciencenewsforstudents.org/article/really-learn-fail-%E2%80%94-then-fail-again)  [Trial And Error Is How Progress Is Made](http://www.geniusintelligence.com/trialanderror.htm)  [The Use of Trial and Error To Solve Problems](http://www.exforsys.com/career-center/problem-solving/the-use-of-trial-and-error-to-solve-problems.html)  [10 Factors that contribute to the success of a business What are the factors that lead to success](http://www.msstech.com/10-factors-that-contribute-to-the-success-of-a-business/)  [11 Surprising Factors That Determine Your Success in School What are the factors that lead to failure](http://www.onlineuniversities.com/blog/2012/01/11-surprising-factors-that-determine-your-success-in-school/)  [Success Factors for College Students](http://blog.enroll.com/post/Success-Factors-for-College-Students-1)  [Trial and Error: The Gritty 21st Century Skill, by Paula Golden](http://www.huffingtonpost.com/paula-golden/trial-and-error-the-gritt_b_5284245.html)  [Accounts, Formulations and Goal Attainment Strategies in Service Encounters, by Christine Lacobucci](http://journals.sagepub.com/doi/abs/10.1177/0261927X9091005)  [Twelve strategies for achieving your goals from the book Willpower, by Erin Doland](https://unclutterer.com/2011/09/22/eleven-strategies-for-achieving-your-goals-from-the-book-willpower/)  [How Toddlers Learn Through Trial and Error, Wom Editorial](http://www.worldofmoms.com/articles/how-toddlers-learn-through-trial-and-error/3614/2)  **Additional and Supporting Information For Topic-1, from Web-Based Videos**  |||  [YouTube search pages: "Trial and error”](https://www.youtube.com/results?search_query=%22Trial+and+error%E2%80%9D)  [Factoring Trinomials using Trial and Error](https://www.youtube.com/watch?v=xyXWmgKcHy4)  [How To Solve An Equation Using The Trial And Improvement Method (to 1 decimal place)](https://www.youtube.com/watch?v=NdEKAWZTOu0)  [Math Problem Solving Strategies - Trial and Error, by F Hughes](%22Trial%20and%20error)  [Approximate a Square Root to Two Decimal Places Using Trial and Error](https://www.youtube.com/watch?v=iNfalyW7olk)  [Trial and error learning - VCE Psychology](https://www.youtube.com/watch?v=rp_MwICR7KA)  **If you want to go to chapter 20 of this e-book, left click on the following link:**  [**www.TechForText.com/DP/chapter-20**](http://www.TechForText.com/DP/chapter-20) |