QBCC CONFERENCE

LEGAL ARGUMENT TECHNIQUE

Logic Applied to Law

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Litigation Lawyers

1. INTRODUCTION

1.1 In this paper I seek to cover a number of issues in relation to legal arguments. The aim is to improve the use of logic so that arguments are more persuasive.

1.2 The purpose of submissions, whether in a letter or in submissions to the Court, is to persuade the reader. You expect that your submissions are clear and logical.

1.3 Conversely, you would want to be able to identify inconsistencies and errors in logic in the opposition's submissions. That is – if their submissions are not logical, how can a result be said to flow from their submissions?

1.4 Many lawyers have not studied logic and only apply common sense. In this paper it is submitted that an understanding of the concepts in logic will assist any analysis and will improve the strength of your submissions or your attack on the other side's submissions.

1.5 The ability to reason and argue is fundamental to all areas of law and is used daily by all lawyers. Therefore, logic is of vital importance to any lawyer.

1.6 Logic is as a concept is most commonly applied these days to computers [eg the name of George Boole, who wrote a book on logic in 1854, is the basis for Boolean searches]. The concepts however applies to reasoning generally – and therefore to the application of legal argument.

1.7 This paper is not intended to be an exhaustive enunciation of the rules of logic. It merely seeks to introduce logic in summary form, so as to increase awareness of concepts and to improve clarity in submissions.

2. CONCEPTS IN RELATION TO PROOF

2.1 <u>Fundamental Issues</u>

2.1.1 At the outset, a number of fundamental issues need to be understood. These concepts assist you to analyses and apply logic.

2.1.2 Whilst at first glance these will appear simple and obvious, great minds such as Aristotle, Plato and Pythagoras have developed the concepts to assist in understanding and applying logic. Like chess, the concepts are simple, but the application can be very complicated.

2.1.3 The concepts covered here are:

- Consistency;

- The “law of the excluded middle”; and
- The “law of non-contradiction”.

2.2 Consistency

2.2.1 You would expect that arguments and submissions are internally consistent. Obviously, if they are not, the argument will not be persuasive in the slightest.

2.2.2 Therefore, when reasoning any problem, we should avoid anything self-contradictory. Where nothing has changed, you would expect the same stance on a topic. If something has changed without explanation, then there would be inconsistent and contradictory stances.

2.3 Law of the Excluded Middle

2.3.1 The “law of the excluded middle” requires that a thing must either possess a given attribute or must not possess it. Either a shape is a square, or it is not.

2.3.2 In a proper statement of the excluded middle, there is no in-between. The position is either black or white, and not any shade of grey.

2.3.3 Aristotle declared that every affirmative statement has its own corresponding negative, just as every negative statement has its affirmative positive. He illustrates the following pairs of contradictories:

It may be	*It cannot be*
It is contingent	*It is not contingent*
It is impossible	*It is not impossible*
It is necessary	*It is not necessary*
It is true	*It is not true*

2.3.4 Where the statement is universal in nature (eg “every” or “all”) then the opposite is particular (“some” or “not all”). Hence to identify an opposite, attention needs to be paid to the language used.

Universal	*Particular*
Every person has enough to eat	*Not every person has enough to eat* *or* *Some people do not have enough to eat*

2.3.5 The concept of contraries is where both statements are absolute.

Universal	*Also universal*
All people are rich	*No people are rich*

It can be seen that both cannot be true – yet it is possible that neither is true – hence there is a middle possibility that is not excluded.

This shows there is a significant difference between contradictory statements and contrary statements. As this is a common area for error, it is discussed below in more detail.

2.3.6 This concept is misused where there is a middle ground which is ignored in a question – eg "*Either you're with me or against me*". Arguments are frequently worded as if the middle is excluded, forcing their opponents into positions they do not hold.

2.3.7 An example of where this is obviously important is in questioning. Take the question – "are you against foreign ownership of land?" Whilst a generalisation could be given, it would not be universal as there is a middle ground where there are circumstances where you might go either way.

2.4 Law of Non-Contradiction

2.4.1 The "Law of Non-Contradiction" requires that a thing cannot both be and not be at the same time. Eg a shape cannot both be a square and not a square at the same time. A statement cannot both be true and not true.

2.5 Premises and Propositions

2.5.1 Logic is based upon premises.

2.5.2 The word "premise" is a term in logic meaning something assumed in making an argument. A premise must be a proposition.

2.5.3 A "proposition" is any statement that has the property of truth or falsity (eg the apple is green). A prayer or a request is not a proposition. Propositions can be true or false and nothing in between (ie the law of the excluded middle), but not both true and false at the same time (law of non-contradiction).

2.5.4 Terms called quantifiers are available for making propositions. Quantifiers are words such as *every*, *all*, *some*, *none*, *many* and *few*.

2.5.5 Quantifiers which should be considered carefully are:

(a) "**All**" and "**every**" – these are universal quantifiers and indicate totality (100%) of something.

Sometimes the *all* is implied. For example, "members may vote".

It should also be obvious that this cannot be inverted - ie if all S are P, it does not follow that all P are S. Consider "all mothers are parents". This does not mean "all parents are mothers";

(b) "**Any**" – whilst this is also universal (eg Any person who can show just cause why this man and woman should not be married…") at times it is not as clear as "all". In common use, *any* is not always used to mean *all*;

(c) "**Not**" – Whilst the law of non-contradiction indicates that something cannot both be and not be, we can construct both an affirmation and a negation which have the same meanings. "*All humans are* imperfect" has the same meaning as "*no human is perfect*". "*On Monday you were away*" means the same as "*On Monday, you were not present*";

To use the word "**not**" however, you need to consider carefully the excluded middle. The contradictory of "*All men are just*" is "*It is not the case that all men are just*". It is not "*No men are just*".

The difference between the contradictory and the contrary is that the contradictory is the negation of an entire proposition. "*it is not the case that all men are just"* is better communicated as "*some men are just";*

(d) The concept of contrary statements is different from contradictories. Contrary statements are universal statements which cannot both be true, though it is possible neither is. For example – "*All people are rich*" and "*No people are rich"* are contraries. They cannot both be true, but it is also possible that neither is true;

(e) Similarly, "**not all**" has the same meaning as "some". Consider "*not every child likes ice cream*" and "*some children don't like ice cream*";

(f) "**Some**" – Some usually means "not all". It can in logic however mean "Some and possibly all". For example, if you were unsure of the position, you might say "Some car dealers are licensed". This may well allow that all are licensed – it is not intended to exclude the possibility;

If you visited a new city and noticed that all taxis were white, you might say "some taxis are white" withholding judgment until you know for sure; and

(g) The words "**all**", "**none**" and "**some**" denote that the statement which follows is a universal statement.

2.5.6 Whilst in standard logic, quantifiers are identified in terms of *all*, *some* or *none*, the point is that <u>any</u> universal proposition will fall within those categories even if they use different words which amount to the same meaning or such words are implied.

2.5.7 Take for example "***most***". This has in a logical sense a similar meaning to "s*ome*" in that both mean not all, but some. The fact that commonly *most* means more than half whereas "s*ome*" commonly means less than half, does not affect the use in logic. That is, logic applies without reference to context.

2.6 <u>Use of words</u>

2.6.1 In considering the above points, you can see that the application of logic depends upon an exact understanding of the words used.

2.6.2 Often the information we convey is the *least* amount necessary to get our point across. Consider – "*all those who sit quietly during the test may go outside and play afterward*". This means, on its face, that those who will get to go out and play will definitely include the quiet sitters. However, it might well include those who make noise. In fact the statement says nothing about the noisemakers one way or the other.

2.6.3 You can see that the statement fails to cover the entire group and therefore does not convey properly the meaning intended. In the interest of brevity, we must often take the speaker's meaning in context and make necessary assumptions. This is unsafe in logic and inferences must be made to understand the statement.

2.6.4 The negative pregnant and the double negative can require more than usual concentration to ascertain the correct meaning, as this in effect means that a *no* means *yes*. This is important where many in society blur the use of these, such that a double negative is intended to mean no, not yes.

2.6.5 A negative pregnant is a denial which implies its affirmative opposite by seeming to deny only a qualification of the allegation (ie a limited part) and not the allegation itself.

2.6.6 For example, "*I have never consumed alcohol while on duty*" might imply that the person making the statement had consumed alcohol on other occasions, and was only denying that they had done so while on duty. Hence, such statement implies an affirmative.

2.6.7 Consider also a question “*Did you steal the car on November 4th?*” receiving the response “*I did not* steal *it on November 4th*”. This leaves the possibility and even the implication that it was stolen on a different date.

2.6.8 In a double negative, yes means no and vice versa.

2.6.9 Whilst this is obvious, consider a question “*Are you against gun control?*” Yes would mean you are against, whereas no means you are for gun control.

2.6.10 Consider a question on a referendum – “*are you in favour of repeal of gun control?*” Again, if you favour gun control, you should answer “*no*”.

3. PROOF AND DISPROOF

3.1 Proof

3.1.1 Proof can be established by <u>deduction</u> or by <u>contradiction</u>.

3.1.2 The basic steps of deductive proof begin with true or agreed statements, called premises, and concede that the next statement or construction follows legitimately from the previous statement. When we arrive at the final statement, called our conclusion, we know it must necessarily be true due to our logical chain of reasoning. Deductive proof is discussed below.

3.1.3 Proof can be obtained by contradiction in that you can refute a hypothesis by revealing its inconsistencies. Eg – *if statement P is true, then statement Q is true. But statement Q cannot be true (because it is absurd), therefore, Statement P cannot be true*.

3.1.4 Argument by refutation can only prove negative results – ie the statement is not true.

3.1.5 However, with the help of the double negative, you can prove all sorts of positive statements. *Reductio ad absurdsum* can be used in proofs by assuming as false the statement to be proven. To prove an affirmative, we adopt as a premise the contradictory of our conclusion. This way, once we have refuted that premise as an absurdity, we have proven that the opposite of what we wanted to prove is impossible. This is called indirect proof or proof by contradiction.

3.1.6 For example the ancient Greeks used this principle to prove that there is an infinite number of prime numbers. To do this, it was assumed the opposite as the initial premise – ie that there is not an indefinite number of prime numbers, rather there is a finite number. Proceeding logically, a contradiction was reached. Therefore, the only assumption was that the initial premise was wrong.

3.2 Disproof

3.2.1 Disproof of a conclusion is often easier than proof. A claim that something is correct or absolute only needs one example to the contrary to disprove the claim.

3.3 Methods of Argument - Deductive and Inductive reasoning

3.3.1 Understanding and identifying different types of argument techniques will enable you to identify whether a conclusion necessarily flows, or is merely a likely result.

3.3.2 There are basically two types of argument – deductive reasoning and inductive reasoning.

3.3.3 **Deductive reasoning** identifies a conclusion that must necessarily follow from given premises. Given the truth of the assumptions, a valid deduction guarantees the truth of the conclusion. In other words, deduction is the process of deriving the consequences from what is assumed.

3.3.4 **Inductive reasoning** is the process of deriving a reliable generalisation from observations. Hence inductive reasoning is where facts are determined by repeated observations.

3.3.5 Therefore an inference is deductively valid if and only if there is no possible situation in which all the premises are true and the conclusion false. Inductive validity on the other hand requires us to define a reliable *generalisation* of some set of observations. The task of providing this definition may be approached in various ways, some less formal than others; some of these definitions may use mathematical models of probability.

3.3.6 Deductive reasoning applies general principles to reach specific conclusions, whereas inductive reasoning examines specific information, perhaps many pieces of specific information, to derive a general principle. By thinking about phenomena such as how apples fall and how the planets move, Isaac Newton induced his theory of gravity. In the 19th century, Newton's theory (general principle) was applied to deduce the existence, mass, position, and orbit of Neptune (specific conclusions) from slight deviation in the observed orbit of Uranus (specific data).

3.3.7 Both types of reasoning are routinely employed. One difference between them is that in deductive reasoning, the evidence provided must be a set about which everything is known before the conclusion can be drawn. However, where you do not know all the evidence, inductive reasoning must be applied. Given a set of evidence, however incomplete the knowledge is, the conclusion is likely to follow, but one gives up the guarantee that the conclusion must follow. However it does provide the ability to learn new things that are not obvious from the evidence.

3.4 Deductive reasoning

3.4.1 Deductive reasoning proceeds from premises to derive particular information.

3.4.2 Deductive reasoning was developed by Aristotle, Thales, Pythagoras, and other Greek philosophers of the Classical Period (600 to 300 B.C.).

3.4.3 Deductive reasoning is dependent on its premises. That is, a false premise can possibly lead to a false result, and inconclusive premises will also yield an inconclusive result.

3.4.4 One might deny the major premise and hence the conclusion; yet anyone accepting the premises must accept the conclusion.

3.4.5 A deductive argument is termed a syllogism (from the Greek meaning "conclusion" or "inference").

3.4.6 A syllogism consists of three parts: the major premise, the minor premise, and the conclusion. In Aristotle, each of the premises is in the form "Some/all A belong to B," where "Some/All A' is one term and "belong to B" is another.

Each of the premises has one term in common with the conclusion:

- in a major premise, this is the *major term* (*i.e.,* the predicate) of the conclusion;
- in a minor premise, it is the *minor term* (the subject) of the conclusion.

For example:

Major premise: All humans are mortal.
Minor premise: Socrates is human.
Conclusion: Therefore, Socrates is mortal.

3.4.7 Each of the three distinct terms represents a category, in this example, "human," "mortal," and "Socrates." "Mortal" is the major term; "Socrates," the minor term. The premises also have one term in common with each other, which is known as the *middle term* -- in this example, "human." Here the major premise is universal and the minor particular, but this need not be so. For example:

Major premise: All mortal things die.
Minor premise: All men are mortal things.
Conclusion: Therefore, all men die.

3.4.8 Here, the major term is "die," the minor term is "men," and the middle term is "[being] mortal things." Both of the premises are universal.

3.4.9 Another example:

All apples are fruit.
All fruits grow on trees.
Therefore, all apples grow on trees.

3.4.10 A “sorites” is a form of argument in which a series of incomplete syllogisms is so arranged that the predicate of each premise forms the subject of the next until the subject of the first is joined with the predicate of the last in the conclusion.

For example – All A are B; all B are C; all C are D, therefore All A are D.

3.5 Common syllogistic mistakes

3.5.1 Although there are infinitely many possible syllogisms, there are only a finite number of logically distinct types which logically compel the conclusion. The classification of these is beyond the scope of this paper.

3.5.2 The important point is that any deduction needs to be considered for its validity, as not all combinations of propositions form valid conclusions. Hence merely using the form of deductive reasoning does not make a valid conclusion.

3.5.3 People often make mistakes when seeking to apply deductive reasoning.

3.5.4 For instance, given the following parameters: some A are B, some B are C, people tend to come to a definitive conclusion that therefore some A are C. However, this does not follow.

3.5.5 For instance, while some cats are black, and some black things are televisions, it is false that some cats are televisions. This is because the supposition of the middle term is variable between that of the middle term in the major premise, and that of the middle term in the minor premise (that is, of course, not all "some" cats are by necessity of logic the same "some black things").

3.5.6 Determining the validity of a syllogism involves determining the distribution of each term in each statement, meaning whether all members of that term are accounted for. This raises the law of the excluded middle.

3.5.7 Examples of invalid patterns are:

- *Undistributed middle* - Neither of the premises accounts for all members of the middle term, which consequently fails to link the major and minor term.

- *Illicit treatment of the major term* - The conclusion implicates all members of the major term; however, the major premise does not account for them all.

- *Illicit treatment of the minor term* - Same as above, but for the minor term and minor premise.

- *Exclusive premises* - Both premises are negative, meaning no link is established between the major and minor terms.

- Affirmative *conclusion from a negative premise* - If either premise is negative, the conclusion must also be.

- *Existential fallacy* - If both premises are universal, i.e. "All" or "No" statements, they don't imply *the* existence of any members of the terms. In this case, the conclusion cannot be existential; i.e. beginning with "Some".

4. "if… then …" DEDUCTIVE REASONING

4.1 There is a second type of deductive syllogism, based on the concept of conditional statements – highlighted by the use of "if … then.." (apparently originated by a group called Stoics in about the 3rd century BC) .

4.2 For example:

If *p* then *q*	To hold a driver's licence you must pass a test
p exists	You do hold a licence,
Therefore *q* applies.	Therefore, you must have passed the test

4.3 This can be used in more complex situations:

If *p and q* then *r and s*
P and q exist
Therefore *r and s* apply.

4.4 It also follows that:

If *p* then *q*	If this train goes to Sandgate, it stops at Bowen Hills
If not *p* then *r*	This train does not stop at Bowen Hills
Therefore *q or r*	Therefore, it does not go to Sandgate

Note that the conclusion assumes the unstated premise "either p or not-p" which must apply by virtue of the excluded middle.

4.5 Another valid method is:

If *p* then *q*	where there is smoke, there is fire
Not *q*	there is no smoke
Therefore not *p*	therefore there is no fire

4.6 The common fallacies in this type of reasoning is:

If *p* it true, then *q* is true	If there is a stop sign, you stop the car
q is true	You stop the car
Conclusion = no conclusion can be drawn.	
A common error is to conclude *p* is true.	To conclude there was a stop sign would be wrong

5. INDUCTIVE REASONING

Induction involves reaching conclusions about unobserved things on the basis of what has been observed. Inferences about the past form present evidence is reasoning by induction. Induction could also be across space rather than time, for instance as in physical cosmology where conclusions about the whole universe are drawn from the limited perspective we are able to observe. Induction is also seen in economics, where national economic policy is derived from local economic performance indicators.

Induction or inductive reasoning, is the process of reasoning in which the premises of an argument are believed to support the conclusion but do not ensure it.

It is used to ascribe properties or relations to types based on tokens (i.e., on one or a small number of observations or experiences); or to formulate laws based on limited observations of recurring phenomenal patterns. Induction is employed, for example, in using specific propositions such as "this ice is cold" to infer a general proposition such as "all ice is cold".

Another example is a conclusion that all swans are white. This was thought to be true in Europe until the settlement of Australia, when Black Swans were discovered.

Inductive reasoning cannot logically prove the proposed conclusion – at best it gives a likely answer.

Types of inductive reasoning

5.1 Generalisation

5.1.1 A generalisation proceeds from a premise about a sample to a conclusion about the population. For example:

The proportion Q of the sample has attribute A.
Therefore - The proportion Q of the population has attribute A.

5.1.2 The support the premise provides for the conclusion is dependent on (a) the number of individuals in the sample group compared to the number in the population; and (b) the randomness of the sample. The hasty generalisation and biased sample are fallacies related to generalisation.

5.2 Statistical Assessment

5.2.1 A statistical assessment proceeds from a generalisation to a conclusion about an individual.

Proportion Q of population P has attribute A.
An individual I is a member of P.
Therefore:
There is a probability which corresponds to Q that I has A.

The proportion in the first premise would be something like "3/5ths of", "all", "few".

5.3 Argument from analogy

5.3.1 An (inductive) analogy proceeds from known similarities between two things to a conclusion about an additional attribute common to both things.

P is similar to Q.
P has attribute A.
Therefore:
Q has attribute A.

5.3.2 An analogy relies on the inference that the properties known to be shared (the similarities) imply that A is also a shared property. The support which the premises provide for the conclusion is dependent upon the relevance and number of the similarities between P and Q. The fallacy related to this process is false analogy.

5.4 Causal inference

5.4.1 A causal inference draws a conclusion about a causal connection based on the conditions of the occurrence of an effect. Premises about the correlation of two things can indicate a causal relationship between them.

5.5 Prediction

5.5.1 A prediction draws a conclusion about a future individual from a past sample.

Proportion Q of observed members of group G have had attribute A.
Therefore:
There is a probability corresponding to Q that other members of group G will have attribute A when next observed.

5.6 Argument from authority

5.6.1 An argument from authority draws a conclusion about the truth of a statement based on the proportion of true propositions provided by an authoritative source. It has the same form as a prediction.

Proportion Q of the claims of authority A have been true.
Therefore:
There is a probability corresponding to Q that this claim of A is true.

5.6.2 For instance:

All observed reports in newspapers are true.
Information X came from a newspaper.
Therefore - Information X is likely to be true.

5.7 Inductive fallacies

- Generalisation

5.7.1 A conclusion drawn where there is little or no link between the premises are usually over-generalisations – and therefore cannot be said to be likely.

5.7.2 An over generalisation of examining just one or very few examples, and assuming that to be representative of the whole class of objects or phenomena.

Many speeding tickets are given to teenagers.
The subject is a teenager
Therefore - The subject drives fast (ie as all teenagers drive fast).

5.7.3 In this example, the premise is built upon a certainty; however, it is not one that leads to the conclusion. Not every teenager observed has been given a speeding ticket. In other words, unlike "the sun rises every morning", there are already plenty of examples of teenagers not being given speeding tickets. Therefore the conclusion drawn can easily be true or false (perhaps more easily false than true in this case), and the inductive logic does not give us a strong conclusion. In both of these examples of weak induction, the logical means of connecting the premise and conclusion (with the word "therefore") are faulty, and do not give us a strong inductively reasoned statement.

- Biased sample

- Misleading vividness is a kind of hasty generalisation.

- Biased interpretation of results

Where the interpretation of the relevant statistic is "massaged" by looking for ways to reclassify or re-quantify data from one portion of results, but not applying the same scrutiny to other categories.

- Correlation fallacies

  Correlation fallacies are logical fallacies based on a relationship between two statements where one must be false and the other true – hence where premises breach the Law of Non-Contradiction.

6. VALIDITY AND PROOF

6.1 Formal logic is deductive rather than inductive.

6.2 In contrast to deductive reasoning, conclusions arrived at by inductive reasoning do not necessarily have the same degree of certainty as the initial premises. Inductive arguments are never binding, though they may be cogent. Inductive reasoning is deductively invalid.

6.3 You can see that Inductive Reasoning is commonly applied. However, if Inductive Reasoning by its nature does not give a certain result, it cannot be said that the conclusion logically follows. That could only be said where the conclusion is proved deductively. If an inductive argument is disproved, then the proposed conclusion must not be correct. For a (valid) deductive conclusion to be wrong, one or more of the premises must be false.

7. EXAMPLES

7.1 Having covered the above, we should attempt to apply logic to some standard legal principles.

- Example 1

  In a case of money owing for breach of contract, a defendant might seek to defend on the basis that there was a misrepresentation received after the contract was made.

  Such conclusion can be disproved by *Reductio ad absurdsum.* If it was assumed that the defendant did rely upon the representation when entering the contract, he must have known about it at the time of the contract, namely before it occurred. As that is absurd, the alleged conclusion must be false.

- Example 2

  In a pleading, you might allege:

  A contract provides that in the event of X occurring, then person A has a right to terminate.
  Event X has occurred.
  Therefore, person A has a right to terminate.

  You can see that the conclusion is dependent upon the premises being correct – ie the contract including the term alleged and that the event has occurred.

- Example 3

  The rules require that leave of the court to withdraw an admission in a pleading;
  X wishes to withdraw an admission in a pleading
  Therefore X needs leave of the court

You will note that the general proposition of law is stated (major premise), then the relevant fact (minor premise) giving the conclusion.

- Example 4

  S. 56AF(3) QBCC Act provides that if 28 days expires after an excluded person notices is served, with no activity from the licensee, the licence must be cancelled.
  If 28 days expires after a 56AF(2) notice with no activity from the licensee…
  ... then the licensee must be cancelled.

- Example 5 [based on the McNab case]

  S. 33 QCAT Act provides that an Application for Review must be filed within 28 days after "the day the Applicant is notified of the decision".
  S 109A QBCC Act provides that a notice may be posted, and refers to s. 39 Acts Interpretation Act. s. 39A AIA explains that service by post is taken to have been effected at the time at which the letter would have been received in the ordinary course of the post.
  Therefore, service of the notice is taken to have been effected at the time the notice would have been received in the normal course.

8. CONCLUSION

8.1 The words you use are important. You cannot convey your point if your words do not give the meaning intended.

8.2 You can prove a point in a number of ways.

8.3 By identifying the contradiction of the point you want to prove, applying the "law of the excluded middle" and the "law of non-contradiction", you can disprove the opposite of your argument, thereby proving your point.

8.4 You can also prove an argument by deductive reasoning.

8.5 Arguing by merely inductive reasoning may give you a likely answer, but not undisputable proof.

8.6 If you bear these issues in mind when making arguments, then your arguments will be more compelling – or at least you will know when they are and when they are not. Similarly, applying logic to the opposing side's arguments will reveal the truth or fallacy of their argument.

8.7 Much of the above sounds common sense. However in practical application it can be quite difficult to apply. Many lawyers fail to apply logic to the substantial detriment to their submissions.

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